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# **University of Southampton**

Faculty of Social Science

School of Education

## **Advancing Environmental Literacy Training for Instructors of Outdoor Adventure Activities**

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by

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Thesis for the degree of Doctor of Philosophy

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# University of Southampton

## **Abstract**

Faculty of Social Science

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Many commercially led outdoor adventure activities (OAAs) are expected to increase clients' environmental connections and pro-environmental behaviours. The reality of sustained environmental outcomes however is uncertain, with previous literature emphasising the need for instructors to have environmental knowledge and skills for outcomes to be successful. Due to a lack of available training for instructors on environmental facilitation, the purpose of this research was to create an evidence-based course for instructors on environmental literacy development, to upskill instructors and increase the potential for sustained environmental outcomes.

I used a design-based research (DBR) approach and conducted four phases of iterative research to identify seven design principles in response to the overarching research question; *“What are the characteristics of an effective course for outdoor instructors aimed to advance environmental literacy development through outdoor adventure activities (OAAs)?”*.

Three of the four phases involved empirical research. Phase 1 was informed by theory to produce a first draft of course material based on a framework for environmental literacy pedagogical and andragogical content knowledge (EL-PACK), belief in ability to teach (BiAtT), and the components of environmental literacy. Phase 2 conducted expert appraisals (n=6) to assess the face validity of the course material. Phase 3 involved a pre-course survey and four iterations of course trialling and modification with instructors (n=32). Phase 4 collected evaluative data from a post-course survey (n=17) and interviews (n=8) with instructors. Data were analysed qualitatively and discussed in interim discussions following each empirical phase to influence the development of the design principles and the subsequent phase of research.

In addition to underpinning seven characteristics of an effective course, the research contributes to the academic body of literature around (1) the rhetoric reality gap between environmental outcome expectancy and actual long-term pro-environmental outcomes, (2) instructors' ability (EL-PACK and BiAtT), motivation and opportunity (AMO) for integrating environmental conversations and activities into OAAs, and (3) instructor learning preferences.

The development of the environmental literacy course also contributes on a practical level to move the outdoor sector forward towards a more sustainable paradigm. The sector would benefit from such a course being endorsed by National Governing Body (NGB) organisations to supplement qualification progression. This would give rise to more instructors learning how to integrate environmental conversations and activities into OAAs, and a greater likelihood of environmental outcome expectancies being met.

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## Research Thesis: Declaration of Authorship

Print name: Ella Rose Sutton

Title of thesis: Advancing Environmental Literacy Training for Instructors of Outdoor Adventure Activities

I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission

Signature: .....Date:.....

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My PhD would not have been possible without any of you. Thank you.

## Definitions and abbreviations used in this thesis

Environmental literacy .....A process of engaging with the environment, through knowledge, emotion, and experience, to enable competent decision making and to empower individuals to take some form of positive action to benefit the environment.

Inclusion of Nature in Self Scale (INS)      An instrument created by (Schultz, 2002) to understand *“the extent to which an individual includes nature within his/her cognitive representation of self”* (p.67).

National Governing Body (NGB)      An organisation that governs and administers a sport on a national basis.

Nature.....An outdoor space that provides home for living organisms, flora and fauna, where the physical processes of Earth are encountered and relied upon.

Nature connectedness .... *“A measurable psychological construct that moves beyond contact with nature to an individual’s sense of their relationship with the natural world”* (University of Derby, no date).

Outdoor adventure activities (OAAs)Activities that promote *“engagement with the natural environment in a physically challenging manner, where an element of skill and perceived risk are central to the experience and the participant seeks to appreciate the aesthetic qualities of the natural environment in a peaceful manner”* (WATO, 2020, no page number). It should be noted that the definition of OAAs used for this thesis (and called ‘Outdoor Adventure Activities’) is slightly different to the ‘OAA’ used by the National Curriculum, which is ‘Outdoor and Adventurous Activities’ (see Oxford Cambridge and RSA (OCR), no date). While National Curriculum OAA includes adventurous activities that take place indoors (e.g. indoor climbing or indoor skiing), the current definition refers only to adventure activities that take place outside. A list of outdoor adventure activities is provided on the Welsh Adventure Tourism Organisation’s website (see WATO, 2020).

Outdoor centres.....Centres that offer outdoor adventure activities for tourists, families, corporation groups and/or schools.

## Definitions and abbreviations used in this thesis

- Pro-environmental behaviours (PEBs)      Some form of positive action to benefit the environment.
- Specific learning differences (SpLDs)      “*An overarching term for a number of associated learning differences that affect the way information is learned or processed*” (*The British Dyslexia Association, no date*). The use of ‘differences’ as opposed to ‘specific learning difficulties’ was chosen to align with current good practice as recommended by (Hudson, 2024); to respect that differences can be advantageous as well as having downsides.

# Chapter 1 Introduction

## 1.1 Overview of the research problem

Since the industrial, scientific, and technological revolutions, it is claimed that society has become increasingly distanced from nature, both physically and psychologically (Merchant, 2006; White, 2013; Ducarme and Couvet, 2020). Consequently, children and adults are being encouraged to spend more time outdoors to develop an understanding of how humans and nature interact, to inspire emotional affiliations with nature, and to motivate pro-environmental behaviours (PEBs), as well as for their own physical and mental health (Moore, 1997; McCurdy *et al.*, 2010; Ryan *et al.*, 2010; Kamitsis and Francis, 2013; Capaldi *et al.*, 2014; Kuo, 2015; Hamman and Iltzan, 2016; Williams *et al.*, 2018; Kuo *et al.*, 2019; Reas, 2020; Spaltenstein *et al.*, 2020).

One way to engage and interact with nature is through participation in outdoor adventure activities (OAAs) (Pomfret *et al.*, 2023). Activities such as surfing, rock climbing, coasteering or hill walking immerse individuals in nature and require constant interactions between themselves and a dynamic environment. They provide ideal locations to appreciate the magnitude and forces of nature as well as its aesthetic beauty, while proving exhilarating experiences. There is, however, a marginal proportion of the population that have available access, resources, and knowledge to be able to safely enjoy these activities at their own leisure.

In recent years there have been various outdoor businesses established, offering a range of opportunities from half day on-site activities to residential or expedition adventures. OAAs have been documented to increase emotional connections to nature (Palmberg and Kuru, 2000; Martin, 2004; Harrison, 2010; Ross *et al.*, 2014; Hanna *et al.*, 2019; Huynh and Torquati, 2019; Moseley *et al.*, 2020; Pomfret *et al.*, 2023), which in turn are expected to increase participation in some aspect of pro-environmental behaviours (Nisbet *et al.*, 2009; Pereira and Forster, 2015; Braito *et al.*, 2017; Lumber *et al.*, 2017; Klaniecki *et al.*, 2018; Deville *et al.*, 2021). However, it has also been argued that effectively developing environmental knowledge, emotional affiliations and/or inspiring pro-environmental behaviours cannot be a predetermined outcome of the activities, for it is, at least partially, reliant on the competency of the instructor (Lonergan and Andresen, 1988; D' Amato and Krasny, 2011; Collins and Brymer, 2018; Huynh and Torquati, 2019).

Academics and organisations promoting best practice in the outdoor sector have recognised the opportunities outdoor instructors and educators have in increasing their clients' environmental understanding. The Institute for Outdoor Learning (IOL) is the UK based professional body for facilitators of outdoor activities that promotes learning, increased health and wellbeing and

environmental awareness (Institute for Outdoor Learning, 2021a). The IOL offers a high standard of professional development for individuals and organisations through facilitating accredited courses, continued research, networking, and guidance to increase both the participation in, and the quality of, outdoor learning provision (Institute for Outdoor Learning, 2021c). A statement issued by the Institute for Outdoor Learning (2021b, no page number) declares “*outdoor professionals are ideally placed to influence and educate the children, young people and adults we come into contact with about climate change and biodiversity threats, impact and possible solutions*”. However, while the promotion of environmental awareness is a fundamental intention of the IOL, there is a lack of courses available for outdoor instructors on how to incorporate environmental teaching and learning (environmental communication) into the facilitation of activities (Langley, 2010). Therefore, despite recognising the potential of the activity setting and the ability for professionals to influence participants, there is no means of ensuring instructors have the knowledge or competencies themselves to effectively support or educate others about environmental concepts.

There has been a long-held assumption in the practice of outdoor activities, that location and time are sufficient for heightening environmental development, through the intimate contact and experience of nature (Moseley *et al.*, 2020; Pomfret *et al.*, 2023). This notion however has been challenged by the likes of Lugg (2007), D’ Amato and Krasny (2011), Long *et al.* (2018) and Collins and Brymer (2018) who stress the importance of an environmentally knowledgeable instructor, if environmentally-related outcomes are to be successful. With reference to outdoor education rather than specifically OAAs, Lugg (2007, p.106) highlights:

*“[the possibilities of outdoor education contributing to the development of environmental awareness] reinforces the importance of the teacher’s knowledge and skills to frame and facilitate this learning and to maximize serendipitous opportunities for developing environmental learning and/or sustainability literacy. **It is not merely a matter of exposing people to outdoor experiences and hoping that they become infused with environmental awareness or sensitivity**”* (my own emphasis added).

O’ Connell *et al.* (2005) express a similar recognition for the potential of OAAs, highlighting the instructor to be key for effective learning. O’ Connell *et al.* (2005, p.82-91) write:

*“Nature-based tourism professionals are in a unique position to encourage others to develop and practise sustainable living [...] It has become fundamentally clear that sustainable education training in outdoor recreation rests on the curricula planners and instructors who teach in this exciting and rapidly growing area”.*

Despite these statements being made over 15 years ago, there has been little research to evidence any action that has been taken to address instructor knowledge and competencies in developing client environmental awareness, knowledge, or sensitivity. In 2020, Moseley *et al.* continued to vouch that, “*for the greatest impact on students, educators should develop lessons that explicitly emphasize human connectedness to the environment as a specific learning experience outcome, integrated throughout all stages (pre-, during, and post-) of a field trip*” (p.247). Therefore, while aimed at outdoor education for school students, Moseley *et al.* (2020) are highlighting how outcomes of outdoor field trips or activities remain limited, unless the facilitator can actively emphasise connections in a briefing of the activity, during the activity, and in a review.

In a position statement on climate change and biodiversity, issued by the IOL, a highlighted expectation of outdoor professionals is that they “*ensure their professional training and CPD equips them to provide accurate information, education and advice on climate change and biodiversity*” (Institute for Outdoor Learning, 2021b, no page number). This highlights the importance of accurate context knowledge, in addition to knowledge of communication and delivery methods. However, while this is an expectation of IOL, it is knowledge that instructors are expected to have or learn themselves through self-directed means, rather than it being a standardised or mandatory training.

Awards certified by relevant National Governing Bodies (NGBs) exist to enable outdoor professionals to enhance their knowledge and skillset to facilitate safe activities for other people. Some governing bodies exist on an international level, such as the Union of International Mountain Leader Associations, which governs the International Mountain Leader Qualification. Other governing bodies however exist on a national level, such as Paddle UK, the British Surfing Association, the French Ski Federation, and the Australian Rafting Federation, etc.

Within some of the courses provided by NGBs, there has been an introduction of modules dedicated to learning about the local environment, its sustainability, and our responsibility as users of the environment to protect and ensure we have minimal impact (for example, see British Canoeing Awarding Body, 2018). Although this is an integral aspect of developing the environmental literacy of instructors, it does not cover pedagogic practices related to how the instructor can use their skills and knowledge to effectively influence their clients. Instructors may therefore have appropriate environmental knowledge, but not the necessary pedagogic skills to apply the content knowledge into an OAA context.

While it is therefore recognised that instructors are likely to hold some degree of knowledge about the biodiversity and climate impact in the specific environments they work in (Langley, 2010; Sutton, 2019), it cannot be assumed that instructors are aware of practices to effectively

communicate this information to increase the environmental literacy of others. Missing from the outdoor sector in the UK is a course reflecting environmental education and practice (Langley, 2010) to increase instructors' ability to engage their clients with environmental knowledge, attitudes, skills, and pro-environmental behaviours (environmental literacy).

The problem is that resources are not available for outdoor instructors without them searching the internet or books themselves. There is no standardisation or mandatory learning that instructors are required to carry out, yet the expectation and significance of OAAs is still being promoted as a vehicle for inspiring nature connections, increasing environmental awareness, and motivating environmentally responsible behaviours. This presents a rhetoric-reality gap, where clients' environmental outcome expectancy is beyond the ability of many instructors (Weiler and Kim, 2011). This is not a representation of the quality of outdoor instructors, but rather a lack of opportunity for them to learn how to meet these environmental-teaching related expectations. It highlights a need for professional development in the outdoor sector that responds specifically to evolving expectations, emphasising a consideration for environmental communication, context knowledge and behaviour change.

### **1.2 Purpose and potential impact of the research study**

Environmental teaching requires a knowledge and understanding of environmental content and an ability to teach. In formal education, the practice of environmental teaching and teacher ability has been well researched (Tuncer *et al.*, 2009; Kennelly, 2012; Boubonari *et al.*, 2013; Saribas *et al.*, 2014; Markos *et al.*, 2017; Saribas *et al.*, 2017), however in OAAs, environmental knowledge and belief in ability to teach have received little attention. Despite this, many outdoor centre websites promote their ability to develop nature connectedness, environmental awareness, or environmental attitudes (McClure *et al.*, no date-b). Furthermore, OAAs are regularly used as an intervention for assessing environmental development particularly with school children on residential trips (Talebpour *et al.*, 2020), and (Mullenbach *et al.*, 2019).

To research the rhetoric reality gap mentioned above between the sector's expected contribution to environmental literacy and instructors' ability to facilitate such outcomes, a design-based research (DBR) approach was utilised. The DBR approach facilitated the identification and exploration of design principles that should be applied for the development of an effective course for outdoor instructors, to promote environmental literacy development. An environmental literacy course was created informed by literature and was revised and improved based on data collected from expert appraisals, phases of course trialling and post-course evaluations. This approach to the research reflects the future nature of the course which is not a fixed product but



a flexible and adaptive intervention that responds to social and environmental factors. Using the design principles identified within this research, the intention for the course is that it will continue to evolve in response to new environmental challenges that may emerge on a local and global scale (such as biodiversity loss, climate anxiety, land-use changes), following the completion of the research.

The research attempts to progress the outdoor sector in its environmental contribution and enhance the credibility of OAAs as a respected means to developing lasting environmental knowledge, attitudes, and behaviours. The study contributes to education and learning in a practical manner for the outdoor sector by creating a viable course that teaches instructors about environmental literacy and how effective communication and activities can empower clients to adopt environmentally responsible behaviours.

The study is focused on the professional learning development of outdoor instructors, not the direct environmental literacy outcomes of their clients. While improved pro-environmental behaviours (PEBs) among clients is a desired long-term outcome, this is not within the scope of the research. Table 1 presents an overview of the research scope and how it addresses the gap in literature and practice. The literature gap will be further explored in the literature review (see Chapter 2).

Table 1: Overview of the research scope and how it addresses the gap in literature and practice

| <b>Literature/practice gap</b>                                                                                                                                 | <b>How this study responds</b>                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| OAAAs often emphasise the ability to enhance connections to nature and environmental awareness, but there is a lack of environmental training for instructors. | Underpins design principles for developing a course for outdoor instructors grounded in environmental literacy theory.               |
| Research has not explored instructors as facilitators of environmental literacy, focusing instead on student or client outcomes.                               | Focuses on instructor learning and pedagogical and andragogical considerations and belief in ability to teach about the environment. |
| Scarcity of empirical studies on what makes environmental literacy training effective in outdoor adventure settings.                                           | Evaluates and refines course design through participant experience.                                                                  |

### 1.3 Rationale for the project

There is increasing pressure being placed on outdoor education and outdoor recreation as a means for inspiring a deep love for our planet that (re)connects people with nature and motivates environmentally responsible behaviours. Outdoor education in schools is recognised to enhance knowledge and understanding of the environment, to guide morals, and increase skills and abilities to change behaviour (Lugg, 2007; Hockley and Humberstone, 2012; Nicol, 2014; North, 2015; Coates and Pimlott-Wilson, 2019; Cudworth and Lumber, 2021; Harris, 2021; Pirchio *et al.*, 2021; Asfeldt *et al.*, 2022). While some schools have timetabled outdoor education lessons, or Forest School, others out-source the experiences to centres that offer residential trips packed with OAAs. The experiences provide different aspects of learning for the students, travelling to a new place, staying away from home (possibly for the first time), and participating in new and exciting OAAs. However, unlike teachers, outdoor instructors are not required to take any teacher training, and do not necessarily have the qualification, ability, or motivation to educate about the environment during their activities. Moreover, whilst it is understandable that environmental knowledge and teacher training may not be a prerequisite of being an outdoor instructor, there is currently no certified means for instructors to progress with their environmental teaching or communication skills, should they wish to.

Outdoor centres offering OAAs (henceforth ‘outdoor centres’) predominantly facilitate activities run by instructors with a recognised qualification to safeguard their company and ensure their clients’ safety. The summer mountain leader (ML) award for example is mandatory for instructors leading multi-day trips involving wild camping and moving over steep ground, and the rock-climbing instructor (RCI) award is mandatory for leading outdoor climbing; the list goes on. However, when it comes to outdoor centres claiming to increase clients’ nature-connections, environmental awareness or environmental understanding, there is no qualification or certification to ensure their instructors can fulfil these outcomes. To increase the credibility of outdoor centres and instructors being able to contribute to the development of environmental values, there is a need for a standardised course tailored specifically for outdoor instructors.

### 1.4 Positionality

It is important to state how my background and personal experience relates to this research and to acknowledge the possible consequent biases which may have impacted how I engaged with the research.

I have worked as an outdoor instructor since 2014 and have completed various training and qualifications enabling me to deliver, or assist in the delivery, of OAAs on land, rivers, and at sea.

In 2019 I graduated with a BSc(Hons) from the University of Worcester, in Outdoor Adventure Leadership and Management. Modules on the sustainability of outdoor adventure were of particular interest to me. I became aware of the damage our activities can cause, yet how simultaneously the sector is prided (and prides itself) on creating connections with nature and influencing an environmental ‘love’ that drives responsible behaviours.

I approach this research as an academic, using design-based research to explore, identify and contribute to solving a real-life problem. Although I believe I have remained as objective and impartial as possible throughout the study, I accept that my interest and determination for the research has been shaped by my personal experiences within the sector and my belief that instructors of OAAs can be doing more to reduce their impact on their activity surroundings, and can have a greater influence on clients’ knowledge, attitudes, skills, and pro-environmental behaviours.

The language used for the thesis (e.g. the vocabulary, terms and way concepts are expressed) is not always the same as the language used in the presentation of the course. This is because the academic language is not always suitable for the outdoor instructor audience and could risk instructors disengaging from the course material. Likewise, the conceptual framework developed (see Chapter 3) has been used to shape the development of the course and can be used as a guide for other academics. The framework and references to pedagogical and andragogical content knowledge however are not used in communications with outdoor instructors. Where appropriate, I have provided simplified models (e.g. of environmental literacy) to increase instructor interest and understanding.

## 1.5 Structure of the thesis

### Overarching research question:

This study uses a design-based research (DBR) approach to find design principles that help us understand a given context. For this kind of research, Plomp (2010, p.19) recommends asking “*what are the characteristics of an <intervention X> on the purpose/outcome of Y ( $Y_1, Y_2, \dots, Y_n$ ) in context Z*”. In keeping with this recommendation, my overarching research question asks:

*“What are the characteristics of an effective course for outdoor instructors aimed to advance environmental literacy development through outdoor adventure activities (OAAs)?”*

The formation of design principles is a key feature of DBR, however Shah *et al.* (2015) has warned that research papers using DBR have focused too much on the outcomes of the whole project, and not enough on the findings from the phases within. To overcome this, I present an interim discussion at the end each empirical phase of research to discuss how the phase has influenced the development of the design principles, as well as practice. As these discussions are presented within the thesis, I do not have a final stand-alone discussion chapter, but a concluding chapter which underpins how the newly formulated design principles inform the characteristics of an effective course for outdoor instructors, aimed to advance environmental literacy development through OAAs.

An overview of the chapters is as follows:

**Chapter 2** is a literature review outlining the rhetoric reality gap between OAAs and environmental outcomes. It is presented in three parts.

Part I introduces the subject broadly; it identifies the research audience, highlights the environmental contradiction in OAAs and introduces environmental literacy.

Part II looks at the characteristics of OAAs that intend to increase client environmental literacy. Specifically, (a) the methods of facilitation, and (b) the knowledge and competencies needed by outdoor instructors to increase client environmental literacy.

Part III looks at existing courses and how they can be used to influence the development of an environmental literacy course.

**Chapter 3** presents a conceptual framework for increasing environmental literacy in OAAs.

**Chapter 4** summarises the overarching research methodology used to carry out the research.

**Chapter 5** presents the material created for the course (a handbook and presentation slides).

**Chapter 6** looks at what the characteristics are of an effective environmental course for outdoor instructors, according to experts in the outdoor sector. The chapter details the methodology used for conducting expert appraisals and presents an analysis of findings and implications for course modification. The chapter concludes with an interim discussion, presenting six preliminary design principles.

**Chapter 7** details the methodology and findings of the pre-course survey. The chapter concludes with an interim discussion to present how the findings contribute to the design principles.

**Chapter 8** details the methodology for carrying out the iterations of course trialling and modification. The chapter gives an analysis of findings followed by an interim discussion.

**Chapter 9** details the evaluation phase of the research. The chapter presents the methodology for carrying out the post-course survey and follow-up interviews and gives an analysis of findings. The chapter concludes with an interim discussion to refine and present the final design principles.

**Chapter 10** summaries the research findings. It presents seven characteristics of an effective course for outdoor instructors in response to the research question, as well as my reflections and recommendations for future work.

## Chapter 2 Literature review

The literature review is presented in three parts:

Part I introduces the subject broadly; it identifies the research audience, highlights the environmental contradiction in outdoor adventure activities (OAAs) and explores the concept of environmental literacy.

Part II looks at the characteristics of OAAs that aim to increase client environmental literacy (EL). Specifically, (a) the methods of facilitation, and (b) the knowledge and competencies needed by outdoor instructors to increase client EL.

Part III looks at existing courses that can be used to influence the development of an environmental literacy course.

### 2.1 Part I

#### 2.1.1 Outdoor adventure activities (OAAs)

Humans have a longstanding history of exploration and adventure. From sailing to find new lands, to climbing the highest peaks, submerging to the depths of the ocean, and inventing the means to travel to outer space, the flare for adventure is engrained within many of us. It might be curiosity about what has not yet been physically encountered by human eyes or feet (Launius, 2019), challenging one's physical and/or mental comfort zone (Kerr and Houge Mackenzie, 2012; Lynch and Dibben, 2016), or craving an interaction or closeness with nature or place that we are removed from in everyday life (Kerr and Houge Mackenzie, 2012; Lynch and Dibben, 2016; Giddy and Webb, 2018). Some adventurers have been called thrill-seekers and adrenaline junkies, however the adventurers themselves often recall different identities and motives which focus on place attachment, connections, and management of risk (Brymer *et al.*, 2009; Brymer and Gray, 2009; Holland-Smith and Olivier, 2013; Sharma-Brymer *et al.*, 2017; Carter, 2019). As well as feelings of excitement and thrill, outdoor adventure can also prompt feelings of calm, focus and peace (Brymer *et al.*, 2009; Sharma-Brymer *et al.*, 2017; Houge Mackenzie and Brymer, 2020).

While OAAs have been associated with extreme, high-risk activities and expeditions (Brown and Fraser, 2009; Mullins, 2014), they are now more frequently associated with outdoor education,

tourism, and recreation (Martínez and Mackenzie, 2022). Commercially led OAAs usually take place in remote, picturesque places (Giddy and Webb, 2018; Immonen *et al.*, 2022; Pomfret *et al.*, 2023). Groups are led by trained professionals into often wild, secluded, and beautiful areas whether it be on land, shore, lake, or sea where they can take advantage of a natural playground, and are provided with a safe opportunity to experience the thrill of an activity, while being exposed to a spectacular environment they may not otherwise be able to see (Beringer, 2004; Sutton, 2023). Despite little need for skill, and little real risk (Dickson and Dolnicar, 2004; WATO, 2020), activities can still require physical and mental determination, elicit an element of vulnerability, and provide memorable experiences (Pomfret *et al.*, 2023). Through these experiences, children and adults have reported enhanced teamwork (Cooley *et al.*, 2016; Nurlaela *et al.*, 2017; Prince, 2021), communication (Huff *et al.*, 2003; Prince, 2021), confidence (Merenda, 2021; Prince, 2021; Benham, 2023), physical and mental health (Pomfret *et al.*, 2023), and feelings of connection to nature (Brymer *et al.*, 2009; Barton *et al.*, 2016; Hanna *et al.*, 2019; Talebpour *et al.*, 2020; Zafeiroudi, 2020; Schwass *et al.*, 2021; Puhakka, 2023).

The definition of OAAs used in this thesis is from the Welsh Adventure Tourism Organisation's (WATO) definition of adventure (see WATO, 2020, no page number).

*“Engaging with the natural environment in a physically challenging manner, where an element of skill and perceived risk are central to the experience and the participant seeks to appreciate the aesthetic qualities of the natural environment in a peaceful manner.”*

The WATO definition was chosen for the research as it is a current definition used by an organisation that promotes best practice within the sector. It is a definition that is not just based on literature, but also on experience and the real-world practice of OAAs.

It is recognised that not all participants of OAAs might ‘seek to appreciate the aesthetic qualities of the natural environment in a peaceful manner’. However, in response to current societal challenges (Brown and Beames, 2017), I believe a focus of OAAs should be to promote environmental engagement and learning in a responsible and sustainable way, to empower subsequent pro-environmental behaviours.

### **2.1.2 Bridging the gap between outdoor education, adventure education and adventure tourism**

OAAAs are referred to or conducted through both formal education (e.g. Forest schools, teacher-led outdoor education and through school trips), and recreation (e.g. commercial outdoor sector, tourism, and for personal recreation) (Brown and Beames, 2017). The expectations and outcomes, depending on who the activity is being facilitated by can change significantly. However, as there are many terms used interchangeably to describe OAAs in different contexts, differentiating between them can be challenging (Turčová *et al.*, 2005; Rantala *et al.*, 2018; Janowski *et al.*, 2021).

Adventure education has resembled traditional practices as influenced by the likes of Lord Baden-Powell (The Scouting Movement) and has associations to uncertainty, risk and danger (Brown and Beames, 2017). Introduced in the early 20<sup>th</sup> century, Scouting reflected the (now contested) values and beliefs of the time, such as racism, homophobia, masculinity and imperialism (Brookes, 2016). The intention of adventure education was to physically prepare the next generation of British soldiers (Warren, 1986; Brown and Beames, 2017) by increasing physical skill, mental resilience, toughness, morality and bravery (Loynes, 2002; Maher, 2016), through practising military-style physical challenges (Loynes, 2002).

The approach to adventure education began to change in the 1930's to focus on increasing qualities of personal development through outdoor education in schools and outdoor centres. Expropriated from Germany, Kurt Hahn moved to the UK and founded Gordonstoun School in Scotland, where he sought to use a combination of indoor and outdoor practice to achieve principles of equality, personal responsibility, self-respect, and community service (Freeman, 2011; Priest and Gass, 2018). In 1941 alongside Lawrence Holt, Hahn established the first Outward Bound School in Aberdyfi, Wales, where the ambition was to enhance sailors' character, develop personal growth, and increase self-esteem and personal confidence through activities that replicated being at sea (Kelly and Potter, 2011; Priest and Gass, 2018). This initiated a popularisation of outdoor centres across the UK, offering both educational trips for schools (outdoor and/or adventure education), as well as guided activities for tourists and other paying consumers (recreation and/or tourism) (Cooper, 2018).

Now more commonly associated with schools is the term 'outdoor education' as opposed to 'adventure education', though outdoor education remains influenced by the work of John Dewey (Prins and Wattchow, 2020), Kurt Hahn, and Paolo Friere (Bartunek *et al.*, 2002). It is



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predominantly led by three dimensions; practical outdoor activities, environmental education, and personal and social development (Bartunek *et al.*, 2002; Maher, 2016). The facilitation is commonly centred around Kolb's model of experiential learning, promoting reflection of the experience and action for change (Kraft, 1990). For this research, outdoor education generally refers to formal education situations. Where adventure education is referenced, this generally refers to OAAs facilitated by outdoor companies to schools and/or corporate groups.

Rather than being defined as education, adventure tourism is more commonly associated with recreation (Bailey *et al.*, 2017; Janowski *et al.*, 2021) and is facilitated by outdoor companies. While definitions are disputed, Buckley (2006, p.1) broadly defines adventure tourism as being *“guided commercial tours where the principal attraction is an outdoor activity which relies on features of the natural terrain, generally requires specialised sporting or similar equipment, and is exciting for the tour clients”*. The adventure tourism sector has grown rapidly since Hahn's first Outward Bound school (Cooper, 2018) and in recent years participation in OAAs through outdoor companies has continued to rise (Janowski *et al.*, 2021; Office for National Statistics, 2021b; Outdoor Foundation, 2022; Miller *et al.*, 2023). However, whether these OAAs are classed as recreational and/or educational is still debated.

The purpose of four different types of adventure programmes and their strategies for facilitation was categorised by Priest *et al.* in 1992 (as cited in Priest, no date) and is presented in Table 2. The table highlights differences between the terminology and subsequent expectations and methods of facilitation. However, as outdoor companies often facilitate OAAs both for tourists and school or corporate groups, the structure and balance of recreation to education and/or development/redirection could be expected to change from group to group. According to Table 2, recreation is designed for 'enjoyment, fun and play', is 100% 'doing' the activity, and requires no specific facilitation techniques. This summary has similarities to the definition of adventure tourism by Buckley (2006) and the dimensions of adventure tourism outlined by Janowski *et al.* (2021), highlighting the outdoor activity to be principal attraction, and excitement being the intended outcome for clients. Despite this, many outdoor companies offering OAAs for tourists promote some degree of education and development (particularly environmentally-related) on their websites (McClure *et al.*, no date-b) (see also Sandymouth Surf School, 2020; The TYF Group Ltd, 2020; Blue Peris, 2024; and Pure Outdoor, 2024, to name a few). Furthermore, in contrast to recreation requiring no facilitation techniques (see Table 2), Dymment *et al.* (2018b), states that regardless of the intensity or formality of OAAs, there is an expectation of some form of

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knowledge or skill acquisition, and/or personal development, therefore concluding instructors of OAAs should have some element of pedagogical and facilitation knowledge and skills.

Table 2: The four purposes of adventure programmes by Priest *et al.* (1992, cited by Priest, no date)

| Programme                          | Recreation             | Education                  | Development                | Redirection                 |
|------------------------------------|------------------------|----------------------------|----------------------------|-----------------------------|
| <b>Changes</b>                     | Feeling                | Thinking                   | Behaving                   | Resisting                   |
| <b>Experiential learn. cycle</b>   | ACTION<br>& activities | REFLECTION<br>& discussion | INTEGRATION<br>& metaphors | CONTINUATION<br>& support   |
| <b>Facilitation techniques</b>     | Not needed             | Fundamentals & funnelling  | Frontloading & freezing    | Fortifying & solution-focus |
| <b>Framing</b>                     | Fantasy                | Reality                    | Contextual                 | Isomorphic                  |
| <b>Diagnosis</b>                   | Conversation           | + surveying                | + interviews               | + observation               |
| <b>Design &amp; Delivery Focus</b> | Enjoyment, fun & play  | Concepts & awareness       | Functional habits          | Dysfunctional conduct       |
| <b>Do/Debrief</b>                  | 100% / 0%              | 75% / 25%                  | 50% / 50%                  | 25% / 75%                   |
| <b>Departure</b>                   | Anchors                | + evaluation               | + action plan              | + empowered                 |
| <b>Follow Up</b>                   | Reunion                | Check up                   | Booster                    | Ongoing                     |

The result is confusing; inevitably there is variation within the outdoor sector of companies facilitating recreation, education, development and/or redirection. Common to both education and tourism however is the concept of learning through doing; participants can access elements of personal and social development, physical and mental skills, and engagement with a natural environment, which may have positive environmental repercussions (Pomfret *et al.*, 2023). The degree of these outcomes is dependent on the ethos of the company, the instructor, and the requests of the group.

The current research is predominantly focussed on outdoor instructors who deliver OAAs for outdoor companies. Instructors are expected to work with schools, clubs and corporate groups (adventure education) as well as tourists (adventure tourism) and are therefore expected to deliver OAAs for a combination of recreational, educational, developmental and redirectional

outcomes. Whether these outcomes are focused on personal development, skill, and/or environmental literacy development, however, is dependent on the instructor.

As stated by Brown and Beames (2017), the ‘traditional’ associations of adventure education were instated in response to a societal need (preparation for war), which are now out-dated. Now, despite societal challenges having shifted towards technological, climate, and migration, the adventure sector in its priorities has not caught up (Brown and Beames, 2017).

In response to Brown and Beames (2017), this research focuses on improving the environmental focus within adventure tourism and adventure education by training outdoor instructors. While the opportunity and potential for environmental learning through OAAs has been credited, the reality of the sector moving away from its traditional philosophies and adopting ecocentric motives has been slow moving.

The definition of adventure by WATO (2020) (see Section 2.1.1) could be seen to embrace an era of change which more accurately represents and addresses societal (dis)connection from nature, and prioritises environmental engagement. The natural terrain is recognised as an important feature of outdoor adventure tourism and education (Buckley, 2006; Maher, 2016), not only for facilitating natural playgrounds, but also as a draw for participants to become immersed in nature (Janowski *et al.*, 2021; Pomfret *et al.*, 2023). A report on the economic and social evaluation of the outdoor activity sector in Wales found “*getting closer to nature*” to be a significant driver of visitor participation in OAAs in Wales (Miller *et al.*, 2023, p.17). Furthermore, contrary to the view of OAAs being for adrenaline seeking risk-takers, the benefit of “*adrenaline/excitement*” was rated least important by the 563 respondents (Miller *et al.*, 2023, p.17). This suggests a readiness among participants for a greater environmental focus within OAAs, to learn about human-nature connections and to help address the current societal environmental challenge.

### **2.1.3 The environmental contradiction in OAAs**

OAAs predominantly occur in natural playgrounds (i.e. using Earth’s natural features such as hills, rivers and sea, as opposed to artificial playgrounds) (Beringer, 2004; Giddy and Webb, 2018). The draw of beauty and remoteness fuel the desire of many people to experience mountaineering, climbing, ski-touring and coasteering, to name a few. Yet, by exposing these locations to repetitive human disturbance, it degrades the balance of the natural ecosystems

that exist (Pastor *et al.*, no date). Many outdoor companies pride themselves in being environmental ambassadors, stewards, and educators, yet they may be one of the biggest contributors of direct disturbance the ecosystems are exposed to (Martínez and Mackenzie, 2022). Research on ecological impacts of adventure tourism have highlighted concerns over path degradation and weed seed dispersal from trail walkers and mountain cyclists (Evju *et al.*, 2021; Pickering, 2022); coasteering has shown to have a negative impact on the survival of barnacles due to repetitive tramping (Tyler-Walters, 2005; Sutton, 2020); climbing raises concerns over the preservation of cliff and rock vegetation, as well as causing potential disturbance to birds and ground-nesting species. “How much disturbance or impact is acceptable?”, is a subjective question, especially when balancing economic value, accessibility, inclusion, and business development.

This paints a picture of OAAs in a negative light, however within the sector there are businesses, schools, and individuals taking initiative to drive ecocentric motives and pave the way to more sustainable adventures (Nicol, 2003; Murphy, 2004; Lugg, 2007; Cooper, 2010; Mullins, 2014; Knowles, 2019; Sheldon, 2020; Beames *et al.*, 2022; Martínez and Mackenzie, 2022). Moreover, in a study about instructor knowledge and attitudes towards conservation and the environment, Langley (2010) recognised that despite a lack of environmental training, many instructors are inspired to learn and have positive environmental attitudes.

OAAAs are respected as a vehicle for enhancing connections with nature and sense of environmental awareness (Brymer *et al.*, 2009; Barton *et al.*, 2016; Hanna *et al.*, 2019; Talebpour *et al.*, 2020; Zafeiroudi, 2020; Schwass *et al.*, 2021; Puhakka, 2023). It is hoped that by the end of OAAs, participants might reflect on their position within the environment, their responsibilities, and their future actions (Sutton, 2023). However, this expectation and outcome is uncertain, with scepticism over its success among some (Beery and Wolf-Watz, 2014), and a reliance on knowledgeable instructors and explicit facilitation (Lonergan and Andresen, 1988; O'Connell *et al.*, 2005; Lugg, 2007; D'Amato and Krasny, 2011; Collins and Brymer, 2018; Huynh and Torquati, 2019; Moseley *et al.*, 2020). Furthermore, while most research references short-term pre- and post- intervention designs to understand the influence of OAAs on student environmental awareness or nature connection (for examples, see Mullenbach *et al.*, 2019; Talebpour *et al.*, 2020; and Holland *et al.*, 2025), there has been little evidence of positive environmental impacts being recorded as lasting outcomes (for example, see Prince, 2021).

The purpose of this research was to gain a richer understanding of how OAAs can contribute to individuals adopting sustained pro-environmental behaviours. This was done by exploring the

concept of environmental literacy, and how, by educating outdoor instructors in environmental literacy, they can be more equipped with pedagogical and andragogical competence to positively influence their clients.

### 2.1.4 Environmental literacy

The concept of environmental literacy was introduced by Roth (1968) to bring together the roles of environmental knowledge, skills, affects and behaviours (see Roth, 1992). Initially, there was little attention given to the concept following its introduction, however by 2010 literature addressing the need for environmentally literate citizens increased (Eren, 2020). Although with some degree of variability, the four components as introduced by Roth (1992) (knowledge, skills, affects and behaviours) have maintained the basis of environmental literacy and continue to influence its array of definitions (Simmons, 1995; Disinger and Roth, 2000; Erdoğan *et al.*, 2009; Scholz, 2011; Biswas, 2020; Eren, 2020).

In a report for the North American Association for Environmental Education (NAAEE), Hollweg *et al.* (2011) broadened two of the four components, altering *skills* to *competencies*, and *affects* to *dispositions*. The term *competencies* was chosen to recognise the influence of both abilities (the innate or developed capabilities that support performance), and skills (the learned capacity to perform a specific task or action). In the context of an OAA, an instructor's ability could relate to their physical stamina and strength to carry out the activity, their logical reasoning for conducting dynamic risk assessing, or their attention to detail enabling them to spot wildlife while maintaining a focus on the group. Their skill on the other hand, would be identifying different species, articulating knowledge or recognising environmental changes and offering potential solutions. Dispositions include the highlighted qualities in Roth's understanding of affects (environmental sensitivity, attitudes and values), with the addition of "*personal responsibility, locus of control/self-efficacy, motivation and intention to act*" (Hollweg *et al.*, 2011, p.3-2). This adaption moves values that were in the behavioural component by Roth (1992) (personal responsibility and investment) into an affective component. Furthermore, whilst qualities of motivation and intention to act are not explicitly stated by Roth (1992), they are implied as an overarching necessity to link understanding with engagement. Asserting the qualities within a component of dispositions could therefore be questioned as they no longer underpin the whole of environmental literacy and subsequent behaviour change.

Nevertheless, the four updated components have provided a structure for environmental literacy which has been used to promote its development in multiple disciplines. The components address internal factors to develop cognitive (understanding, skills, knowledge, and abilities) and psychological (emotional investment, personal responsibility, and motivation) cues which together can influence pro-environmental behaviour change (Kollmuss and Agyeman, 2002; Hollweg *et al.*, 2011; Teksoz *et al.*, 2012; Genc and Akilli, 2016; Wong *et al.*, 2018; Natural Resources Wales, 2023).

### **2.1.4.1 Defining environmental literacy**

There has not yet been a universally accepted definition for environmental literacy. Available definitions either did not include the four key components clearly enough, were too detailed, or I felt were written in an inaccessible language for non-academics. Table 3 presents two definitions of environmental literacy, plus definitions of nature literacy, ocean literacy, and carbon literacy. From these definitions, a new, working definition is presented which will be used and referred to throughout the thesis.

Table 3: Definitions of different environmentally based literacies

| Concept                | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Source                                            |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Environmental literacy | [The capacity for] someone who, both individually and together with others, makes informed decisions concerning the environment; is willing to act on these decisions to improve the well-being of other individuals, societies, and the global environment; and participates in civic life.                                                                                                                                                                      | Hollweg <i>et al.</i> (2011, p.13)                |
| Environmental literacy | Knowing and understanding environmental issues; having attitudes, concerns, morals, and ethics towards the environment; having the ability and intention to act with environmentally responsible behaviour; having the active involvement and social engagement related to the environment, as well as having skills to evaluate data and draw conclusions to form one's own opinion and collaboratively working with stakeholders to solve environmental issues. | Kaya and Elster (2019, p.15)                      |
| Ocean literacy         | Understanding your individual and collective influence on the ocean, and the ocean's influence on you.                                                                                                                                                                                                                                                                                                                                                            | The Ocean Literacy Network (2015, no page number) |
| Nature literacy        | The ability to engage with nature, both cognitively and emotionally, and feel empowered to take some form of positive action to benefit nature.                                                                                                                                                                                                                                                                                                                   | Grace <i>et al.</i> (2021, p.17)                  |
| Carbon literacy        | An awareness of the carbon dioxide costs and impacts of everyday activities, and the ability and motivation to reduce emissions, on an individual, community, and organisational basis.                                                                                                                                                                                                                                                                           | The Carbon Literacy Trust (2022, no page number)  |

The definition for the NAAEE report (Hollweg *et al.*, 2011) primarily targets the intended behavioural outcomes of environmental literacy, without highlighting associated factors. In his book 'Environmental literacy in science and society', Scholz (2011) advocates intuitive and experience-based understanding to be key in making informed decisions, however specifies they must be complemented by expert-led conceptualisation and explanation. In the definition by Hollweg *et al.* (2011) it is unclear as to the information source, or type of information held to classify 'informed decisions'. Furthermore, although 'willingness to act on decisions' indicates some degree of affective disposition, it does not indicate a level of skill or ability to do so appropriately.

Kaya and Elster (2019) conducted a review of available definitions, concluding with their own which gives more description into the context of knowledge, dispositions, competencies and behaviours. Their definition is less concise than that of Hollweg *et al.* (2011), however it takes account of a rich selection of published literature and draws on similarities and understandings to detail each of the four recognised components. The definition is credible as an informed description of environmental literacy; however, its descriptive format lends itself to being an expansion of what environmental literacy involves, as opposed to a succinct statement that defines the concept clearly and briefly.

Other definitions of literacies within the scope of the environment (nature, ocean, carbon) are worded more simply, though each highlight a reciprocal awareness between one's own actions and the environment. The ocean literacy definition lacks acknowledgement of psychological, skill and behavioural components, however these are presented in detail within the ten dimensions of ocean literacy (see McKinley *et al.*, 2023). The carbon literacy definition shows an element of the four environmental literacy components; however, the psychological component is reduced to 'motivation' as opposed to acknowledging emotional investment.

Grace *et al.* (2021) underpin the integration of psychological and cognitive components effectively in their definition of nature literacy. It resonates with components of environmental literacy and indicates a likely motivation to participate in pro-environmental behaviours (PEBs). In addition, it emphasises nature literacy will not cue *all* PEBs, but rather it will encourage individuals to make gradual and achievable adjustments to their day-to-day lives.

The concept of nature-literacy was considered for the driver of this research, rather than environmental literacy. However, the idea was dismissed firstly due to the lack of research surrounding nature literacy, and secondly given the broader remit of environmental literacy



relating to social, economic, and cultural aspects. However, the definition influenced the working definition of environmental literacy used for the thesis, which is:

***‘A process of engaging with the environment, through knowledge, emotion and experience, to enable competent decision making and to empower individuals to take some form of positive action to benefit the environment’.***

The addition of ‘competent decision making’ to the definition reflects the importance of skills. It was added because (1) skill is a recognised component of environmental literacy, and (2) in his study on ‘a socio-environmental case for skill in outdoor adventure’, Mullins (2014) concludes that practice must account for skill development and performance for shaping pro-environmental and socioecological behaviours.

A person’s environmental literacy is constantly evolving based on the four components: knowledge and competencies (cognitive), affective dispositions (psychological), and behaviour. Rather than having a fixed end point of ‘being environmentally literate’, it is a continually developing process that we continue to move around (Hollweg *et al.*, 2011).

### **2.1.5 Teaching for environmental literacy**

The goal of developing environmental literacy is that individuals are empowered to take some form of positive action to benefit the environment. Understanding how to develop environmental literacy requires understanding how the four key components (knowledge, skills/competencies, affects/dispositions, and behaviour) interact; whether some are more dominating than others, and whether there is an order of development.

The simplified model of components from the NAAEE report (see Figure 1) suggests competencies to be the integral component for bridging the gap between knowledge and dispositions, and behaviour. Knowledge, competencies, and dispositions interact reciprocally; however, the model suggests an interaction of either knowledge or dispositions with competencies to lead to pro-environmental behaviours (PEBs), within a given context. As competencies are necessary for either route, it suggests the integral component.

The feedback/reflection loop highlights the continuous nature of environmental development; however, it suggests behaviours can reinforce knowledge and competencies, but not directly dispositions. It is unclear whether the model is suggesting knowledge to be a precursor of

dispositions given its positioning in the model, however given that the reflection loop could exist without dispositions to retrieve the same outcome, it suggests dispositions are given low priority.

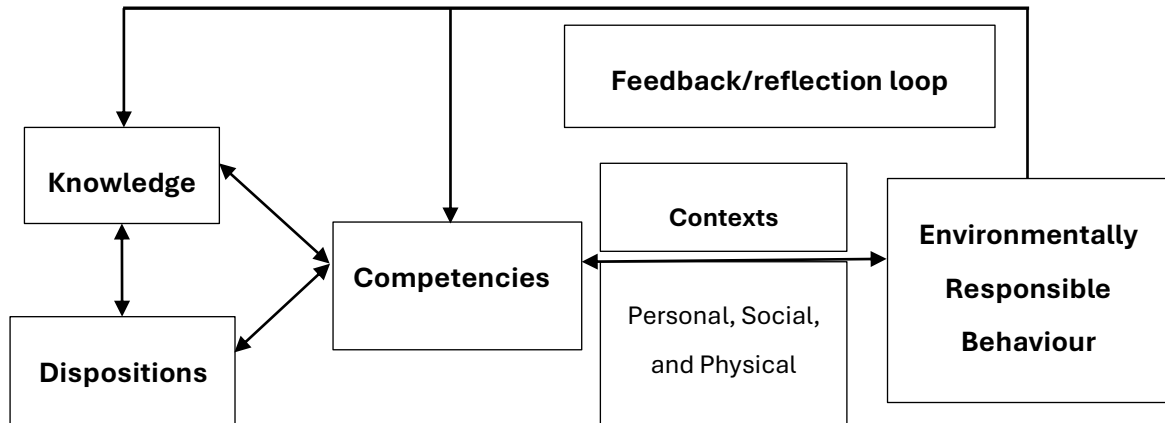


Figure 1: Simplified model of environmental literacy components (adapted from Hollweg et al., 2011, p.17)

Wong *et al.* (2018) present a linear process of environmental literacy through the Theory of Planned Behaviour (TPB) (see Ajzen (1991) (see Figure 2). The framework illustrates the necessary combination of both knowledge and disposition to inform behaviour change. Competencies are included as an element within the spectrum of disposition, providing a potential fast-track option past 'behaviour intention'. In contrast to Hollweg *et al.* (2011), the framework by Wong *et al.* (2018) suggests competencies to be a non-essential component, as elements of knowledge and dispositions alone can lead to PEB. In addition, the framework by Wong *et al.* (2018) suggests knowledge to be a precursor to dispositions but recognises dispositions as integral for influencing behaviour change.

The influence of the TPB model included in the framework by Wong *et al.* (2018) poses an interesting consideration for how different aspects of knowledge, dispositions, and competencies are developed. Knowledge of behavioural, normative and control beliefs affect individuals differently depending on the context they are in, the norms of their social group and the priority of their needs in comparison to sacrifices they may have to make to do the PEB.

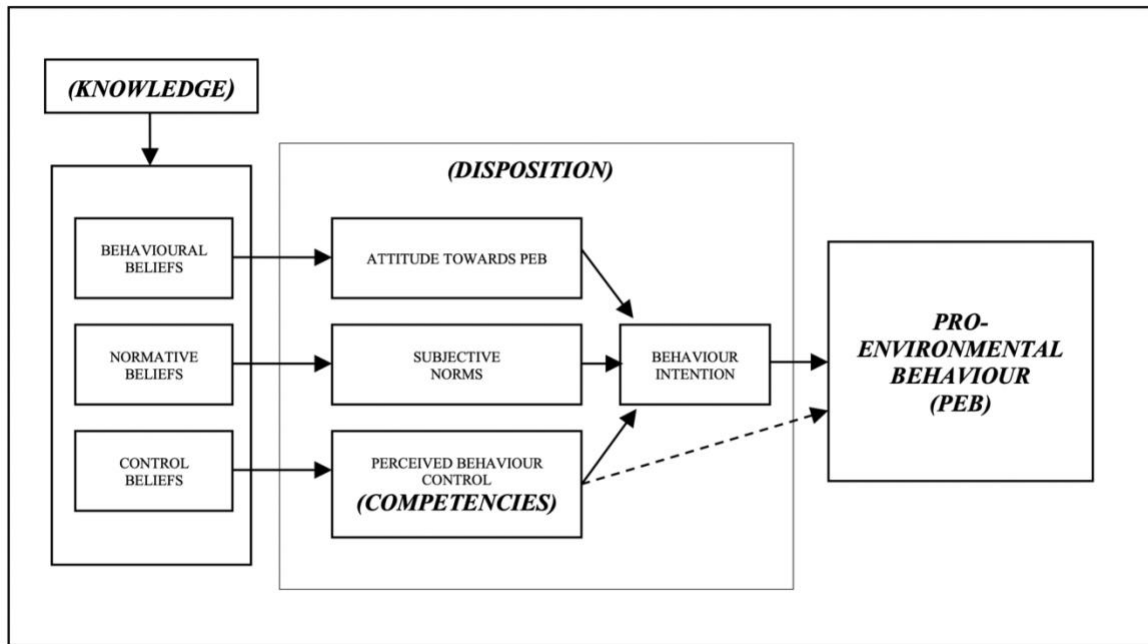


Figure 2: Conceptual framework of environmental literacy development using Theory of Planned Behaviour (TPB) (from Wong et al., 2018)

While not specifying environmental literacy, additional models and theories could be understood to represent the concept and interaction in different ways. Natural Resources Wales (NRW) published a framework of “*natural progression for developing a sustained knowledge, understanding and interaction with nature*” (Natural Resources Wales, 2023, no page number). The progression (see Figure 3) recognises that both a psychological and cognitive connection are necessary to drive behaviour change and presents an order of steps by which such connections are expected to occur. In contrast to the models presented by Hollweg *et al.* (2011) and Wong *et al.* (2018), NRW highlight the psychological connection (dispositions) to occur first. This decision is in line with the work on nature connectedness, which argues the case of psychological connections being superior to the cognitive (Lumber *et al.*, 2017; Richardson and Butler, 2021).

Following the psychological connection in the NRW process is a series of cognitive steps which are moved between in an ongoing process, unique to each person. The linear process of the emotional connection indicates it is a precursor before entering the cognitive phase, however why it could not be revisited and strengthened in a cyclical process like the cognitive phase is unclear.

The framework of Natural Progression by NRW (presented in Figure 3), bears significant differences from the models of Hollweg *et al.* (2011) and Wong *et al.* (2018), however it still resembles the working definition and components of environmental literacy used in this thesis.

## Chapter 2

The working definition of environmental literacy used in this thesis states environmental literacy to be ‘a process of engaging with the environment (step one in the NRW framework for natural progression), through knowledge (steps three and four in the NRW framework for natural progression), emotion, and experience (step two in the NRW framework for natural progression), to enable competent decision making (steps four and five in the NRW framework for natural progression), and to empower individuals to take some form of positive action to benefit the environment’ (steps five and six in the NRW framework for natural progression). Presenting the working definition of environmental literacy alongside the steps of progression listed by NRW it shows that although the steps of progression are all accounted for by the definition, they do not occur in the same order.

The models shown here indicate the variation in understanding of how environmental literacy is developed. There are aspects of all the models which have informed my understanding of environmental literacy development, however by exploring their similarities and differences I concluded there is no one model that accurately and fully represents my understanding. I present my own model of environmental literacy development in Section 3.2.

## A natural progression

An individual has the potential to move from being in and connecting with the natural environment to becoming an active, healthy responsible, ethical citizen able to influence others on the importance of managing our natural resources sustainably now and in the future. When deciding, which intervention should be introduced it is important to understand where an individual is along the Natural Progression.

### A NATURAL PROGRESSION . . . DEVELOPING A SUSTAINED KNOWLEDGE, UNDERSTANDING AND INTERACTION WITH NATURE

#### Emotional Connection

**Step 1**  
Being in the natural environment, enjoying it and feeling comfortable in it

**Step 2**  
Connecting with nature – observing and experiencing

#### Cognitive Connection

**Step 3**  
Developing knowledge of the natural environment, its resources and multiple benefits

**Step 4**  
Understanding own and others impact on nature and why sustainable management is needed

**Step 5**  
Taking a personal position on managing our natural resources now and in the future – values and beliefs

**Step 6**  
Influencing society as an active, responsible and ethical citizen – part of a resilient and prosperous community

#### Multiple benefits of developing a sustained knowledge, understanding and interaction with nature

##### Prosperous

- Environmental employment & volunteering
- Outdoor education & skills
- Attracts investment
- Economic resilience

##### Resilient

- Adapting to climate change
- Flood management
- Improved air & water quality
- Assists biodiversity

##### Healthy

- Increased physical activity
- Better mental health
- Prevention of e.g. obesity, Type 2 diabetes
- Community food growing

##### More Equal

- Accessible spaces & connecting corridors
- Tackles social exclusion
- Deprived communities benefit most

##### Cohesive Communities

- Involvement in design & maintenance instils local pride
- Places to get to know your neighbours
- Stronger community identity

##### Vibrant Culture

- Desirable spaces with Welsh culture & identity
- More visits – arts, sports, recreation
- Creative, expressive, fun opportunities

##### Globally Responsible

- Local & national economic development
- Climate change mitigation
- Meets national & international policies

Figure 3: A process of natural progression for connecting with the natural environment, by Natural Resources Wales

## 2.2 Part II

Part II of the literature review looks at the characteristics of OAAs that aim to increase client environmental literacy. Specifically, (a) the methods of facilitation, and (b) the knowledge and competencies needed by outdoor instructors to increase client environmental literacy.

### 2.2.1 Methods of facilitation used in OAAs to increase components of environmental literacy

There are various methods of facilitation and activities used in practice that are associated with outdoor education and OAAs based on the intention of the activity. OAAs operate with different goals and for different clientele; some seek to improve perceptions of human-nature relationships, while others focus on character building, personal development, expanding comfort zones, or purely adventure. Dyment *et al.* (2018b) recognise the importance of pedagogic content knowledge for outdoor educators and instructors, stressing that any activity facilitated with anticipated outcomes is reliant on some degree of understanding being effectively passed from the instructor to the participant. Furthermore, knowledge of theories, content, policies and beliefs of teaching, and the knowledge of how to appropriately apply the theory to enhance the understanding of another person have been recognised as essential for effective teaching (Watkins and Mortimore, 1999; Alexander, 2008). This overarching understanding about the theory and practice of teaching is termed pedagogy (Shulman, 1986; Simon, 2005; Alexander, 2008; Cree and Robb, 2021), under which a teacher or instructor should have a range of methods or activities for facilitating an interesting and engaging lesson or OAA.

A review of pedagogies used within OAAs was conducted to scope the types of methods and activities of facilitation used to promote environmental literacy development.

EBSCO, Taylor & Francis Online and Google Scholar were used to find data about methods used for engaging clients of OAAs in environmental literacy.

Search terms used are specified in Table 4; these had to be present in the title of the research papers reviewed. Initial search terms under the 'broad context' column were 'outdoor recreation / tourism' and 'adventure recreation / tourism / education', however these retrieved no results. These preliminary searches revealed an inadequacy of literature on pedagogic practices in OAAs. This was unpredicted given the reputation and credit given to such activities, however the lack of literature may not be representative of practice. It is plausible that training, strategies, practices, and activity plans exist internally within outdoor companies (rather than published academically) to enable instructors to deliver activities that meet the company intentions.

Table 4: Search terms used for the literature review to discover methods of facilitation used in outdoor education to increase components of environmental literacy

| <b>Construct – Methods of facilitation</b> | <b>Broad Context – Outdoor adventure activities</b> | <b>Broad Concept – Environmental literacy</b> |
|--------------------------------------------|-----------------------------------------------------|-----------------------------------------------|
| Facilitation                               | Environmental                                       | Literacy                                      |
| Pedagogy / pedagogic / pedagogies          | Nature                                              | Knowledge                                     |
| Pedagogic Content Knowledge                | Outdoor                                             | Education                                     |
|                                            | Adventure                                           | Connectedness / Connection                    |

As pedagogies relevant to the delivery of environmental literacy development through OAAs has not been recorded in literature, the research had to draw from other outdoor education sources. Studies cited in the review reflect pedagogies used to increase at least one component of environmental literacy over a range of time frames. Participants in the studies range from teachers and outdoor educators to undergraduate and postgraduate students, adolescents, and year six primary school students.

The initial data search retrieved 619 articles. To identify the relevant articles within this search, two inclusion criteria were introduced:

1. The discipline of study was outdoor or adventure education / tourism / recreation.
2. The study analysed the use of (at least one) pedagogy in developing (at least one) of the components of environmental literacy.

Analysis of article titles and publication types using the two criteria above reduced the number of relevant studies to 89. Of these 89 journal articles, 28 were relevant based on their abstracts and being fully accessible. After reading the papers in full, 12 were disregarded as they did not meet the inclusion criteria. The remaining 16 articles were re-read in detail and are presented in a table in Appendix A.1.

Findings revealed a range of pedagogies used to promote environmental engagement, most of which targeted the dispositions component of environmental literacy. Environmental knowledge, and competencies were targeted less frequently than dispositions, however, all studies sought to make a difference theoretically or practically to influence positive behaviour change. Activities such as slow photography, storytelling, nature journaling, emotion talk and autoethnography

were used to engage students in environmental knowledge and prompt affective dispositions. Using moments of intensity was also captured as a strategy for engaging participants in opportunities for learning.

Two pedagogies were cited more than once within the review; experiential and place-based (see Appendix A.1). An experiential approach emphasises learning through direct experience and reflection. The concept was popularised by Kolb, who presented a four-stage cycle of experiential learning: concrete experience, reflective observation, abstract conceptualisation and active experimentation. Place-based pedagogies are used to connect the location of learning to the content which is being taught. Through connecting learning to location, the aim of place-based pedagogies is to promote active engagement, responsibility and involvement with communities and environmental challenges. In addition to these pedagogies being cited by more than one study in the review, there was also a recognition for pedagogic agility and the importance of being able to effectively use and transition between different methods and activities

Terms such as ‘pedagogic agility’ (Evans and Acton, 2021) and ‘wilding’ (Quay and Jensen, 2018) of pedagogies emphasised the importance of knowing various methods of facilitation to meet the needs of the group and situation. This is understandable, as in teaching any subject it cannot be expected that one style will suit every learner. Moreover, it is evident that not one pedagogy would be able to attend to all environmental literacy components simultaneously (Monte and Reis, 2021), or work for every outdoor instructor. In practice, just as teachers are required to use a range of pedagogies to aid student learning (Monte and Reis, 2021), outdoor instructors should be equipped for using a range of pedagogies to facilitate environmental literacy development. Focusing on one pedagogy for the development of a specific environmental outcome although can provide an in depth understanding of the pedagogy, it does not capture the movement between pedagogies required by instructors to communicate with different group members.

### **2.2.2 Knowledge and competencies needed by outdoor instructors to increase client environmental literacy**

Maurer and Curtner-Smith (2018; 2019) explore the perspectives and beliefs of adventure educators entering the professional world of OAAs. Maurer and Curtner-Smith (2019, p.128) conclude that preservice adventure educators enter the sector with one of three orientations:

- *“a leisure orientation: keeping clients safe however giving little instruction and delivering a narrow field of adventure activities. Requires positive personal and social characteristics.*



- *an outdoor pursuits orientation: keeping clients safe in a wide range of adventure activities while teaching skills. Requires positive personal and social characteristics, content knowledge and pedagogical skill. Or,*
- *an adventure orientation: keeping clients safe in an expansive range of adventure activities while teaching skills and strategies. Teaching personal and social skills such as communication, teamwork, trust etc through experiential models of instruction. Reflecting on activities, personal efforts, and learning. Requires content knowledge, pedagogical skill, mastery of direct teaching styles, and competency employing indirect pedagogies”.*

A similar perspective about the development of expertise, skill acquisition and responsibility is put forward by Wagstaff (2011; 2016) in his exploration of career development in outdoor leaders. Wagstaff (2011) initially proposed five stages of career development which ranged from leisure interactions, to having a professional identity. While the basis of the stages have remained the same, they were analysed and updated to be named; stage one “*exploration*”, stage two “*contemplation*”, stage three “*engagement*”, stage four “*professional involvement*”, and stage five “*career professional*” (Wagstaff, 2016, p.89-90).

Positive personal and social characteristics of outdoor educators have been identified in a review of 27 articles by Povilaitis *et al.* (2019). The results showed 12 distinct instructor behaviours, of which five were cited more than once; fostering safety, being supportive, facilitating autonomy, role modelling, and providing feedback (Povilaitis *et al.*, 2019). In addition, Schumann *et al.* (2009) identified five prominent influential instructor characteristics based on student learning at the National Outdoor Leadership School (NOLS). Influential instructors were characterised as being patient, knowledgeable, empathetic, inspiring, and fun/entertaining (Schumann *et al.*, 2009).

While adventure orientations were influenced by age and past experiences with OAAs (Wagstaff, 2016; Maurer and Curtner-Smith, 2019), a commonality among instructor motivations was the attraction of being able to work outdoors and with other people, and contributing to a community (Barnes, 1999; Maurer and Curtner-Smith, 2018). For instructors to aid the development of client environmental literacy through OAAs, this work suggests they must have at least an outdoor pursuits orientation, or even better, an adventure orientation.

Section 2.2.1 highlighted different pedagogies and activities used in outdoor education to increase one or more component of environmental literacy. In addition to a knowledge of activities and pedagogies, Maurer and Curtner-Smith (2018; 2019) highlight the importance of content knowledge. To educate and inspire clients for environmental literacy outcomes, outdoor

instructors are expected to have an underpinning knowledge of local and global environmental features, challenges, and possible solutions (Institute for Outdoor Learning, 2021b).

The role of the outdoor instructor has been discussed in literature with regards to instructor qualities and personalities, however in terms of developing environmental literacy traits there is relatively little coverage. Cases of role modelling have been recorded to be influential as well as instructors facilitating 'down time', particularly for school groups, allowing time for reflection (Huynh and Torquati, 2019; Povilaitis *et al.*, 2019). However, little longitudinal research has been carried out to conclude how effective either aspect is in generating sustained behaviour changes.

It is assumed that an experienced outdoor instructor having entered the sector through the leisure, outdoor pursuits, or adventure orientation, possesses the personal and social characteristics of an influential instructor. The area of less certainty, however, is instructor content knowledge and pedagogical skill, and whether, despite their ability to teach and facilitate skills and adventure, they can teach, inspire, and facilitate environmental literacy development.

### **2.2.2.1 Environmental content knowledge**

Richard Louv (2008, p.104) states "*we cannot protect something we do not love, we cannot love what we do not know, and we cannot know what we do not see. And touch. And hear.*" Physically engaging in an activity influenced by the forces of nature, and being exposed to diverse ecosystems gives outdoor instructors an opportunity to show and engage clients in the wonders of nature, to teach, see, touch and listen, and to influence behaviour change (O'Connell *et al.*, 2005; Lugg, 2007; Institute for Outdoor Learning, 2021b). However, it is not just about "*exposing*" and "*hoping*" (Lugg, 2007, p.106) for environmental awareness or behaviour change; client learning outcomes are reliant on instructor knowledge and their effective communication.

In the expansion of knowledge under the NAAEE framework, Hollweg *et al.* (2011) identifies environmental literacy knowledge to consist of knowledge of physical and ecological systems; social, cultural and political systems; environmental issues; multiple solutions to environmental issues; and citizen participation and action strategies. While this may be favourable, the reality of instructors keeping up to date with such a breadth of topics is perhaps unrealistic given time pressures and motivations, in addition to the multitude of resources available offering an array of information. In the context of where many OAAs take place, areas where instructors can educate and inspire others is primarily through ecological knowledge, environmental issues, human disturbance, and action strategies (Institute for Outdoor Learning, 2021b). However, where an instructor is interested and passionate about social, cultural and/or political systems related to the environment, this may influence the conversations they choose to have.

Environmental knowledge can be categorised by its reference to ‘global’ and ‘local’. Global challenges underpin subjects of climate change, global warming, and sea level rise. The challenges can seem overwhelming and distanced from a British worldview, where the severity of impacts is yet to take its toll as it is in other countries. The phrase ‘think global, act local’ makes it easy for individuals to recognise concern, but gives little priority or enthusiasm for changing behaviours (Hulme, 2008), particularly when they do not witness the effects of their changes. Using the understanding of *knowing, seeing, touching, and hearing* by Louv (2008) to engage emotions and motivate pro-environmental behaviours suggests a local engagement of knowledge to be appropriate for influencing qualities of environmental literacy. Having said this, while recognising the influence of place-attachments on acting locally, Devine-Wright (2013) argues that such attachments should encompass global considerations too, to help in the understanding and action against climate change. Furthermore, Jasanoff (2010) recognises that knowledge from experience can be more powerful than intangible knowledge from science, but nevertheless agrees with global place attachments and the possibility of linking global challenges to local meaning and experience.

Outdoor instructors should be familiar with the context of global and local environmental challenges, how to link them to together, how to link them to individuals’ interests and how to link them to areas where they can take action (Monte and Reis, 2021). This can give clients a tangible gateway into understanding connections between human and non-human life and how local actions can influence on a wider scale.

Local environmental knowledge for OAAs is location and activity specific. Instructors facilitating marine based OAAs will have a different set of knowledge compared to instructors facilitating activities only on fresh water, or those working in the Highlands of Scotland compared to the shores of Wales. Courses, webinars, and information packs have been facilitated by outdoor charities and organisations such as Paddle UK (formally British Canoeing), Mountain Training Association, the Field Studies Council, and Pembrokeshire Coastal Forum to name a few, with the intention of increasing specific environmental knowledge.

Given the breadth of environmental topics that could be covered, it is recognised that knowledge will be unique to each outdoor instructor. To be effective in sharing and communicating their knowledge to educate and inspire client environmental literacy, instructors must have some aspect of environmental knowledge (content knowledge), knowledge of how to deliver environmental information and activities to children and adults (pedagogic and andragogic knowledge), and knowledge of how information and activities should be framed to different individuals, in different groups, in different settings (pedagogical and andragogical content knowledge).

Dyment *et al.* (2018b) conducted a theoretical study to develop a framework for pedagogic content knowledge (PCK) for outdoor educators. As the framework is primarily intended for educators of children (hence pedagogy) in formal outdoor education, the work does not reference qualities needed to teach adults (andragogy). However, the framework does present a useful set of criteria to understand what characteristics are needed of an effective outdoor educator. PCK and the framework by Dyment *et al.* (2018b) are explored in detail in the section below.

### 2.2.2.2 Pedagogic content knowledge (PCK)

Pedagogic content knowledge (PCK) relates to a particular form of knowledge that refers to the ability to transform content knowledge into a context that can facilitate student learning (Van Driel and Berry, 2010). The concept was introduced by Shulman in 1986 who argued that to be a successful educator one must have a combination of both subject knowledge and teaching practices. Shulman (1986, p.9) states, “*PCK includes the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations - in a word, the ways of representing and formulating the subject that make it comprehensible to others*”. Demonstrating PCK competency therefore involves anticipating and recognising what makes certain content easy or difficult to learn, understanding common misconceptions among learners, using appropriate strategies and sequencing for teaching the content and choosing appropriate examples. As such, PCK distinguishes expert teaching from subject expertise alone. For example, in the context of an OAA, it could be expected that a professional kayaker would make a good instructor. However, just because they are able to demonstrate their content knowledge in the form of demonstrating highly technical skills, it does not mean they are able to teach those skills to others; they may lack pedagogic knowledge (see North and Dyment, 2021).

The concept of PCK has been built upon by other theorists. Notably in the field of science education has been the contribution by Magnusson *et al.* (1999), who defined PCK as “*a teacher’s integrated understanding of pedagogy and subject matter content that forms the basis for his or her ability to facilitate student learning*” (p.96). Magnusson *et al.* (1999) provided a detailed framework of the components believed to make up science PCK to break down the characteristics into teachable and observable dimensions. A simplified version of the framework by Magnusson *et al.* (1999) is shown in Figure 4.

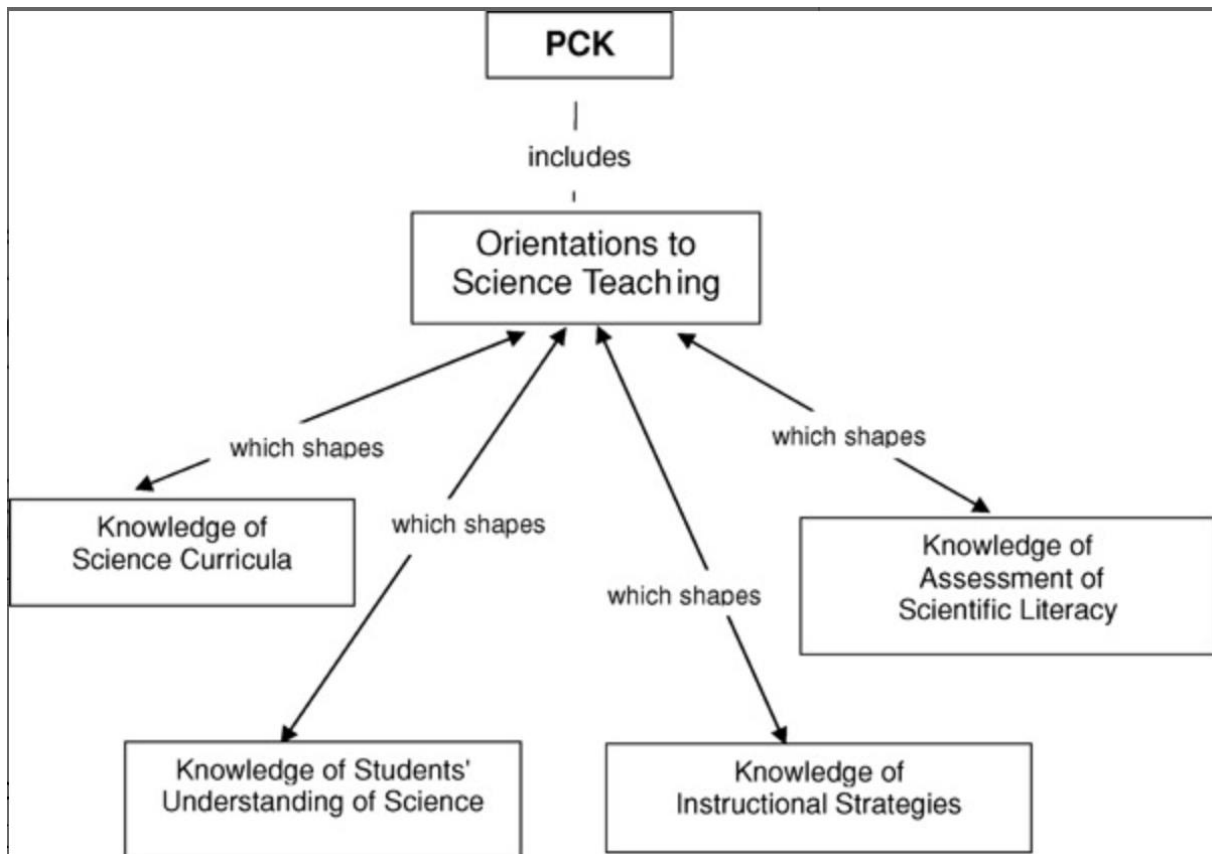


Figure 4: Simplified model of PCK for science teaching by Magnusson *et al.* (1999).

As shown in Figure 4, ‘orientations towards science teaching’ act as a lens through which all other components are interpreted. However, due to ambiguity around what is meant by ‘orientations to science teaching’, Friedrichsen *et al.* (2011) propose orientations to be defined by three dimensions: beliefs about the goals and purposes of science teaching, views of science, and beliefs about science teaching and learning. Consequently, it is recognised that PCK is more than just a theoretical framework but is a dynamic and evolving construct that is individually constructed by a person’s experience and beliefs as well as the context in which they are in and the situational demands.

In schools, Kidman and Casinader (2019) note a focus of research is predominantly on developing the environmental literacy of students, with little attention given to the environmental literacy of teachers. Developing the environmental literacy of students however requires a teacher that is familiar with environmental literacy content knowledge and appropriate practices that can facilitate its development (Kidman and Casinader, 2019). Researchers are therefore pushing for greater professional courses for pre- and in- service teachers to expand on pedagogical knowledge to support the quality of classroom teaching (Richardson *et al.*, 2017; Kidman and Casinader, 2019). In outdoor education and OAAs the focus is similar, with investigations being carried out into how participation in activities can enhance participants’ nature connectedness, environmental awareness and PEBs. Missing from the research, however, is a comprehensive

review of outdoor instructors' ability to facilitate such outcomes; their knowledge of content, theory, and application of activities to meet the specific needs of the group.

Recognising the need for teacher support in the field of environmental literacy, Richardson *et al.* (2017) explored the impact of an intervention on 26 junior level pre-service teachers, assessing PCK and environmental education efficacy and beliefs. They adopted principles for teaching teachers as recommended by Bell *et al.* (2003), using pedagogical approaches that promote inquiry, viewing teachers as learners, and having teachers use and engage in and reflect on appropriate PCK. PCK was assessed qualitatively through the 5 dimensions (see Figure 4) and environmental education efficacy was assessed through a pre- and post-intervention survey using the Environmental Education Efficacy and Beliefs Instrument (EEEBI) by Sia (1992). Despite the success of the intervention for pre-service teachers, its transferability to outdoor instructors is limited as in the context of OAAs, 2 of the 5 orientations (knowledge of curricula and knowledge of assessment) are irrelevant. Nevertheless, the premise of the research supports the need for training for instructors, if client environmental outcomes are to be expected.

In the context of outdoor education, Dymment *et al.* (2018b) present a detailed framework of PCK for teaching outdoor educators with dimensions headed 'clearly PCK', 'content knowledge in a pedagogical context', and 'pedagogical knowledge in a content context' (see Appendix A.2). The framework encourages teachers of outdoor education to consider the relationship between what they are teaching and how they are teaching it and highlights the need for educators to be competent in communicating information and facilitating activities in different ways, to suit the specific audience (Dymment *et al.*, 2018b).

The PCK framework was constructed for outdoor educators as a criteria to follow to improve the standard of teaching. The framework was designed to benefit the teaching of all modules within outdoor education rather than environmentally specific (hence why the paper did not qualify for the review in the section above), therefore placing the focus on pedagogy over subject content.

There has been limited published research on the success of the PCK framework (see Evans and Acton, 2021), so it is unclear how many outdoor educators have contemplated either the framework or PCK within their outdoor profession. However, in subjects such as mathematics, increasing teacher PCK has shown to increase the standard of teaching and student learning (Cueto *et al.*, 2017). Furthermore, North (2022, personal communication) vouched for the success of the framework when used with trainee outdoor educators in New Zealand as a criteria for assessing teaching abilities and directing training. North (2022, personal communication) explained that trainee outdoor educators were required to make a self-assessment of their understanding and ability to fulfil the PCK framework and highlight areas they do not understand,

or which they are not confident in facilitating. These areas were then addressed in training to improve the quality of their teaching.

Despite the subject of PCK for outdoor instructors having little coverage, the idea of incorporating a PCK framework for increasing environmental literacy offered a structure from which a course could be developed. Chapter 3 presents the conceptual framework of this research, showing how the framework by Dymont *et al.* (2018b) has been used to inform the creation of an environmental literacy pedagogic and andragogic content knowledge framework (EL-PACK) for outdoor instructors.

### **2.2.3 Assumptions about teaching outdoor instructors**

#### **2.2.3.1 Teaching adults as opposed to children**

The theory of teaching adults and how adults learn is termed *andragogy* and has roots in European countries from the early 1900's (Krajnc, 2003). Its acceptance in the UK and US was not until mid to late 1900's, when the concept was popularised by Malcolm Knowles (Krajnc, 2003). Knowles (1977, p.211) suggests a self-directed andragogical approach to learning, characterised by a set of five assumptions and processes about learning:

1. *“The concept of the learner is increasingly self-directed.*
2. *The role of the learners’ experience is a rich resource for learning.*
3. *Their readiness to learn develops from life’s tasks and problems.*
4. *The preferred orientation to learning is task or problem centred.*
5. *Their motivation to learn is directed by internal incentives and curiosity”*

These assumptions about andragogy, underpin key differences between teaching children and teaching adults. In contrast to the andragogical assumptions, a pedagogical approach to learning tends to be teacher directed as the motivation is external; the orientation to learning is subject centred; the readiness to learn varies with the level of maturation; and experience is to be built upon rather than used (Knowles, 1977, p.211). Knowles (1977) recognises the assumptions as a continuum rather than fixed assertions that dictate teaching practice, however despite this there have been critiques of whether the assumptions are proven theories, or hypothesised beliefs (McGrath, 2009).

There has been little attention given to andragogy in the field of outdoor education, and especially in the field of OAA instructing. However, Wood (2024, p.2000) argues that in the context of post-graduate outdoor learning programmes the assumptions of andragogy do not fit, given that

1. *“The educator directs the programme of learning, as opposed to it being student-led (self-directed),*
2. *The diversity of experience and learning interests among students means not all aspects of a curriculum will be relevant to each student, and*
3. *Students’ personal experiences are challenging to incorporate into studies given the lack of critical literature in the field of outdoor instructing or educating”*

Wood (2024) explored an alternative framework of heutagogy for postgraduate outdoor education students, based on the work of Kerry (2013). Heutagogy, or ‘self-determined learning’ is understood as a progression from andragogy (Blaschke, 2012), suitable for mature and autonomous learners who facilitate their own learning (Canning, 2010), and where little guided direction or structuring is required (Blaschke, 2012). Wood (2024) found that postgraduate outdoor education students were able to direct and take responsibility for their learning, despite mentioning feelings of imposter syndrome. However, Wood (2024) did not conclude heutagogy to be more suited to outdoor education students than andragogy, given the necessary structure within the educational setting to be somewhat guided by a curriculum and tutor.

The findings about outdoor education students by Wood (2024) extends the field of research about academic outdoor students, however, the assumptions cannot necessarily be transferred to non-academic instructors. Outdoor degree programmes are not compulsory for becoming an instructor (Higgins and Morgan, 1999; Maningas and Simpson, 2003); centres can hire through experience or apprentice schemes and can train employees to become instructors through activity specific courses (Maningas and Simpson, 2003; Trappe, 2013). Where outdoor degree programmes are offered, they usually have relatively low entry requirements in comparison to other education subjects and are advertised to be negotiable based on experience and maturity (see courses by Plymouth Marjon University, 2024; and the University of Cumbria, 2024 as examples). The result is, outdoor instructors are not necessarily the typical ‘teacher’; whilst they may be competent and passionate about facilitating safe and exhilarating activities, they may or may not be academically minded (Higgins and Morgan, 1999; White and Groves, 2023), they may or may not have experience in teaching, and they may or may not know anything about environmental literacy, climate change, or environmentally responsible behaviours. Furthermore, as outlined by Maurer and Curtner-Smith (2018; 2019), the reasons for outdoor instructors entering the job role are mainly due to either a leisure orientation, an outdoor pursuits orientation, or an adventure orientation. Bridging the three orientations for working as an outdoor instructor was being able continue doing their activities on a regular basis (Maurer and Curtner-Smith, 2018; 2019), as opposed to being a teacher or educator, however this finding has been contested in earlier research (see Barnes, 1999).



Given the expected inexperience of instructors having characteristics of an environmental educator, and the current lack of environmental education through OAAs, it is hypothesised that instructors will favour andragogical learning over heutagogical learning. For the development of an environmental literacy course, I adopted the andragogical assumptions from Knowles (1977) and used my personal experience in the sector to further inform my understanding.

I, like many of my course mates in our Outdoor Adventure undergraduate programme, and my colleagues at outdoor centres, have a specific language impairment (like dyslexia), and ADHD. Although I found no empirical data to support specific learning differences (SpLDs) being prominent in the wider outdoor sector, White and Groves (2023, p.16) state, “*the outdoor sector attracts individuals who are often thought to be better with their hands—dyslexia can sometimes appear to be a requirement for working in the outdoors!*”. During university we were taught through a mixture of theory lectures and practical trips, though where lectures were inside, we were given tasks to break up the theory, to get us moving and keep us engaged. This type of education in outdoor leadership development is typical of other outdoor training (Brandt, 2016) and supports an experiential approach to teaching.

I found no research on andragogical content knowledge (ACK) in outdoor education or OAAs, however there have been references to ACK in formal and non-formal education (Nurhayati, 2015), most frequently referencing teacher professional development in education and technology. The lack of attention to the theory and practice of teaching outdoor instructors highlights the literature gap addressed by the conceptual framework of this thesis, which presents a set of criteria for environmental literacy pedagogical and andragogical content knowledge (EL-PACK) (see Chapter 3).

### **2.2.3.2 Belief in ability to teach (BiAtT)**

Belief in ability to achieve something, or ‘self-efficacy’, has been largely studied by psychologist Albert Bandura. Bandura (1997) predicted that those with high self-efficacy are more likely to achieve their aims, than those with low self-efficacy. In environmental education research, Moseley *et al.* (2002; 2003) and Moseley *et al.* (2016) have explored the influence of outdoor environmental education on teachers’ self-efficacy, suggesting that a teacher will be most effective when they have positive beliefs about outcome environmental expectancy, and positive beliefs about their personal environmental communication. While PCK refers to the influence of beliefs on one’s orientation towards teaching (for example, see Friedrichsen *et al.*, 2011), and as such, is listed within the framework by Dymont *et al.* (2018b) which highlights the importance of

‘beliefs about the nature of teaching and learning’, and ‘beliefs about the nature of content’ (see Appendix A.2); it does not mention the importance of self-efficacy.

A theory similar to PCK, but inclusive of self-efficacy is the theory of ‘knowing, doing, and believing’, by Martyn Rouse. Rouse (2006; 2008) underpins the theory for successful inclusive teaching practice, highlighting that teachers need to know the subject, know how to deliver the subject, and believe they can make a difference.

In an article based on his keynote address at a Special Education symposium, Rouse (2006) explains why knowledge of content and knowledge of process are both important for making changes in a classroom setting. Rouse (2006) indicates there has been evidence of disparity between teacher abilities following course participation and actual teaching practices, explaining that where courses are solely content focused teachers are often unable to transfer theory into practice. In addition, where content and process are covered in a course, Rouse (2006, p.12) identifies beliefs about “*their capacity to make a difference*”, “*their responsibility*”, “*the children’s ability to learn*” and the “*worth of educating*” to be barriers that inhibit change.

In the context of environmental education, belief in ability to teach has been assessed using a survey, to understand environmental education outcome expectancy (ability of participants to learn and worth of educating) and personal environmental education teacher efficacy (capacity and responsibility to make a difference) (Moseley *et al.*, 2016; Richardson *et al.*, 2017). Again, while there is little research available to understand the link between PCK and belief in ability to teach for outdoor instructors, there is evidence from other fields to suggest self-efficacy beliefs positively influence PCK (Park, 2007; Richardson *et al.*, 2017; Thomson *et al.*, 2017).

The influence of belief in ability to teach is included in the development of the EL-PACK criteria, as shown in Section 3.3.

## **2.3 Part III**

Part III of the literature review looks at existing courses and how they can be used to influence the development of an environmental literacy course.

### **2.3.1 Characteristics of existing courses aimed at increasing environmental literacy through outdoor adventure activities**

Despite offering a large range of different OAA qualifications, the UK currently has very little education available for outdoor instructors about how to engage, communicate or teach about

the environment (McClure *et al.*, no date-a). Where education is provided it is within an outdoor company, or a very small element of an existing qualification (McClure *et al.*, no date-a).

A search was conducted of courses that exist to achieve similar environmental objectives. Three projects are outlined below which claim to increase environmental literacy or education and are available for outdoor instructor participation. Additional courses and workshops may well be run in small scales within certain outdoor businesses (for example, by the Field Studies Council). These have not been commented on however, given their content and structure is not available online and many in-house trainings are not available to the wider audience of instructors.

### **2.3.1.1 The environmental literacy model (ELM)**

In contrast to the UK, the concept of environmental literacy and its inclusion in school education and teacher training has received significant research in America. Organisations such as the Chesapeake Bay Foundation (no date-b) and the Maryland Association for Environmental and Outdoor Education (2024b) have been credited for their production of documents and teaching aids for professionals to use in their lessons and activities (O' Neil *et al.*, 2020).

In 2009 the state of Maryland introduced an initiative to integrate environmental literacy into the curriculum of state high schools (O' Neil *et al.*, 2020; Maryland Association for Environmental and Outdoor Education, 2024a). To achieve this goal, an aspect of the partnership was centred around professional development; educating schoolteachers in how to incorporate environmental literacy education through science, art, and social studies (O' Neil *et al.*, 2020).

An environmental literacy professional development programme was run as an intensive in-person, week-long course, with a focus on how to use an environmental literacy model (ELM) to conduct field studies relating to the local community and subject.

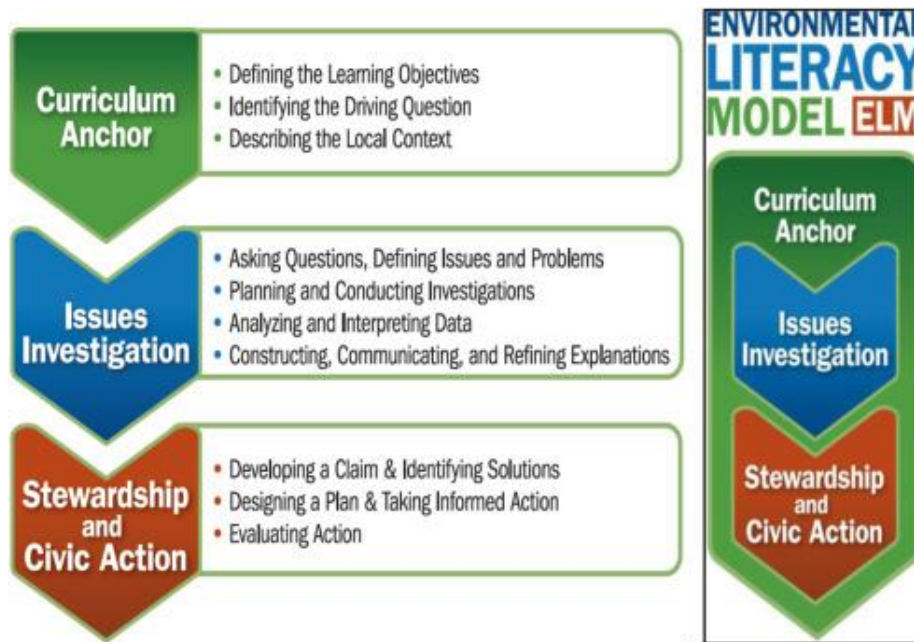


Figure 5: The environmental literacy model (ELM) based on the work of the Chesapeake Bay Foundation and the Maryland Environmental Literacy Partnership, cited by O'Neil et al. (2020)

The ELM (see Figure 5) illustrates three phases to address: the curriculum anchor, issue investigation and stewardship and civic action. In terms of addressing components of environmental literacy, the ELM focuses predominantly on the knowledge-competencies-behaviour route, as opposed to addressing affective dispositions. This is reinforced by their environmental literacy standards (see the Maryland State Department of Education, 2022), which despite receiving international recognition from the Inter-Parliamentary Union, the World Future Council and the United Nations Children's Fund (O'Neil et al., 2020), each address a practical application of knowledge and understanding as opposed to cultivating emotional responses. Despite this, the process of enhancing competencies through active contact and investigation encourages participants to ask questions to stimulate their curiosity and understanding of the subject (Peter et al., 2021). As a result, participants could develop traits of affective dispositions subconsciously. Such occurrences have been documented by Peter et al. (2021) in their research on attitudes following participation in citizen science activities.

O'Neil et al. (2020) conducted a review of the professional development programme as part of a case study approach for using urban environments to increase environmental literacy. Outcomes of the programme were deemed successful, with teachers satisfied with the content and indicating both a greater understanding for how environmental literacy can be enhanced, and increasing their own understanding and awareness of environmental issues, and available participation (O'Neil et al., 2020). The most challenging aspect reported was phase three of the

model: stewardship and civic action. This was predominantly due to time restraints within the lesson or planning; however, another reason was lack of available resources (O'Neil *et al.*, 2020).

A worksheet copy of the ELM is available for download from the Chesapeake Bay Foundation (no date-a) for anyone to use. It provides a useful tool for planning environmental literacy outcomes and challenges educators on the steps and knowledge needed to meet them. The model is primarily used by teachers for children in formal education and thus references to curriculum are not relevant for the field of OAAs. Having said this, the underpinning structure of knowledge, exploration, action, implies an orderly method for environmental literacy engagement. Furthermore, the importance of planning reinstates a distinction between outdoor education and OAAs, showing that teachers have a greater focus on curriculum targets and learning outcomes than outdoor instructors do. For environmental literacy to be a tangible outcome of OAAs there must be some element of planning by instructors of how to incorporate it into their activities.

There was little information found about the professional development course, other than that reviewed by O'Neil *et al.*, (2020). Conclusions drawn on its development of PACK are therefore minimal, however given the structure of the ELM, PCK would be favoured for its application with children.

### **2.3.1.2 Leave no trace (LNT)**

LNT is a not-for-profit organisation established in America in the 20<sup>th</sup> century to help the protection and conservation of nature, particularly from recreationalists. Their goal is to inspire individuals through education, science and stewardship to adopt environmentally responsible behaviours and ensure a sustainable future of the planet (Leave No Trace, 2021b). To achieve this, LNT set out seven principles (see Table 5), to guide recreationalists on how to explore and adventure sustainably.

The seven principles give a basic degree of environmental literacy; offering knowledge, reasoning, and skills to be applied during an OAA to empower behaviour change for sustainable adventure. There is no recognition of developing affective dispositions through admiring nature, slowing down, or tuning into senses, however, for the purpose of their intentions (which was not to promote environmental literacy), the principles offer a clear message which has become recognised worldwide.

Table 5: The seven principles of Leave No Trace (Leave No Trace, 2021a)

| <b>Leave No Trace principles</b> |                                     |
|----------------------------------|-------------------------------------|
| <b>1</b>                         | Plan ahead and prepare              |
| <b>2</b>                         | Travel and camp on durable surfaces |
| <b>3</b>                         | Dispose of waste properly           |
| <b>4</b>                         | Leave what you find                 |
| <b>5</b>                         | Minimise campfire impacts           |
| <b>6</b>                         | Respect wildlife                    |
| <b>7</b>                         | Be considerate of other visitors    |

LNT provide recreational and instructor training at various levels. The Level One Instructor Course (formally the Trainer Course) is a 2-day course to increase knowledge and understanding of the seven principles (Leave No Trace, 2024a). It also qualifies participants to become leaders of the recreational workshop and skills course (Leave No Trace, 2024b). Participants explore the principles of LNT through experiential instruction, provide short (15-20 minute) activities for their peer group based on the principles, and participate in an overnight camp (Ross, 2021). The course intends to help participants become competent facilitators of the LNT principles through acquisition of theory and practical involvement (Ross, 2021; Leave No Trace, 2024a), therefore referencing key qualities of PACK.

The Level Two LNT Course (formally the Master Educator Course), qualifies participants to be facilitators of the Level One and recreational courses. The Level Two is a five-day immersive programme, and like the Trainer Course, uses experiential instruction to explore principles and related activities that can be used to aid learning (Leave No Trace, 2024b). The syllabus for the Level Two is not published online, however its predecessor (the Master Educator Course) incorporated transformative learning styles, encouraged participants to critically reflect on their beliefs, questioned the intended outcomes of becoming a Master Educator for LNT, and assessed participants' facilitation of activities in nature (Ross, 2021). The course included a focus on communication styles, framing techniques and effective dissemination of information to different learners through discussions, scenarios, and practical activities (Ross, 2021). Although the updated Level 2 may have differences from the Master Educator course, the attention to both knowledge and facilitation through communication styles and activities indicates a structured course that would enhance instructor PACK. As the course qualifies participants to facilitate

lower-level courses, a focus on both adult learning (andragogy) and child learning (pedagogy) would be expected.

The majority of LNT courses occur either online, or in person in America. The Trainer Course had some recognition in the UK, with Nature Training (2024) facilitating the course in Fort William, Scotland in April 2020 and 2021 under the Mountain Training Association. However, given the recognition of its principles, particularly by Mountain Training in its guidance for assessments of mountain leaders and rock-climbing awards, greater accessibility might have been expected. Furthermore, the Level Two course is seldom offered outside the US or Australia (Tanner, 2022, personal communication) and therefore accessibility for UK-based outdoor instructors is limited.

The LNT courses are ideal for teaching outdoor instructors how to behave in nature responsibly, and how to share this information more widely with their clients through effective communication and activities. The duration of the courses enables time to cover both theory and content, and the review of courses suggests instructors PACK for teaching LNT principles would be enhanced. Recognition of practical elements such as role-play, and how it contributes to understanding theory is important for developing PACK. Also recognised however, is that courses can be run online, therefore assuming the practical elements can be replaced by break-out groups where necessary.

### **2.3.1.3 The sustainability and environmental education in outdoor sports project (SEE)**

The SEE is a European funded project led by Leave No Trace Ireland, with partners across different countries throughout Europe. The three-year project was launched in 2021 with the aim to *“enhance the protection of natural landscapes through education in and through sport with a special focus on responsible outdoor behaviour and skills development for outdoor sports leaders, trainers, guides, or instructors”* (SEE Project, 2022). The project culminated with its dissemination event in 2023, having published four reports, a best practice guide, and an educational toolkit (SEE Project, 2023b).

The project recognises the inadequacy of environmental responsibility currently promoted through outdoor sports and highlights the need for outdoor instructors, leaders, teachers, and guides to be more knowledgeable in sustainable practices, to effectively teach and influence clients (SEE Project, 2022). Given the similarities of the project specification to my own research area, I contacted the project coordinator (Noel Doyle) in October 2021 to explore opportunities for collaboration. Upon further explanation of the course, Doyle (2021, personal communication) confirmed there were significant differences between our intentions, the main being the SEE intended to supplement existing courses, whereas I believed a stand-alone environmental course

was important. Collaboration would also have been complicated due to Brexit (Doyle, 2021, personal communication).

The public release of the toolkit in December 2023 provides valuable resources for outdoor instructors to access and learn about different activities they can integrate into their OAAs to promote environmental literacy. The toolkit highlights a process of six stages; disruption and awareness, impact analysis, selection and creation, integration, action, and transformation (SEE Project, 2023a). As the toolkit was not published until the latter phase of this research, the stages were not used to influence the design of the environmental literacy course. The attention given to background factors (i.e. understanding and taking accountability for the activities disruption and impact) presents a rigorous degree of content knowledge necessary for activity creation and integration, to promote subsequent action and transformation. A drawback of the project is that while online resources are important, encouraging instructors to access the resources (or making them aware of the project) can be challenging.

As noted in one of their reports, in the UK particularly, a barrier to environmental education integration into activities or courses has been time (McClure *et al.*, no date-a). Furthermore, as environmental training has not been mandatory, neither instructors or companies are losing out because of its lack of incorporation. McClure *et al.* (no date-a) pose a reasonable question in asking whether environmental training will only be taken on by outdoor companies if it becomes mandated.

As far as I am aware, the SEE project has not launched any courses to reflect the aims or to teach the toolkit to instructors. For a more formal method of professional development, I believe a stand-alone course is necessary as it could allocate time specifically for environmental training. On the basis that action can occur faster in collaboration however, future environmental literacy courses will direct instructors to the SEE website and toolkit as valuable additional resources.

## **2.4 Summary of literature review**

The literature review has defined OAAs and environmental literacy for the context of the research and has highlighted the need for philosophical change to promote a greater environmental focus, as appropriate for addressing current societal challenges.

The review has explored characteristics of OAAs that intend to increase client environmental literacy, concluding that for environmental literacy to be an outcome of OAAs, there must be an



element of planned activity, facilitated using appropriate pedagogical or andragogical methods and with specific goals for learning.

Based on the literature, it appears that upskilling outdoor instructors to develop environmental literacy pedagogical and andragogical content knowledge requires a stand-alone course balancing theory and practical involvement. As outdoor instructors are adults, a course should employ andragogical methods of teaching to recognise instructor experience and encourage collaboration. A course should have clear intentions and objectives, a justified timeframe, simple and clear infographics to highlight key messages and processes, and subsequent access to course information as a reminder tool.

Chapter 3 presents a conceptual framework for increasing environmental literacy in the outdoor adventure sector, based on environmental literacy pedagogical and andragogical content knowledge (EL-PACK) and belief in ability to teach (BiAtT).

## Chapter 3 Conceptual framework

The literature review presented an overview of the research context; a summary of what outdoor adventure activities (OAAs) are and how they have become established, a definition of environmental literacy and why the term has been chosen for the research, and an outline of characteristics required of a course, and of outdoor instructors, to enable environmental literacy development.

The conceptual framework presents the working definition of environmental literacy as a diagram, to clarify its aim and purpose, and to highlight where outdoor instructors play a key role in their facilitation of OAAs. It then presents an original model of how I understand environmental literacy to be developed, based on the existing definitions and theories reviewed in Sections 2.1.4.1 and 2.1.5. The chapter concludes with a framework for enhancing instructor environmental literacy pedagogical and andragogical content knowledge (EL-PACK) and belief in ability to teach (BiAtT).

### 3.1 Representing the definition of environmental literacy

Based on the existing courses reviewed (see Section 2.3.1), the environmental literacy course would benefit from using a simple diagram or infographic to present the qualities of environmental literacy and the process through which it can be increased. This kind of step-by-step visual, as used in the Environmental Literacy Model (ELM) (see Section 2.3.1.1), and the Leave No Trace (LNT) principles (see Section 2.3.1.2) can be used as an effective reminder for instructors to refer to.

The new definition of environmental literacy was inspired by the work of Hollweg *et al.* (2011), the The Ocean Literacy Network (2015), Kaya and Elster (2019), Grace *et al.* (2021), and The Carbon Literacy Trust (2022) (see Section 2.1.4.1). Figure 6 highlights the cyclical nature of environmental literacy development and shows how the definition can be broken down into four parts of an ongoing process.

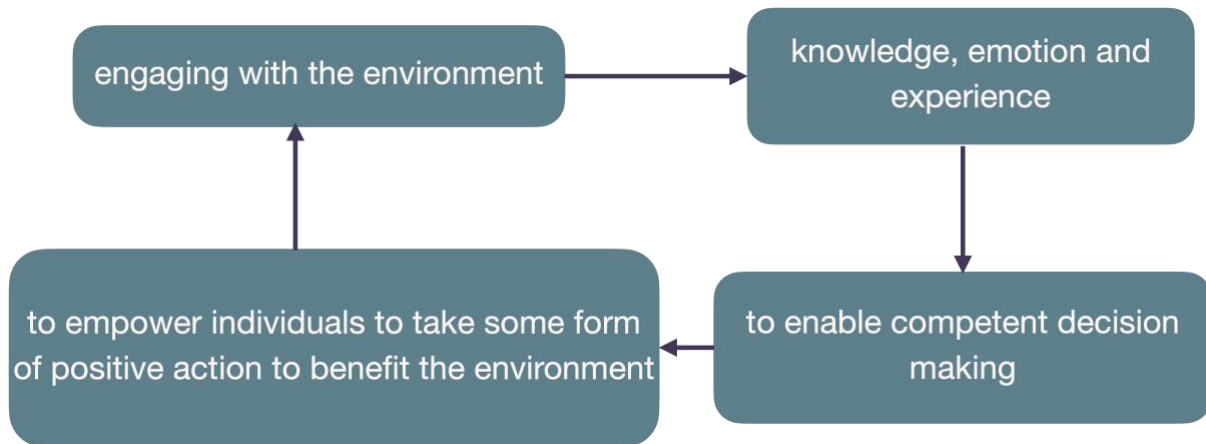


Figure 6: Representation of the environmental literacy definition

### 3.2 A new model for understanding the process of environmental literacy development

Influenced by the models and definitions of environmental literacy outlined in Sections 2.1.4.1 and 2.1.5, I propose an original diagram, showing the process of environmental literacy and the interactions that occur to elicit pro-environmental behaviours (PEBs). Figure 7 uses the Venn diagram to illustrate how combining knowledge, affects and competencies all contribute to informing PEBs.

As noted in Section 2.1.4, the original four components of environmental literacy (knowledge, skills, affects and behaviours) were adapted by Hollweg *et al.* (2011) into the widely accepted knowledge, competencies, dispositions and behaviours. This research accepts the adaption of skills to competencies; however, it clarifies the remit of the component by labelling it “personal competencies”. The term ‘competencies’ was recognised as a holistic integration of learned capacity and innate capabilities (skills and abilities) which support the formation of intention to act. For an outdoor instructor, this could be combining their skills of wildlife identification with their ability to articulate knowledge, to design an inclusive OAA that promotes environmental awareness and behaviour change. Additional competencies as listed by Hollweg *et al.* (2011) include identifying, investigating and analysing environmental issues, and proposing solutions and plans to mitigate those issues. Furthermore, personal competencies in this thesis reflect pedagogical and andragogical knowledge.

In relation to dispositions, the research reverts to the original ‘affect’ component as identified by Roth (1992). This decision was made as I believe qualities such as intention to act and motivation (as included in ‘dispositions’ by Hollweg *et al.*, 2011), to be crucial for all individuals to underpin

PEBs, and therefore should be separate from the other components, which recognise that individuals can possess different knowledge, skills and attitudes based on their interests and experiences. Affects therefore reflect environmental sensitivity, values and attitudes.

The component of knowledge remains unchanged, with the acknowledgement that instructors will have different interests and environmental knowledge based on the environments in which they work. Environmental knowledge includes (but is not limited to) physical and ecological systems, environmental issues and possible solutions, social, cultural and political systems (Hollweg *et al.*, 2011).

The model of environmental literacy illustrates with the overlapping circles how having a combination of knowledge, affects, and personal competencies will increase the intention to engage in PEBs. In contrast to the models by Hollweg *et al.* (2011), Wong *et al.* (2018), and Natural Resources Wales (2023) (see Section 2.1.5), this model of environmental literacy does not assign any indication of priority. This was for two reasons; firstly, the inconsistencies between the existing models meant there was no clear agreement on a pathway to environmental literacy. Secondly, it is recognised that people view and understand the world differently, therefore while some may favour knowledge to as a precursor to PEBs, others may naturally progress through attitudes and emotions. Understanding and recognising how a person perceives and interacts with nature during OAAs is essential for enhancing their unique pathway of environmental literacy. The diagram therefore respects that knowledge, attitudes and competencies can be targeted individually for some aspect of behaviour change, however based on the models of environmental literacy explored, it is anticipated that when an individual possesses both cognitive and psychological connections in addition to competencies, it can increase their likelihood of adopting PEBs

The arrows moving between the Venn diagram, intention to act and PEBs were influenced by the 'feedback/reflection loop' in the model by Hollweg *et al.* (2011). The arrows illustrate an ongoing process rather than 'becoming' environmentally literate. It also recognises that behaviour can inform knowledge, affects, and skills through experiential means.

Both the models by Hollweg *et al.* (2011) and Wong *et al.* (2018) identified a precursor to the environmental literacy components influencing behaviour change. For Hollweg *et al.* (2011), achieving behaviour change is dependent on personal, social and physical contexts. In the model by Wong *et al.* (2018), who conceptualised the process of environmental literacy using the Theory of Planned Behaviour (TPB), dispositions lead to 'behaviour intention' which subsequently result

in behaviour change. Distinguishing between behaviour intention and motivation in Ajzen's TPB can be challenging (Sniehotta *et al.*, 2014). Ajzen (1991, p.182) explains, "*behavioural achievement depends jointly on motivation (intention) and ability (behavioural control)*", adding that behavioural control includes opportunities and resources. This suggests motivation and intention are used interchangeably to represent the same construct, which has been a significant cause for critique of the theory (Sniehotta *et al.*, 2014).

Seeing how Wong *et al.* (2018) had conceptualised the model for environmental literacy was interesting, however references to knowledge and dispositions did not align with environmental literacy knowledge or dispositions, rather the characteristics of beliefs and TPB (attitude towards the behaviour, subjective norms, perceived behavioural control, etc) which are complex to understand.

The behavioural intention was added to the model as it is recognised that not everyone with environmental knowledge, affects and personal competencies will directly perform PEBs. In this context, behaviour intention is defined as a plan or decision to engage in a behaviour, however, it is also recognised that individuals may intend to act but fail to follow it through. For example, an outdoor instructor may intend to incorporate environmental activities and conversations into their OAA, but they may not have the capacity to do so in adverse weather conditions while keeping clients safe and engaged (situational ability), they may feel overwhelmed or disengaged (motivation) or they may be constricted by time (opportunity). To bridge the gap between behaviour intention and actual behaviour change, the model shows three conditional factors: situational ability, motivation, and opportunity (AMO).

AMO is a behavioural theory in itself, developed by Appelbaum *et al.* (2000) and based on the work of Bailey (1993) to achieve high-performance work systems (Marin-Garcia and Tomas, 2016). AMO represents components of the TPB (Li *et al.*, 2019), though its presentation is simplified and more user friendly, meaning it can be easily adapted for different situations. Appelbaum *et al.* (2000) theorises that for individuals to excel in their workplace, they must have the ability to perform tasks (education, skills and training), the motivation to perform tasks (internal and external incentives), and the opportunity to participate (responsibility, decision making and team membership). AMO theory I believe covers the basis of both models by Hollweg *et al.* (2011) and Wong *et al.* (2018) for bridging the gap between intention for behaviour change, and actual behaviour change. Despite not being directly related to a workplace, PEBs could be expected to materialise if individuals are in a personal, social and physical context where they have the opportunity to carry out the behaviour, they have been trained and/or possess

qualifications, resources, skills and belief in ability to perform and mental and physical capacity in a given environment, and they are sufficiently motivated through internal and external incentives to do so. Belief in ability to perform has not been traditionally associated with the AMO theory, however, I refer to beliefs within the ‘ability’ component of my model, influenced by the work of Rouse (2006) and Wong *et al.* (2018) who, in different contexts, both showed the importance of belief for successful performance.

The concept of “ability” can be seen to contribute to the model in two critical but distinct ways; both through the environmental literacy component “competencies”, and through AMO. Within the environmental literacy components, competencies represent personal capabilities to inform behaviour intention; an individual’s cognitive, social and emotional capacities to assess and respond to environmental challenges. Ability within AMO however, requires situational or contextual ability to perform the desired behaviours within real-world contexts. It requires practical skills, confidence and importantly, pedagogic and andragogic content knowledge (EL-PACK).

Figure 7 **Error! Reference source not found.** therefore presents an original application of existing theories to predict the process of environmental literacy development.

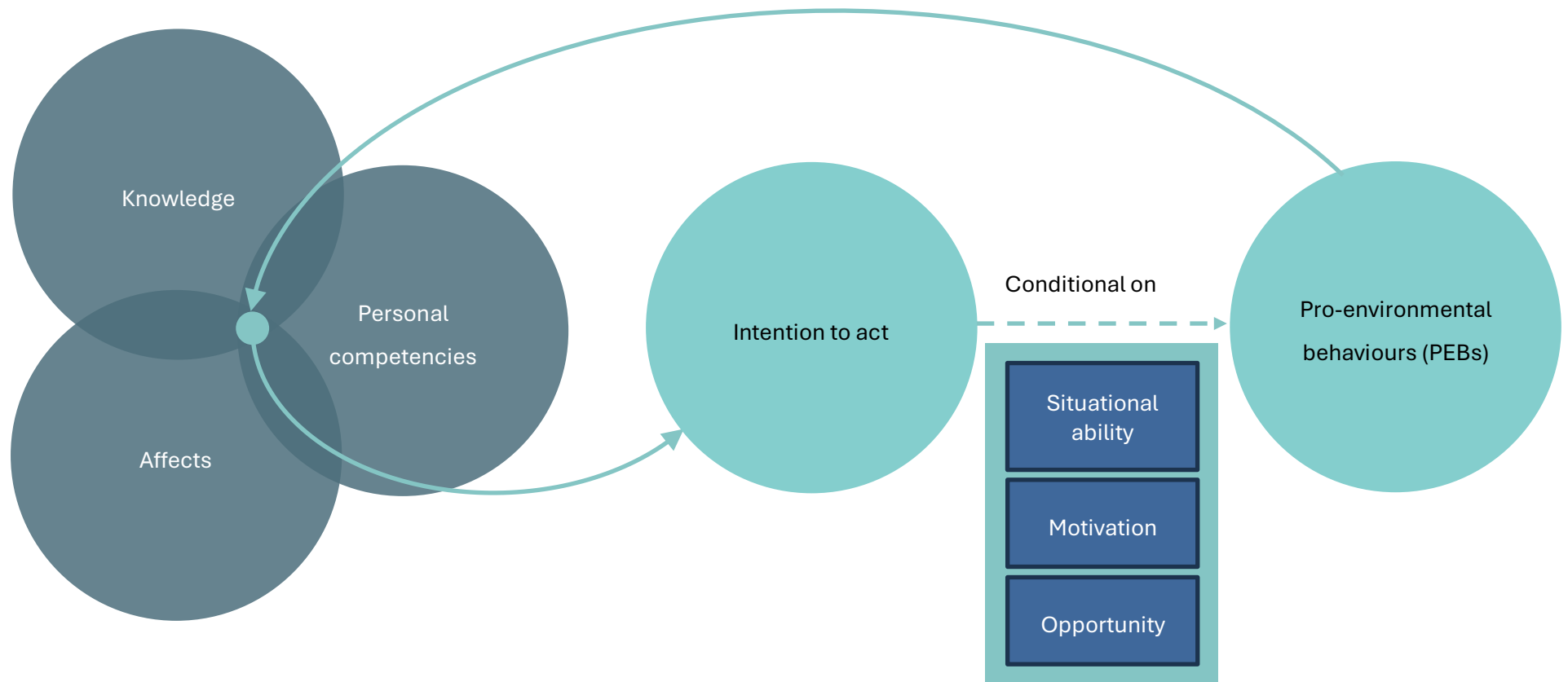


Figure 7: Model showing the process of environmental literacy development

The model showing the process for environmental literacy development is useful for both understanding what instructors need to actively integrate environmental conversations and activities into their OAAs (a PEB), and what individuals need to maximise their own PEBs. As previously noted, environmental literacy is a unique journey of development which will look different for different people based on their experiences, interactions, values and beliefs. The result is, people are likely to exhibit different PEBs, based on their specific knowledge, affects and competencies, as well as their situational abilities, opportunities and motivation.

While acknowledging the importance of individual experience and subjectivity, this research narrows the lens of environmental literacy to look specifically at what instructors have and need, to incorporate PEBs (such as conversations, goal setting, reflection and activities) into their OAAs. To do this, the research examines instructors existing knowledge, affects and competencies in relation to environmental literacy and seeks to enhance their situational ability through a teaching intervention (environmental literacy course) to increase the likelihood of behaviour intention manifesting into actual behaviour change. The development of an environmental literacy course is guided by a framework of environmental literacy pedagogical and andragogical content knowledge (EL-PACK).

### **3.3 Environmental literacy pedagogical and andragogical content knowledge (EL-PACK) for outdoor instructors**

The literature review highlighted the opportunity for instructors to enhance client environmental literacy development through OAAs. While there has been little research on the subject, it has been suggested there is an interest among instructors for learning more about the natural world and giving environmental issues more attention within OAAs (Langley, 2010). The main barrier preventing instructors from integrating environmental conversations and activities into their OAAs is expected to be their situational ability. The aim of the research is therefore to understand what is needed of an effective course to advance instructors' ability to actively integrate environmental conversations and activities into their OAAs.

The work by Dymont *et al.* (2018b) was highlighted in the literature review as a key piece of research (see Section 2.2.2.2). Their work presented a framework for PCK for outdoor educators, to enable affective assessment and targeted training for educators and hence increase the standard of outdoor education. Dymont *et al.* (2018b) suggest their framework to be transferrable to outdoor education contexts beyond that of the classroom, however, using the same



framework for outdoor instructors could be problematic for several reasons. Firstly, the framework is designed for formal education where teachers have a predetermined curriculum to follow and students experience assessment, unlike informal OAAs. Secondly, the language and terminology used in the framework favours an academic audience which could be difficult to interpret and understand if unfamiliar with the subject of PCK. Thirdly, the concept of PCK does not extend to the process of teaching adults, andragogy. Lastly, belief in ability to teach (BiAtT) was recognised in the literature review as an additional characteristic that outdoor instructors should possess for effective and inclusive teaching, which is not included in the PCK framework. For these reasons, a new framework was designed specific to outdoor instructors facilitating OAAs.

Table 6 presents a framework for environmental literacy pedagogical and andragogical content knowledge (EL-PACK), for outdoor instructors. The framework is primarily based on the work of Dymont *et al.* (2018b) (see Appendix A.2), however the examples have been modified to suit outdoor instructors in an environmental literacy context. Additional criteria have also been added to account for belief in ability to teach and for teaching adults. The list of criteria under ‘belief in ability to teach’ were influenced by the work of Rouse (2006) and the Environmental Education Teacher Efficacy Belief Instrument (EETEBI) by Moseley *et al.* (2016). Criterion 7 under ‘pedagogical and andragogical knowledge’ was modified from the criterion by Dymont *et al.* (2018b) to include adults as well as children. The modified criterion states ‘beliefs about the nature of teaching and learning for children **and adults**’ (emphasis added to highlight the modification from original). Criterion 8 was influenced by the work of Knowles (1977) who specified that a positive learning environment should be a safe place where learners feel a sense of belonging.

Table 6: Framework for environmental literacy pedagogical and andragogical content knowledge (EL-PACK) for outdoor instructors

| EL-PACK Criteria                          |                                                                                                                     | <i>Evident when the instructor . . .</i>                                                                                                                                                                                                                                                                 |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Belief in ability to teach (BiAtT)</b> |                                                                                                                     |                                                                                                                                                                                                                                                                                                          |
| 1                                         | Beliefs about outcome expectancy                                                                                    | Recognises the ability and importance of children and adults developing environmental literacy and the role that OAAs can play in affirming a more sustainable future.                                                                                                                                   |
| 2                                         | Beliefs about responsibility and capacity to make a difference (Personal environmental education teaching efficacy) | Recognises the opportunity and potential of OAAs to increase participants' environmental literacy.<br>Recognises their role as an essential factor for making a difference and is constructively critical of practice to improve participant outcomes.                                                   |
| <b>Subject knowledge</b>                  |                                                                                                                     |                                                                                                                                                                                                                                                                                                          |
| 3                                         | Purpose of content knowledge                                                                                        | Acknowledges the importance of environmental knowledge, attitudes and emotions to enable competent decision making that can empower some form of pro-environmental behaviour.                                                                                                                            |
| 4                                         | Knowledge of theory                                                                                                 | Discusses different approaches that can be taken to enhancing environmental literacy with different groups of adults and children. Demonstrates knowledge of local flora and fauna, history and geography, and global environmental challenges, and how the information can be shared with participants. |

### Chapter 3

| EL-PACK Criteria                              |                                                                           | <i>Evident when the instructor . . .</i>                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5                                             | Knowledge of resources                                                    | Recognises resources available that can be used to initiate conversations or activities. These could be natural features of the landscape, or physical resources that can be taken on the OAA (e.g. microscope or water-testing kit etc.), or the activities themselves.                                                                                                             |
| 6                                             | Knowledge of examples                                                     | Is competent using examples to illustrate an environmental concept being talked about.                                                                                                                                                                                                                                                                                               |
| <b>Pedagogical and andragogical knowledge</b> |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                      |
| 7                                             | Beliefs about the nature of teaching and learning for children and adults | Understands how the instructor-client relationship changes between adults and children. Encourages greater collaboration from adult participants and respects how their past experiences shape their beliefs. Embraces the role-model position when working with children and takes the opportunity to actively build knowledge, attitudes, and skills, to empower behaviour change. |
| 8                                             | Safe environment for belonging                                            | Creates a positive rapport with clients in a professional and inclusive manner that enables vulnerability and trust for environmental conversations and activities.                                                                                                                                                                                                                  |
| 9                                             | Participant thinking                                                      | Shows an understanding and respect for philosophical worldviews (i.e. an ecocentric, environment-centred view, or an anthropocentric, human-centred view). Recognises climate anxiety, denial and advocacy and communicates appropriately to meet people where they are, without being intimidating or patronising.                                                                  |
| 10                                            | Participant thinking—misconceptions                                       | Acknowledges the source of information to recognise their own misconceptions, as well as other peoples. Can direct participants to reliable sources of information and takes initiative to fact-check their information before sharing with participants.                                                                                                                            |

| <b>EL-PACK Criteria</b>                        |                                             | <b><i>Evident when the instructor . . .</i></b>                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11                                             | Participant effect (in relation to content) | Tailors environmental communications and activities to the audience to respect participant thinking. E.g., communications with someone who is anxious may revolve around up-skilling and sharing things they can do. Communications with denialists may start with building an emotional connection and sharing information.                         |
| 12                                             | Difficulty of task                          | Recognises the mental and physical difficulty of the OAA for participants and chooses appropriate times to integrate environmental communication and/or activities. Meets participants where they are in relation to their environmental literacy and leaves them inspired to learn more rather than overwhelmed.                                    |
| <b>Subject knowledge in a delivery context</b> |                                             |                                                                                                                                                                                                                                                                                                                                                      |
| 13                                             | Representations of concepts                 | Understands different ways to approach the subject of environmental literacy, without necessarily using the ‘environmental literacy’ terminology. E.g., thinking of the cognitive and psychological connections, nature connectedness, knowing, doing, believing.                                                                                    |
| 14                                             | Explanations                                | Uses links between the local and global to give participants something tangible to see and understand, and how it contributes to the wider global context. E.g., seeing plastic in the sea or beaches is a local challenge, but also illustrates how items from other cities (or countries) travel through water systems and tidal flows.            |
| 15                                             | Facilitation strategies                     | Discusses or uses different methods of facilitation to address different components of EL. E.g., uses storytelling to share knowledge and inspire attitudes, uses slow-photography activities to engage visual senses, imagination, and sense of nature connection, uses informal goal setting to address skills needed to empower behaviour change. |

### Chapter 3

| <b>EL-PACK Criteria</b> |                                     | <b><i>Evident when the instructor . . .</i></b>                                                                                                                                                                                                                                                                      |
|-------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16                      | Beliefs about the nature of content | Respects the potential for OAAs that goes beyond the adrenaline and risk element and recognises the deeper environmental learning that can be achieved.                                                                                                                                                              |
| 17                      | Application of content              | Demonstrates how participant thinking, and misconceptions influence the choice of environmental communications or activities. Demonstrates where different environmental communications or activities would be suitably integrated into OAAs with different groups.                                                  |
| 18                      | Deconstructing content              | Articulates the four components of environmental literacy and chooses activities consciously to develop the appropriate component their group would benefit from.                                                                                                                                                    |
| 19                      | Structure and connections           | Structures the OAA in a manner that promotes environmental literacy development. Makes connections between the OAA and components of environmental literacy as well as connections between the local place, the participants' locality, and the global context.                                                      |
| 20                      | Procedural knowledge                | Builds environmental literacy into the OAA through a process to suit the participants. E.g., using activities to engage participants attitudes and emotional connection, then sharing knowledge about the local area, how it connects to a global context, and what they can do in their life in a personal context. |
| 21                      | Methods of solution                 | Facilitates discussions of how to reduce impact (1) in the local area (e.g. treading lightly, leave no trace etc) (2) in a personal context (e.g. using eco-products, planting bee-friendly plants) and (3) and for a global context (e.g. reducing carbon footprints).                                              |

### Chapter 3

| EL-PACK Criteria                               |                                           | <i>Evident when the instructor . . .</i>                                                                                                                                                                                                                                                             |
|------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Delivery knowledge in a subject context</b> |                                           |                                                                                                                                                                                                                                                                                                      |
| 22                                             | Reviewing approaches                      | Uses informal reviewing techniques with individuals and/or the group throughout and/or at the end of the OAA to reflect on how engagement with the environment through their experience has influenced their knowledge, attitudes, skills, and motivation for adopting pro-environmental behaviours. |
| 23                                             | Getting and maintaining participant focus | Integrates an appropriate degree of environmental communication and activity to keep participants engaged and interested, without detracting from the OAA experience.                                                                                                                                |
| 24                                             | Goals for learning                        | Introduces an environmental lens on the OAA at the beginning of the session and sets informal goals for participants to think about.                                                                                                                                                                 |

Just as the framework by Dymont *et al.* (2018b) has been used to inform pre-service outdoor educator training (North, 2022, personal communication), the aim of the EL-PACK framework was to inform the development of an environmental literacy course for outdoor instructors. The framework outlines knowledge and competencies that should be held by outdoor instructors to effectively engage and educate their clients (adults and children) in the environment. From understanding what is required of outdoor instructors, the course can work backwards to address what content is required of a course to fulfil the qualities listed in the framework.

## Chapter 4 Overarching research methodology

### 4.1 Introduction

This research responds to the recognised opportunities and potential of outdoor adventure activities (OAAs) to address current societal challenges (Brown and Beames, 2017) by actively contributing to the development of environmental literacy. To do this, the research uses a design-based research approach (DBR) to create, test, and evaluate a course for outdoor instructors to increase environmental literacy pedagogical and andragogical content knowledge (EL-PACK) and belief in ability to teach (BiAtT).

The intention of DBR is to formulate design principles which inform and advance knowledge in the subject area. Based on the recommended question structure for DBR by Plomp (2010), and the need for an environmental course for instructors as highlighted in the literature review, the overarching research question asks:

***“What are the characteristics of an effective course for outdoor instructors aimed to advance environmental literacy development through outdoor adventure activities (OAAs)?”***

The design principles identified during the research underpin a standard which, if achieved, present the characteristics of an effective course.

### 4.2 Paradigmatic approach

The suitability of any research design is shaped by the researcher’s ontological, epistemological and axiological considerations (Punch and Oancea, 2014). These considerations influence the researcher’s worldview, and hence influence the research questions, hypotheses, type of data that will be collected and how it will be analysed. This research is grounded in a constructivist paradigm, which aligns with a constructivist ontological and epistemological position and a value-laden and pragmatic axiological stance. A constructivist paradigm is commonly associated with qualitative research methods and whilst this association is not always necessary, a qualitative approach is considered to generate a deeper and richer understanding of individual feelings, expressions and experiences (Punch and Oancea, 2014; Bryman, 2016)



### **4.2.1 Ontological position**

Ontological assumptions underpin a person's beliefs about the nature of reality and the social world, i.e., what exists and how it is understood (Al-Saadi, 2014). In terms of the ontological position of the work, the research aligns with a constructivist position as I believe social phenomena to be subject to change due to social interactions and individuals' experiences, as opposed to objective entities that exist independently of social actors. This ontological standpoint reflects a constructivist paradigm which according to Guba and Lincoln (1994) identifies realities to be locally and socially constructed and dependent on individuals within the group.

Social phenomena and social interactions in OAAs are constantly changing because of colleagues present, clientele, activity, and dynamic risks. To increase the potential for environmental literacy development during OAAs, instructors are required to react to the changing contexts and interactions and apply suitable methods of facilitation, conversation and activity. The course content, teaching methods, and interactions between me and instructors participating in the course will therefore be influenced by both individual perspectives and collective meanings that emerge through the ongoing social processes. Furthermore, in the identification of design principles and subsequent characteristics of an effective course for outdoor instructors, it should be recognised that characteristics are dynamic, context-dependent, and shaped by the lived experiences of the participants as they engage with the natural world.

### **4.2.2 Epistemological position**

Epistemological assumptions deal with the nature of knowledge and how it can be acquired (Al-Saadi, 2014). I believe knowledge to be a direct result of personal experiences, constructed through personal interactions with the world. This aligns the research with a constructivist epistemology. The possibility for OAAs advancing clients' environmental literacy is co-constructed by the interactions and dialogues between clients and instructors, their engagement and immersion in the activity and their reflections on those experiences. This epistemological stance emphasizes the subjective and context-specific nature of knowledge, where learning and environmental literacy development are seen as socially negotiated outcomes that vary based on personal experiences, cultural backgrounds, and environmental contexts. To aid the potential development of environmental literacy, the research focuses on the influence of the instructor

within the OAA context, and how interactions, dialogues and activities can be effectively used to enhance the OAA experience.

### 4.2.3 Axiological position

Axiological assumptions relate to the values and ethics which guide the research. For researchers following a constructivist paradigm, Guba and Lincoln (2005, p.198) expect their axiological beliefs to be that *'propositional, transactional knowing is instrumentally valuable as a means to social emancipation, which is an end in itself, is intrinsically valuable'*. This indicates the importance of knowledge deriving from interactions between people, environments and all that is contained within the environments, for personal judgement and decision making.

The axiological position of this research is guided by a value-laden and pragmatic approach which is committed to advancing both theory and practice. Environmental literacy is inherently a value-laden concept, tied to ethical considerations about sustainability, conservation, and responsible stewardship of natural resources. As discussed in the introduction and literature review, OAAs often occur in natural environments and are viewed as opportunities for enhancing deeper connections, understanding and awareness of the non-human world. The values embedded in environmental literacy emphasise awareness of ecological issues, critical thinking about human-environment relationships, and the ethical importance of caring for the planet. This supports the value of transactional knowledge being developed and shared between people and environments.

I align myself with ecocentric ethics, which emphasise the intrinsic value of all living and non-living elements of the Earth, regardless of their utility to humans (see Thompson and Barton, 1994). I believe it is important to acknowledge the ethical responsibility that humans have towards the natural world as well as the challenge of mediating a voice for nature, particularly when commercial and business values are reliant on nature as a resource. The research process promotes environmental respect, including both the natural spaces used in OAAs and the ecological systems which these spaces represent. Ethical commitments extend to recognising the agency of non-human nature in these interactions and the ways in which instructors can prompt a deeper respect for the environment.

Pragmatism is referred to as being practical rather than idealistic; adopting theories and methods based on their practical utility as opposed to their underpinning philosophical positioning (Cohen *et al.*, 2018). This pragmatic approach is reflected in the intended practical outcome of the research. The intention of the research is not only to generate theoretical insights

into what constitutes an effective course for outdoor instructors, but also to design, develop and refine a course which applies the newly formulated design principles, to produce a practical means for applying environmental literacy training to outdoor instructors in the real-world context. By focusing on both the theoretical and practical aspects of environmental literacy development, the research aims to create an impactful and relevant contribution to the field of OAs and environmental literacy.

### **4.2.4 Reflexivity**

Reflexivity is an important consideration, particularly in qualitative research where the researcher's role and identity may influence the research process and findings. Reflexivity involves the reflection on personal experiences, biases, values and relationships (Bryman, 2012). It is a process of critically examining one's own involvement in the research and recognising how one's perspective might influence data collection, analysis and interpretation (Bryman, 2012).

Considering my personal background and values which have influenced the research (see section 1.4), it would be impossible to eradicate all preconceptions, based on my experiences as an outdoor instructor, therefore the study cannot be value neutral. Throughout the research process I actively considered issues such as power dynamics and familiarity in interviews, my personal and emotional investment in promoting environmental literacy and my experiences about learning and facilitating OAs. Throughout the phases of data collection, I considered how my approach to teaching the course could be improved and how to remain value-neutral during the interpretation of data.

## **4.3 Research design**

Design Based Research (DBR) is a pragmatic approach that seeks to design an intervention to solve an educational problem in a real-world context (Plomp, 2010; van Den Akker, 2010; Hogue, 2013). The approach fits well within the constructivist paradigm as it enables the generation of knowledge that is grounded in practice and responsive to evolving needs and challenges. Furthermore, it focuses on a practical contribution to understanding and implementing the development of learning by increasing the understanding of effective intervention characteristics, and instructional design theory (Collins *et al.*, 2004; van Den Akker, 2010).

DBR is carried out through iterations of problem identification, intervention solutions, evaluation, adaption, and re-evaluation, to assess for changes and developments that will achieve the end goal (Plomp, 2010; Hogue, 2013). The process can be illustrated in a number of ways, though it usually has some form of cyclical element that highlights the iterations of development (Plomp, 2010).

The use of DBR for a PhD thesis could be questioned as literature has suggested its use to be suitable only for long-term projects that contain multiple iterations (Walker, 2006; Shah *et al.*, 2015). Given the time constraints for collecting empirical data for a PhD, multiple iterations of research are not always possible (McKenney and Reeves, 2012). However, Pool and Laubscher (2016) examine the suitability of the methodology for short-term projects arguing the method can still be used to produce “*significant and valid design-principles*” (p.8), assuming the relevant phases of research are followed.

I found no literature about DBR being used in outdoor education or OAA settings, however Dadswell *et al.* (2022) used a similar iterative approach to investigate the design-thinking traits (“i.e. feedback seeking, integrative thinking, optimism, experimentalism, and collaboration”, Dadswell *et al.*, 2022, p.3) of outdoor educators. Their data collection took place over a 6-week period and comprised four 2-hour sessions with the same participant group (Dadswell *et al.* 2022, p.1). Moreover, Monte and Reis (2021) followed a DBR approach with three iterations, to design, develop, evaluate and review a pedagogical model of education for environmental citizenship in primary education. From careful consideration of the timescale and quantity of data collection by Dadswell *et al.* (2022), and the number of iteration cycles used by both Dadswell *et al.* (2022) and Monte and Reis (2021), in addition to the reasoning by Pool and Laubscher (2016) that DBR can be used effectively for short-term projects, I decided it was the most suitable methodology for the proposed study.

Influenced by Reeves (2006) and McKenney and Reeves (2012), Pool and Laubscher (2016) illustrate DBR as a cyclical process containing micro-, meso- and macro- cycles (see Figure 8). The macro-cycle illustrates the whole research process, within which are smaller phases (meso-cycles and micro-cycles). Meso-cycles represent an iterative part of the research. In the first meso-cycle in Figure 8, Pool and Laubscher (2016) show two micro-cycles; they conducted their ‘intervention: redesign of course’, followed by their ‘empirical: pre-test and interviews’. Without stating how many iterations of this meso-cycle were conducted, Pool and Laubscher (2016) are inferring that these two steps were repeated a number of times before moving on to the next meso-cycle. The next meso-cycle in Figure 8 has three micro-cycles therefore, once this step of

research was reached, these three micro-cycles would have been repeated in several iterations, before the research was concluded.

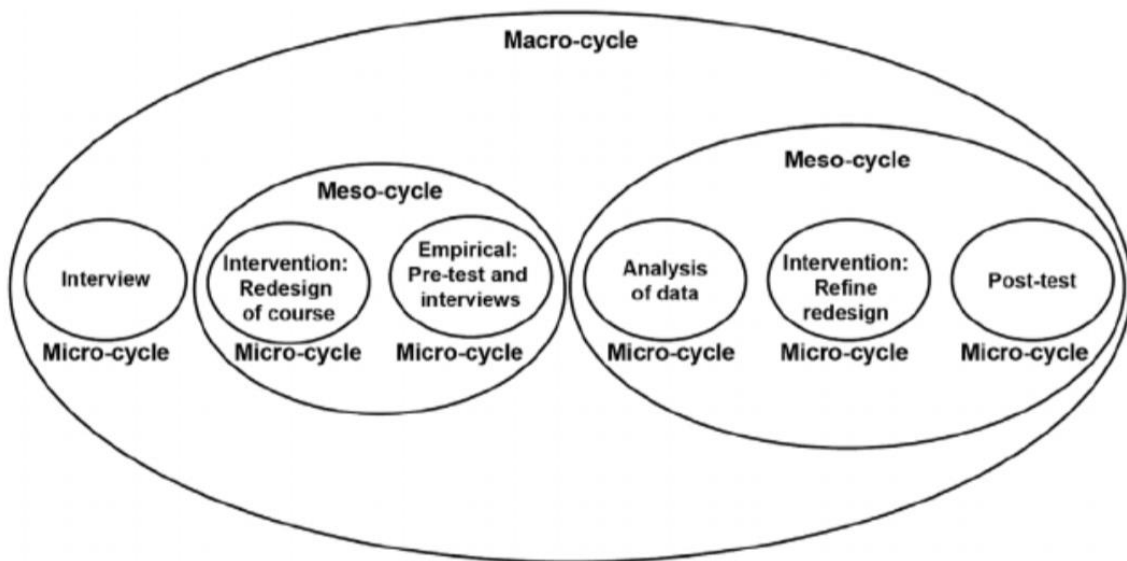


Figure 8: Conceptualisation of design-based research as a process of cycles within a short-term project (Pool and Laubscher, 2016, p.8)

In addition to the iterative approach of DBR, it also typically uses a range of phases and methods to assess for validity, feasibility, practicality and effectiveness (Plomp, 2010; McKenney and Reeves, 2014). There are various structures used to meet these needs; Plomp (2010) presents a set of evaluation criteria related to three phases of research: preliminary, prototyping, and evaluation, while McKenney and Reeves (2014) categorise four stages of research: a developer screening, expert appraisals, piloting, and the try-out. Although their structures of research differ, both include a phase for conducting expert appraisals. Expert appraisals (interviews or focus groups with experts in the subject) at an early stage of the research process is widely recommended by DBR theorists to assess the validity and feasibility of a prototype (Tessmer, 1993; Plomp, 2010; McKenney and Reeves, 2014).

Table 7 illustrates how the two structures of research use different terminology and amount of empirical work; however, both operate under the sphere of DBR. Shaded cells (also marked with an \*), indicate empirical research.

Table 7: Different phases of research used in design-based research based on the work of Plomp (2010) and McKenney and Reeves (2014)

|                                   | <b>Review of literature</b> | <b>Development of prototype</b> | <b>Expert appraisals</b> | <b>Trialling of intervention</b> |             |
|-----------------------------------|-----------------------------|---------------------------------|--------------------------|----------------------------------|-------------|
| <b>Plomp (2010)</b>               | Preliminary                 | Prototyping*                    |                          |                                  | Evaluation* |
| <b>McKenney and Reeves (2014)</b> |                             | Developer screening*            | Expert appraisals*       | Piloting*                        | Try-out*    |

(\* indicates empirical research)

I chose to base my research on the recommendations from Plomp (2010), using the preliminary, prototyping and evaluation design. This was best suited to me as given my time restrictions I felt it was unfeasible to develop the course in collaboration with external partners or by collecting additional empirical data (as would be expected of the developer screening and piloting of the intervention). I modified the model by Plomp (2010) slightly by having two phases of prototyping; firstly the expert appraisals, and secondly the course trialling. I did this for ease of presentation in the thesis so that each part of the course prototyping could have its own methodology and chapter. The four phases used in this thesis are:

1. An initial prototype of an environmental literacy course, based on a review of literature (preliminary)
2. Expert appraisals (prototyping)
3. Trialling the course with outdoor instructors (prototyping continued)
4. Reviewing the course (evaluation)

Influenced by the work of Pool and Laubscher (2016) and Plomp (2010), Figure 9 presents the structure of my DBR. Text in the square edged boxes give context as to how the methods were used in the context of this research.

Like Pool and Laubscher (2016), Figure 9 illustrates the research process as containing a combination of micro- and meso-cycles. The first meso-cycle (in phase two) consisted of six expert appraisals. Data were collected qualitatively via semi-structured interviews and was reviewed between each appraisal. Areas of interest were brought to the attention of the next expert/s interviewed to consult their opinion. The course material was not changed between appraisals. The analysis of data were instead used to influence additional interview questions.

## Chapter 4

Once all iterations in this meso-cycle were completed the course was modified based on the findings.

Prior to the second meso-cycle (phase 3), a pre-course survey was administered to participants. Four iterations of course trialling took place, and qualitative data were taken in the form of field notes and participant feedback. Data were reflected upon between each course, and the course was modified where necessary before subsequent iterations.

As a course to this effect will constantly need updating and changing to meet instructor needs, latest information and best practice, modifications made to the course based on the post-course survey and evaluation interviews presents a 'latest' version of environmental literacy course material, that will inevitably change as the course continues to evolve in practice.

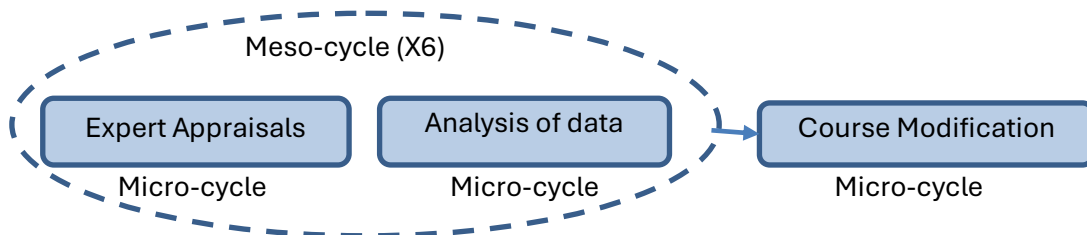
A detailed breakdown of each phase of research (the methodology, participants, etc) is shown in the chapters relevant to each phase.

### PHASE 1 (Preliminary)

Development of course material based on the components of environmental literacy and criteria from the EL-PACK framework.

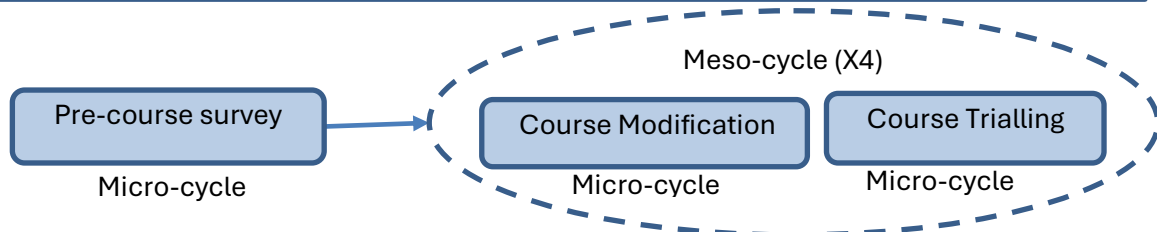
### PHASE 2 (Prototyping)

Phase 2 conducted six iterations of expert appraisals with eight industry experts (one interview was a group interview with three experts). Data were collected qualitatively through semi-structured interviews and data were reviewed, coded, and analysed between each interview.



### PHASE 3 A&B (Prototyping continued)

3A: A pre-course survey was administered before each course to collect quantitative data about instructors EL-PACK and BiAtT.  
 3B: The course was trialled four times with different groups of instructors (32 in total). Reflections from each course were used to modify the material before subsequent iterations took place.



### PHASE 4 A&B (Evaluation)

4A: A post-course survey was administered three months after participation to evaluate whether the course had influenced instructor practice (17 instructors completed).  
 4B: Instructors were invited to take part in an online interview to discuss and evaluate the effectiveness of the course (eight instructors took part).

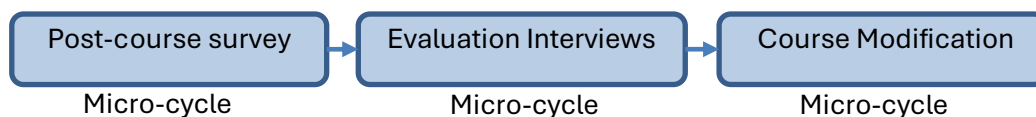


Figure 9: Conceptualisation of design-based research as a method to design, develop, evaluate, and review an environmental literacy course for outdoor instructors



## 4.4 Data collection

The research used a combination of qualitative and quantitative methods of data collection; however, quantitative data (such as that collected from the pre-course survey) was analysed descriptively rather than statistically as no comparisons or generalisations were being made from the sample.

Using a combination of qualitative and quantitative methodologies in research has been popular, particularly in the field of social science and education (Creswell, 2015; Cohen *et al.*, 2018). The terms multi- and mixed- method research have in some cases been used interchangeably, offering no distinction between the two designs and therefore suggesting either term can describe research that involves more than one method (Stange *et al.*, 2006). On the other hand, ‘purist’ mixed methods researchers insist there must be a point of integration between the methods prior to that of the data analysis for the research to really be considered as *mixed* (Cohen *et al.*, 2018). Within the scope of educational research, Creswell and Guetterman (2020) state mixed method designs should involve collection, analysis, and integration of both qualitative and quantitative data in a single or multiphase study.

Qualitative and quantitative data both contribute to understanding the characteristics of an effective course for outdoor instructors and help to inform the development of the design principles. However, the research has no clear point of integration between the data which would make it indicative of a mixed methods project. The research is therefore classed as using multi-methods within its DBR approach. Table 8 gives a summary of the methods used in each phase of research.

Both the model of environmental literacy (see Figure 7 in Section 3.2) and the EL-PACK framework (see Table 6 in Section 3.3) were used as a practical guide to inform the design of the course (Phase 1), as well as being drawn on through an analytical lens for exploration and evaluative purposes (Phases 2, 3 and 4). While not all the 24 criteria in the EL-PACK framework were measured directly through the phases of data collection, the framework as a whole was used to inform my decision making and guide my reflection on how the course could be improved. A detailed account of the methods used for each phase of research is provided in their respective chapters.

Table 8: A summary of the data collection and analysis processes within each phase of research

| Phase    | Summary of data collection and analysis process                                                                                                                                                                                                                                                     |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Phase 1  | Review of literature based on the components of environmental literacy and the framework for EL-PACK as identified in the conceptual framework.                                                                                                                                                     |
| Phase 2  | Audio-recorded semi-structured interviews and one group interview with experts. Recordings were transcribed and transcripts were coded inductively. Codes were categorised using thematic analysis.                                                                                                 |
| Phase 3A | A pre-course survey collected quantitative data by asking Likert-style questions. Data from all respondents were pooled and analysed descriptively.                                                                                                                                                 |
| Phase 3B | Online courses were recorded, and automatic transcripts were produced. Field notes were taken by me during the course to highlight a comment or conversation that I wanted to refer to. Recordings and field notes were coded thematically under 'overall value' and 'responses to course content'. |
| Phase 4A | A post-course survey collected quantitative data by asking Likert-style questions as well as qualitative data by asking open questions. Data were analysed exploratively to influence interview questions.                                                                                          |
| Phase 4B | Audio-recorded semi-structured interviews with instructors. Recordings were transcribed and transcripts were coded inductively to generate themes based on participant responses to the interview questions.                                                                                        |

The survey instruments used in phases 3A and 4A were not tested for internal reliability or for construct validity as although they collected quantitative data, the data were explored through a qualitative lens to present indicative findings as opposed to definitive results. Furthermore, even if quantitative statistics had been carried out, the number of participants would have produced insignificant conclusions. To overcome this limitation, I have triangulated data through the different stages of iterations (for example, some survey items are further explored in the course trialling and in the evaluation interviews). In addition, I have documented the development of interview questions, and the coding processes used in phases 2 and 4B, and have detailed the development of the survey items used in phases 3A and 4A as well as running a pilot study (for phase 3A) and collaborating with my supervisors to assess and refine questions.

## 4.5 Participants

Eight participants were involved in phase two of the research, all of whom were experts in some aspect of the outdoor sector. Thirty-two outdoor instructors were involved in phase three of the research trialling: five in person and twenty-seven online, from various locations around Wales, England, and Scotland. Seventeen of the thirty-two instructors completed the post-course survey in phase four, and eight of these respondents took part in the evaluation interview. A summary of these numbers is shown in Table 9. Specific information about participant selection and their involvement in the outdoor sector is provided in the respective relevant sections; 6.1.1 (for phase 2) 7.1.1 and 8.1.1 (for phases 3A and B), and 9.1.1 (for phase 4).

Table 9: A summary of participants involved in different phases of research

| Phase                              | Number of participants |
|------------------------------------|------------------------|
| 1 – Development of course material | N/A                    |
| 2 – Expert appraisals              | 8                      |
| 3A – Pre-course survey             | 34                     |
| 3B – Course trialling*             | 32                     |
| 4A – Post-course survey*           | 17                     |
| 4B – Post-course interview*        | 8                      |

\* Participants were recruited from the previous phase so were not new to the research.

## 4.6 Ethical considerations and approval

The research is influenced by my ecocentric values and is guided by the Economic and Social Research Council (ESRC) (2023) principles of ethical research which highlight respect, voluntary participation, transparency, integrity, informed consent, social responsibility and accountability. Ethical considerations were reflected on throughout all phases of the research to ensure participants in each phase were recruited and treated fairly, and to account for any emotional or psychological impact of environmental discussions. Ethical approval was granted by the University of Southampton Ethics Committee on the 23<sup>rd</sup> of September 2022, (ERGO number: 77501) with permission to commence research on the 1<sup>st</sup> October 2022 (see Appendix B.1). The research followed guidelines from the British Educational Research Association (BERA) (2018) and the ESRC (2023) to ensure the protection of participants and the integrity of the research

process. A detailed process of data collection for each phase is presented in the relevant chapters (see sections 6.1.2, 7.1.2, and 8.1.2).

Participants were given detailed information sheets and consent forms outlining the research's aims, their involvement, and their rights to withdraw at any time. Participants were informed that audio and video recordings would be used at times throughout the research process to collect data from interviews and the course trialling. Participants were given access to their own transcript upon request. Data collected from surveys was anonymous unless participants opted into future communication and research, in which case identifiable data were stored securely. In all cases, participants were informed their data would be pseudonymised at the earliest opportunity and that their participation in the study would remain anonymous.

One of the six key principles of ethical research identified by the ESRC (2023) is that '*research should aim to maximise benefit for individuals and society and minimise risk and harm*'. In this respect, this research seeks to maximise benefits to individuals and society by improving training on environmental literacy. As discussed in the paradigmatic approach, this research values society inclusive of human and non-human nature, and therefore strives to increase environmental literacy for the benefit of both people and planet. Given the course's environmental focus however, a key ethical concern for safeguarding the participants was the potential for the content to evoke climate anxiety (see Clayton, 2020). The course was designed to avoid overwhelming participants and instead promoted constructive engagement, agency, and solution-oriented perspectives. Instructors were encouraged to consider how environmental conversations might affect their clients and how conversations may differ between people age, gender, and beliefs about environmental values. Participants are reminded during the course that eco- or climate-anxiety is a rational and valid response to current environmental challenges and that there are healthy and constructive ways to process it through creativity, community and therapy which are signposted during the course.

## Chapter 5 Phase 1: Development of course material for an environmental literacy course for outdoor instructors

Phase 1 of research consisted of developing the initial course material to be used for the environmental literacy course. The modules for the course were chosen based on the components of environmental literacy (knowledge, attitudes and emotions, skills and behaviours), and the criteria in the EL-PACK framework, as identified in Chapter 3.

### 5.1 Course objectives

The environmental literacy course began with four learning objectives which intended to address the research problem and satisfy the criteria in the EL-PACK framework (see Section 3.3). The reasoning behind the chosen objectives and how they address the EL-PACK criteria are shown in the objective mapping below, along with which course module/s it features in.

**Objective 1:** For instructors to understand the concept of environmental literacy and why it is important for a sustainable future.

The literature review highlighted the rhetoric reality gap indicating that expectations for environmental development during OAAs are likely to be greater than actual environmental development, unless the instructor is suitably trained. It also highlighted the call for a sustainable paradigm shift in the outdoor sector to address current societal problems. The intention of objective 1 was to highlight these issues and inspire and motivate instructors to be part of a positive environmental movement. Table 10 presents the EL-PACK criteria addressed by objective 1 and which module the content is covered in.

Table 10: EL-PACK criteria addressed by objective 1. The criteria numbers and statements reflect their position in the EL-PACK framework (see Section 3.3)

| Criteria from EL-PACK framework                |                              | Course module   |
|------------------------------------------------|------------------------------|-----------------|
| <b>Subject knowledge</b>                       |                              |                 |
| 3                                              | Purpose of content knowledge | 1. Introduction |
| <b>Subject knowledge in a delivery context</b> |                              |                 |

|    |                                     |                 |
|----|-------------------------------------|-----------------|
| 16 | Beliefs about the nature of content | 1. Introduction |
|----|-------------------------------------|-----------------|

**Objective 2:** For instructors to become competent and confident in their ability to engage and educate others about environment concepts.

The literature review and the conceptual framework highlighted the work of Rouse (2006) and Moseley *et al.* (2016) who emphasised the importance of belief for being an effective teacher. Objective 2 intended to increase instructors' belief in ability to teach by enhancing their subject knowledge and their understanding of their opportunities and potential for influencing others. Table 11 presents the EL-PACK criteria addressed by objective 2 and which modules the content is covered in.

Table 11: EL-PACK criteria addressed by objective 2. The criteria numbers and statements reflect their position in the EL-PACK framework (see Section 3.3)

| Criteria from EL-PACK framework                |                                                                           | Course module           |
|------------------------------------------------|---------------------------------------------------------------------------|-------------------------|
| <b>Belief in ability to teach</b>              |                                                                           |                         |
| 1                                              | Beliefs about outcome expectancy                                          | All modules             |
| 2                                              | Beliefs about responsibility and capacity to make a difference            | 1. Introduction         |
| <b>Pedagogical and andragogical knowledge</b>  |                                                                           |                         |
| 7                                              | Beliefs about the nature of teaching and learning for children and adults | 3. Participant thinking |
| <b>Subject knowledge</b>                       |                                                                           |                         |
| 4                                              | Knowledge of theory                                                       | All modules             |
| 5                                              | Knowledge of resources                                                    | All modules             |
| 6                                              | Knowledge of examples                                                     | All modules             |
| <b>Delivery knowledge in a subject context</b> |                                                                           |                         |
| 23                                             | Getting and maintaining participant focus                                 | 3. Participant thinking |

**Objective 3:** For instructors to become aware of different facilitation strategies for developing environmental knowledge, attitudes, skills, and behaviours

The literature review explored a range of pedagogies used in outdoor education to increase different components of environmental literacy (see Section 2.2.1). Although these were education focused rather than for OAAs, less formal activities can be transferred and used by instructors. This objective intended to educate instructors about different strategies they can use

to enhance their clients' environmental literacy. Table 12 presents the EL-PACK criteria addressed by objective 3 and which modules the content is covered in.

Table 12: EL-PACK criteria addressed by objective 3. The criteria numbers and statements reflect their position in the EL-PACK framework (see Section 3.3)

| Criteria from EL-PACK framework                |                           | Course module                                                      |
|------------------------------------------------|---------------------------|--------------------------------------------------------------------|
| <b>Subject knowledge in a delivery context</b> |                           |                                                                    |
| 15                                             | Facilitation strategies   | 4. Nature connectedness<br>5b. Storytelling<br>5c. Citizen science |
| 18                                             | Deconstructing content    | All modules                                                        |
| 19                                             | Structure and connections | All modules                                                        |
| 20                                             | Procedural knowledge      | All modules                                                        |
| 21                                             | Methods of solution       | 3. Participant thinking                                            |

**Objective 4:** For instructors to become capable of reading group dynamics, choosing activities and framing them appropriately to make activities relatable and beneficial to the group.

The literature review emphasised the idea of pedagogical content knowledge (PCK) for being an effective teacher. The PCK framework by Dymont *et al.* (2018b) was extended in the conceptual framework to include assumptions about andragogy, given that instructors are working with adults as well as children. The purpose of having pedagogical and andragogical content knowledge (PACK) is that instructors have knowledge of subject, knowledge of delivery, and knowledge of how to deliver the knowledge to different clientele in different situations.

Objective 4 therefore addresses the principles of PACK by targeting participant thinking and how different delivery strategies should be implemented depending on the nature of the group. Table 13 presents the EL-PACK criteria addressed by objective 4 and which modules the content is covered in.

Table 13: EL-PACK criteria addressed by objective 4. The criteria numbers and statements reflect their position in the EL-PACK framework (see Section 3.3)

| Criteria from EL-PACK framework                |                                                                | Course module                                |
|------------------------------------------------|----------------------------------------------------------------|----------------------------------------------|
| <b>Pedagogical and andragogical knowledge</b>  |                                                                |                                              |
| 7                                              | Beliefs about the nature of teaching and learning for children | 3. Participant thinking                      |
| 8                                              | Safe environment for belonging                                 | 3. Participant thinking                      |
| 9                                              | Participant thinking                                           | 2. What is nature<br>3. Participant thinking |
| 10                                             | Participant thinking— misconceptions                           | 2. What is nature<br>3. Participant thinking |
| 11                                             | Participant effect (in relation to content)                    | 3. Participant thinking                      |
| 12                                             | Difficulty of task                                             | 3. Participant thinking                      |
| <b>Subject knowledge in a delivery context</b> |                                                                |                                              |
| 13                                             | Representations of concepts                                    | 1. Introduction                              |
| 14                                             | Explanations                                                   | All modules                                  |
| 17                                             | Application of content                                         | 3. Participant thinking                      |
| <b>Delivery knowledge in a subject context</b> |                                                                |                                              |
| 22                                             | Reviewing approaches                                           | 3. Participant thinking                      |
| 23                                             | Getting and maintaining participant focus                      | 3. Participant thinking                      |
| 24                                             | Goals for learning                                             | 3. Participant thinking                      |



## 5.2 Overview of course material

The facilitation of outdoor instructor courses varies depending on the style of course and how much information needs to be covered within the allotted time. For similar courses aimed at increasing environmental learning (see Section 2.3), these ranged from short add-ons within an activity qualification, to stand-alone courses lasting five days. Both the LNT courses and the Chesapeake Bay professional development programme consisted of a mixture of theory and practical elements. For the environmental literacy course to be a viable outcome of the research, its development had to consider a realistic timeframe and an appropriate theory-practical balance in addition to the material and content being included.

Course material consisted of a participant handbook and presentation slides. This aligns with material used for similar courses provided for outdoor instructors, such as First Aid courses, the Rock-Climbing Instructor, Paddle-Sports Leader, Mountain Leader, and Coastal Navigation, etc (see Paddle UK Awarding Body website for paddle-sport qualifications, or the Mountain Training website for Mountain and climbing courses).

The course presentation was developed to assist in the teaching of the course to outdoor instructors. Writing the presentation and detailing time for activities to practise components of environmental literacy development resulted in an anticipated presentation time of eight hours. A traditional ‘death by PowerPoint’ mode of facilitation was unfavoured for the course given the nature of the intended participants (see Section 2.2.3). Through a combination of experience from attending activity courses, working as an activity instructor, and completing an undergraduate BSc in Outdoor Adventure Leadership and Management alongside other outdoor instructors and enthusiasts, sitting for too long can create a distressing and hollow learning environment. Experiential processes of ‘learning through doing’ were favoured for their involvement of movement and discussion.

My initial decision was that the environmental literacy course should run over two consecutive days, with four hours each day being presented and taught through theory and interactive discussions, and four hours each day being dedicated to the practice of facilitation through an OAA.

### 5.2.1 Participant handbook

In the outdoor sector, courses generally have a participant handbook or an assessment guidance which summarise the course content, objectives, syllabus (if required) and delivery. The handbooks also highlight any prerequisites that may be needed to take part in the course and outline the remit of what the qualification or certification enables the individual to do. For example, in the assessment guidance for the Sea Kayak Leader Tidal qualification it states “*the qualification is appropriate for leading others on journeys on moderate sea. This includes a stretch of coastline with some areas where it is not easy to land but there will always be straightforward land points a maximum of two nautical miles apart, crossings not exceeding two nautical miles, up to 2 Knots of tide (but not involving tide race or overfalls). Wind strengths do not exceed Beaufort force 4. Launching and landing through surf (up to 1 metre, trough to crest height)*” (British Canoeing, 2024, p.2)

This introduction to the aim of the qualification highlights the limitations and advantages of the award, enabling individuals to see whether the course is suitable for them. In comparison to activity and first aid qualifications where remits are necessary to ensure safety and protect liability, the nature of environmental literacy communications or activities is such that I have not included a remit for teaching. Instead, the course is designed to add a capacity of value to instructors’ already existing PACK, and in doing so contribute to environmental learning.

The final version of the course handbook for the environmental literacy course being developed is shown in Appendix C.1. The handbook shows an overview of the course, outlining the course modules to give participating instructors an idea of what the course entails. The modules within the course are detailed in Section 5.3 below, however the module titles are:

1. An introduction to environmental literacy
2. What is nature
3. Participant thinking
4. Nature connectedness
5. Environmental knowledge (citizen science and storytelling)

## 5.2.2 Course presentation

The following section details the content of the course developed and presents a selection of the presentation slides that are a key component of the course. Under each module heading is a table highlighting which of the EL-PACK criteria the module contributes to.

## 5.3 Course presentation material

### 5.3.1 Module 1: Introduction

Table 14 summarises the EL-PACK criteria addressed in module 1.

Table 14: EL-PACK criteria addressed in module 1; introduction to environmental literacy

| Criteria from EL-PACK framework         |                                                                |
|-----------------------------------------|----------------------------------------------------------------|
| Belief in ability to teach              |                                                                |
| 1                                       | Beliefs about outcome expectancy                               |
| 2                                       | Beliefs about responsibility and capacity to make a difference |
| Subject knowledge                       |                                                                |
| 3                                       | Purpose of content knowledge                                   |
| 4                                       | Knowledge of theory                                            |
| 5                                       | Knowledge of resources                                         |
| 6                                       | Knowledge of examples                                          |
| Subject knowledge in a delivery context |                                                                |
| 13                                      | Representations of concepts                                    |
| 14                                      | Explanations                                                   |
| 16                                      | Beliefs about the nature of content                            |
| 18                                      | Deconstructing content                                         |
| 19                                      | Structure and connections                                      |
| 20                                      | Procedural knowledge                                           |

#### 5.3.1.1 Module 1a: Introduction to the importance of environmental literacy

The introductory slides show the definition of environmental literacy (see Figure 10 **Error! Reference source not found.**) and emphasise the potential that OAAs can have for increasing pro-environmental behaviours (PEBs). Instructors were shown quotes by the IOL and Lugg (see Figure 11 **Error! Reference source not found.** and Figure 12 **Error! Reference source not found.**) and challenged by asking what they believe their role is in the outdoor sector, and whether they believe they are sufficiently knowledgeable and skilful to be able to meet these expectations.

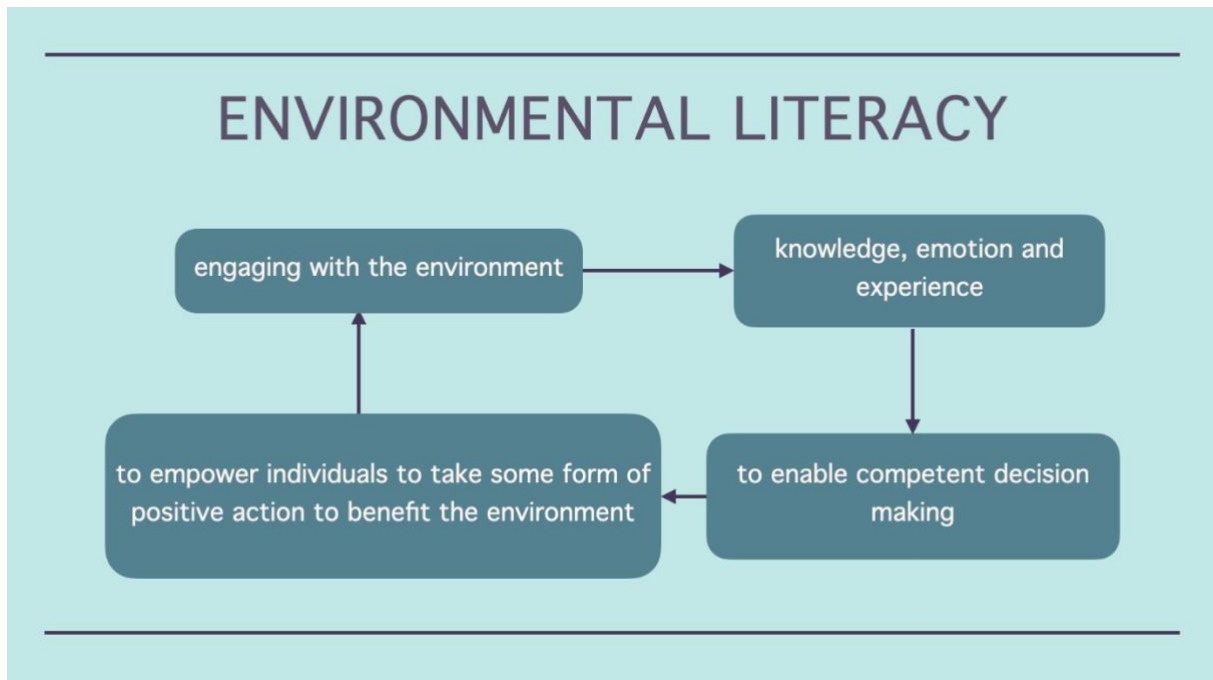


Figure 10: Introductory slide for the environmental literacy course presentation showing the definition of environmental literacy

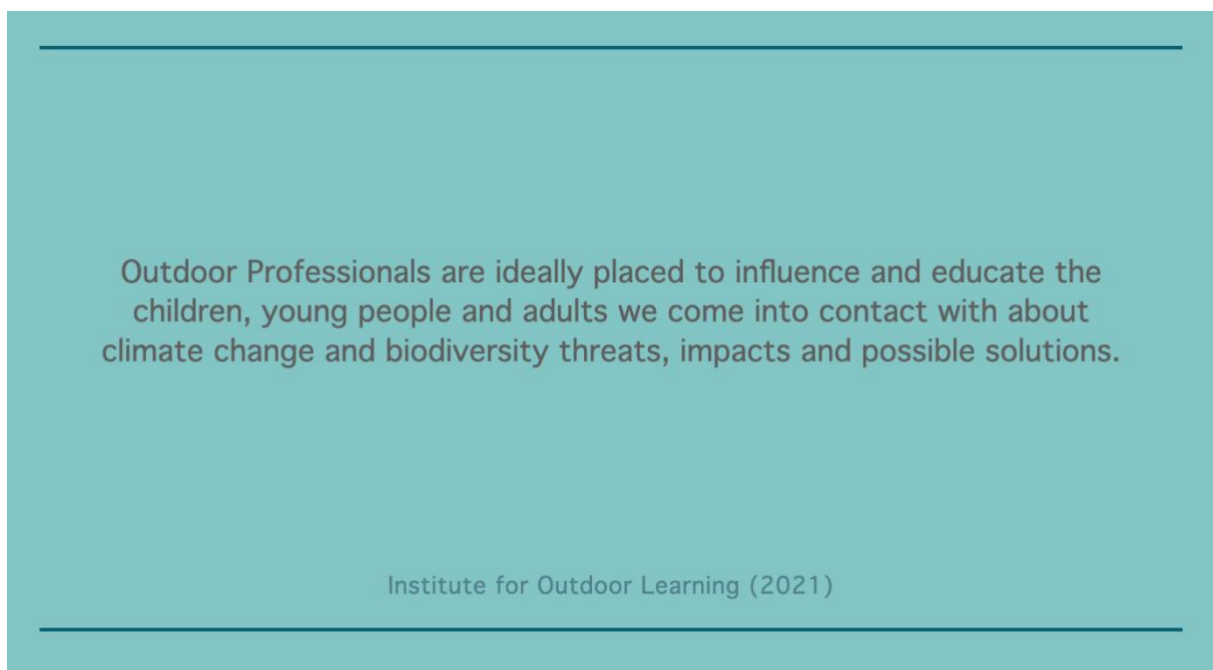


Figure 11: Introductory slide for the environmental literacy course presentation showing the quote by Institute for Outdoor Learning (2021)

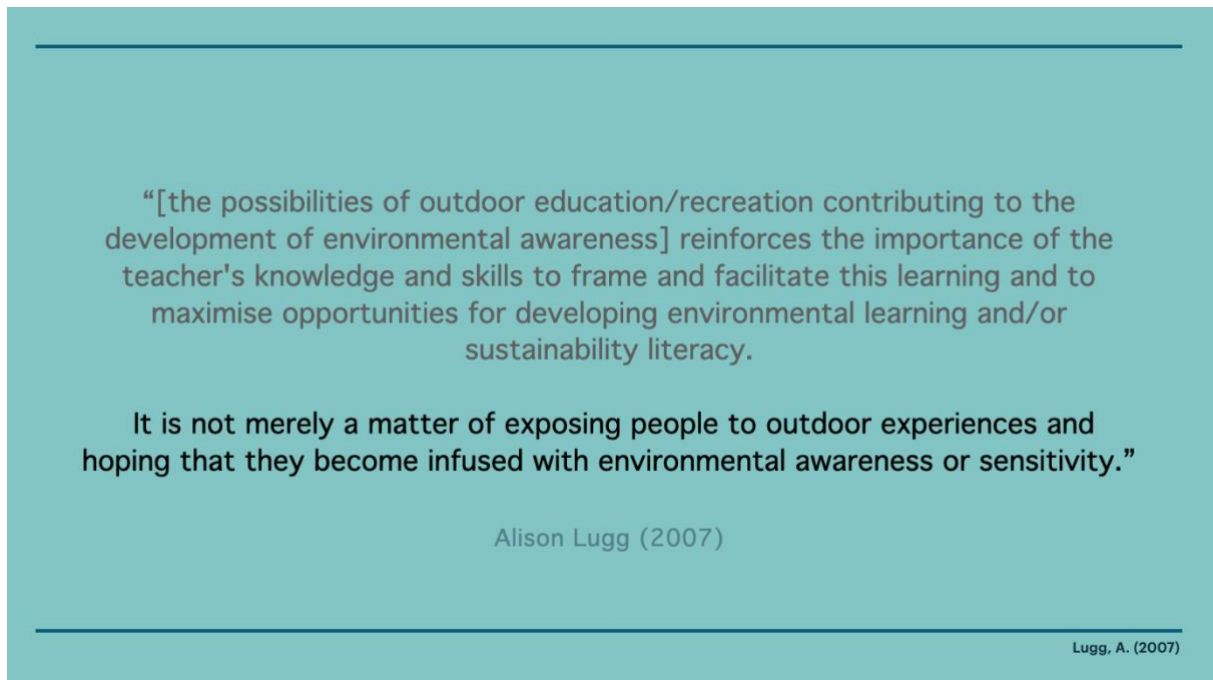


Figure 12: Introductory slide for the environmental literacy course presentation showing a quote by Alison Lugg (2007)

#### 5.3.1.2 Module 1b: Introduction to EL-PACK

As the language of EL-PACK can be complicated, particularly for those unaccustomed with academic work or language, the course introduces an alternative way to think about environmental literacy, using the 'knowing, doing, believing' theory explained by Rouse (2006) (see Section 2.2.3.2). The theory of knowing, doing, and believing is used to highlight instructors existing PACK when it comes to leading their OAAs and the decisions they make to keep group members safe and enjoying themselves. Increasing instructor PACK to teach about the environment should not therefore require a whole new skillset, but the adaption of existing knowledge and skills to relate to developing environmental literacy. Figure 13 shows the slide dedicated to the importance of knowing, doing, and believing.

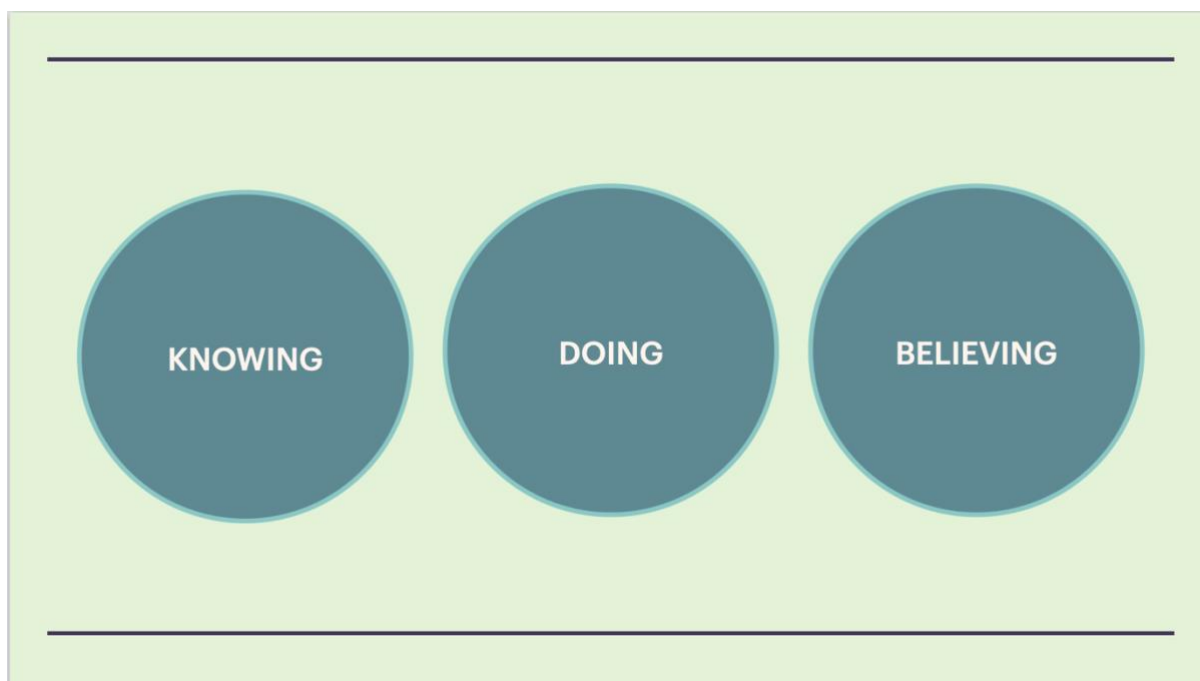


Figure 13: Slide presenting the knowing, doing and believing theory by Rouse (2006) to prompt discussion of EL-PACK

### 5.3.2 Module 2: What is nature?

Table 15 summarises the EL-PACK criteria addressed in module 2.

Table 15: EL-PACK criteria addressed in module 2; ‘what is nature?’.

| Criteria from EL-PACK framework                |                                      |
|------------------------------------------------|--------------------------------------|
| <b>Belief in ability to teach</b>              |                                      |
| 1                                              | Beliefs about outcome expectancy     |
| <b>Subject knowledge</b>                       |                                      |
| 4                                              | Knowledge of theory                  |
| 5                                              | Knowledge of resources               |
| 6                                              | Knowledge of examples                |
| <b>Pedagogical and andragogical knowledge</b>  |                                      |
| 9                                              | Participant thinking                 |
| 10                                             | Participant thinking— misconceptions |
| <b>Subject knowledge in a delivery context</b> |                                      |
| 14                                             | Explanations                         |
| 18                                             | Deconstructing content               |
| 19                                             | Structure and connections            |
| 20                                             | Procedural knowledge                 |

The subjectivity around what nature is can be challenging to come to terms with (Ducarme and Couvet, 2020). In the social sciences, nature has been referred to something that can be experienced (Typhina, 2017; Mcphie and Clarke, 2020), a space or place (Clarke, 2017), a living entity (Whitehead, 1938), or a process (Whitehead, 1929).

Working in the outdoor sector, instructors are frequently working with children and adults who have travelled from urban, or sub-urban areas, into the countryside. Despite feelings of connection to nature being prompted by green-spaces and projects in cities (Melusine, 2018; Bonthoux *et al.*, 2019; Hoyle *et al.*, 2019; Colding *et al.*, 2020; King and Dickinson, 2023), there is an expectation that being in 'big' spaces can elicit awe-inspiring moments that ingrains a stronger psychological connection and appreciation of nature (Kahn and Weiss, 2017).

Kahn and Weiss (2017) introduced the concept of 'big nature' to describe vast spaces that are wild and untamed, large animals and established plantations. They refer to spaces that are free from human civilization and technological advancements, highlighting the importance of visiting 'big nature' to deepen nature interactions, understandings, and connections. In relation to OAAs, many of these would be seen as taking place in 'big' nature, where the locations have thriving biodiversity in 'untamed' ecosystems, and where little human influence is visible to the untrained eye. While this exposure can prompt awe-inspiring moments and recognition of beauty, talking about PEBs and protecting the landscape can risk patronising clients' perception of nature, meaning they have less respect for urban nature due to the scale and beauty they have been exposed to elsewhere (personal experience). This is problematic as the intention of integrating environmental literacy into OAAs is that it empowers clients to adopt some form of positive action to benefit the environment.

Kahn and Weiss (2017) also consider big nature to be a relative concept, by which 'big' is relative to individual subjectivity. A squirrel or fox for example, could be perceived as big by some, or small by others. It is therefore important not to assume nature engagement is only in big nature, but to see 'big nature' in relative terms, through the eyes of the clients. To make experiences in nature relatable to clients, instructors should be compassionate and interested in their clients' perception of nature and seek to learn about nature near to their clients' homes. Instructors should be competent making connections between OAA locality, clients' home locality, and the global context to ensure skills can be transferred and understood in a context away from the activity.



Figure 14: Slide for module 2 ‘what is nature’ to encourage philosophical debates about how people perceive nature, and how it effects participation and outcomes of OAAs

A slide was included in the presentation that consisted of twelve pictures (see Figure 14). All pictures were taken from Google Images under the Creative Commons License. The purpose of the slide was for instructors to discuss what they felt was or was not nature and contemplate whether where they lived and their job etc contributed to their perception.

### 5.3.3 Module 3: Participant thinking

Module 3 covers the different philosophical perspectives about human-nature relationships and encourages an ecocentric ideology among outdoor instructors. The section concludes with a task where outdoor instructors are required to collaborate on PEBs that could be suggested to clients with different epistemological views. Table 16 summarises the EL-PACK criteria addressed in module 3.



Table 16: EL-PACK criteria addressed in module 3; participant thinking

| <b>Criteria from EL-PACK framework</b>         |                                                                           |
|------------------------------------------------|---------------------------------------------------------------------------|
| <b>Belief in ability to teach</b>              |                                                                           |
| 1                                              | Beliefs about outcome expectancy                                          |
| <b>Subject knowledge</b>                       |                                                                           |
| 4                                              | Knowledge of theory                                                       |
| 5                                              | Knowledge of resources                                                    |
| 6                                              | Knowledge of examples                                                     |
| <b>Pedagogical and andragogical knowledge</b>  |                                                                           |
| 7                                              | Beliefs about the nature of teaching and learning for children and adults |
| 8                                              | Safe environment for belonging                                            |
| 9                                              | Participant thinking                                                      |
| 10                                             | Participant thinking— misconceptions                                      |
| 11                                             | Participant effect (in relation to content)                               |
| 12                                             | Difficulty of task                                                        |
| <b>Subject knowledge in a delivery context</b> |                                                                           |
| 14                                             | Explanations                                                              |
| 17                                             | Application of content                                                    |
| 18                                             | Deconstructing content                                                    |
| 19                                             | Structure and connections                                                 |
| 20                                             | Procedural knowledge                                                      |
| 21                                             | Methods of solution                                                       |
| <b>Delivery knowledge in a subject context</b> |                                                                           |
| 22                                             | Reviewing approaches                                                      |
| 23                                             | Getting and maintaining participant focus                                 |
| 24                                             | Goals for learning                                                        |

### 5.3.3.1 Module 3a: Philosophical beliefs about the human-nature relationship

The idea that humans *are not* nature originates from early Christian beliefs, when humans were perceived as stewards ‘of’ nature (Barnard, 2006). More recent associations to this belief however reflect an oppressive perception that became widespread during the 16<sup>th</sup> and 17<sup>th</sup> centuries (Merchant, 2006), when the scientific revolution meant society became culturally and mentally disconnected from nature (Ducarme and Couvet, 2020). This has been referred to as instrumentalist (Stokols, 1990), utilitarian (Seligman, 1989), anthropocentric (Thompson and Barton, 1994; Kopnina *et al.*, 2018), or technocentric (Fien, 1993) (here-on, anthropocentric).

Despite its roots of stewardship and protection, anthropocentrism has been linked to negative connotations of environmental attitudes and behaviours (Lamb, 1996). Humanity is perceived as the superior species (Lumber *et al.*, 2018), and the purpose of nature has been to use and conserve to fulfil human needs (Kopnina *et al.*, 2018), rather than for its own ecological importance. This is otherwise known as a ‘human-centred worldview’. It was not until the early 20<sup>th</sup> century that perceptions of nature began to shift again towards ecocentrism; the environment-centred view.

The idea that humans *are* nature respects the belief that a (dis)connection is a psychological dissonance, rather than a physical disconnection, where time in nature aids the (re)connection of the mind. This belief in a physical and intrinsic connection to nature has been labelled biocentric (Lumber *et al.*, 2018), ecocentric (Fien, 1993; Thompson and Barton, 1994; Kopnina *et al.*, 2018), and spiritualistic (Stokols, 1990) (here-on, ecocentric). Individuals with an ecocentric epistemology tend to value all things nature as equal, thus, all non-human nature has a right to life and conservation regardless of human survival. This is otherwise known as an ‘environment-centred worldview’.

Mullins (2014) argues that for OAAs to work within a sustainability paradigm, there must be an acceptance of ecocentrism. Understanding the background behind different perspectives of nature can help instructors relate to individuals of differing views and opinions. Where philosophical understandings cannot be changed during short adventure activities, an understanding can help instructors encourage those with anthropocentric views to respect nature and embrace PEBs for the future of humankind and the environment. Figure 15 presents the slide used to introduce the concept of ecocentrism and anthropocentrism.

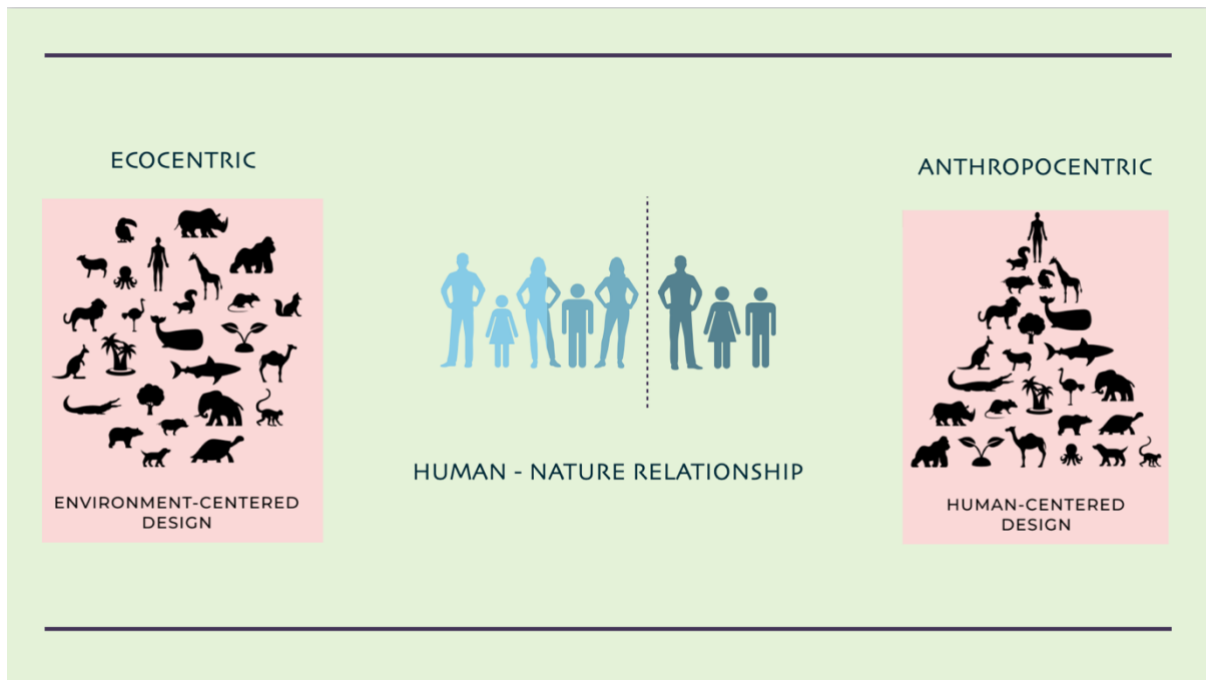


Figure 15: Slide showing human – nature relationships, and how a random group of eight adventure clients might vary in their beliefs about nature connections. Environment-centred and human-centred designs are by Sznal (2020)

Although not directly related to environmental outcomes, Pomfret *et al.* (2023) conceptualise the power of OAAs for subjective well-being using a systematic literature review. Pomfret *et al.* (2023) conclude ‘human/nature’ outcomes to occur in 37% of the 125 articles reviewed. Interestingly, Pomfret *et al.* (2023) comment on such outcomes occurring through two opposing routes. Firstly, they mention OAA participants having to “*fight against*” (p.7) nature and therefore having to demonstrate their skills and strength to master the environment. Although Pomfret *et al.* (2023) recognise the outdoor sector as having moved away from its traditional routes of “*conquering nature*” (p.2), this highlights a potential anthropocentric outcome reaffirming a human-dominant position over nature. In contrast however, Pomfret *et al.* (2023) also state the experiences “*facilitate our convergence with nature*” (p.7), therefore alluding to an ecocentric outcome that humans and nature are one.

### 5.3.3.2 Module 3b: Climate anxiety

Considering the prevalence of climate anxiety among the population (Hickman *et al.*, 2021; Tanna *et al.*, 2021) and the prevailing sense of guilt among many (Mallett, 2012; Tam, 2019), integrating environmental conversations and activities that have a clear purpose could be well received. Instructors are encouraged to take part in activities that contribute to environmental

understanding or conservation (e.g., citizen science activities), or sharing specific skills clients can use at home to reduce their personal impact.

Important for outdoor instructors is recognising climate anxiety and giving clients hope in the face of challenge, rather than fear in the face of crisis. The course uses statistics from Hickman *et al.* (2021) and the Office for National Statistics (2021a) (see Figure 16) to make instructors aware of the scale of climate anxiety and how it affects different ages and genders. It uses the link between ecocentrism and anthropocentrism as a tool for recognising those that may have climate anxiety, and what differences to expect within a random group.

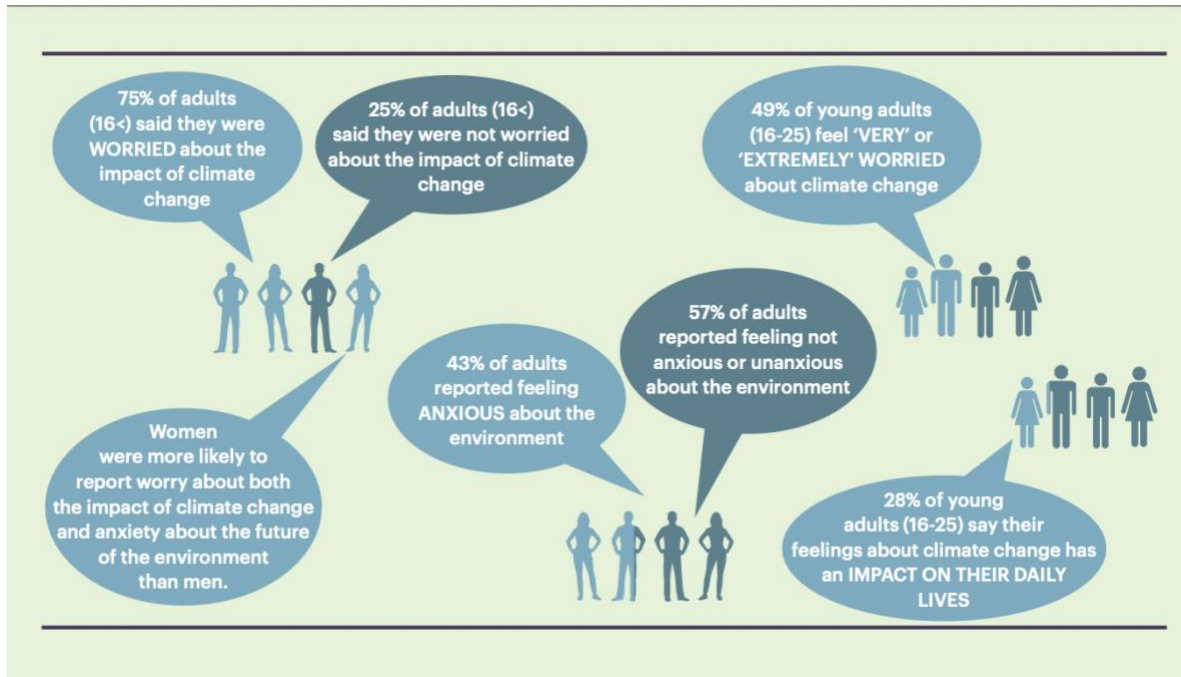


Figure 16: Slide showing perceptions of climate change based on the statistics collected by the Office for National Statistics (2021a) and Hickman *et al.* (2021)

### 5.3.3.3 Module 3c: Appropriate goals for behaviour change

Module 3 finishes by collaborating on how the instructor might communicate differently between those with ecocentric versus anthropocentric views. In relating this to PEBs, and goal setting, it encourages instructors to share appropriate actions that could be suggested to clients to address and overcome barriers to behaviour change.

Setting relevant goals has shown to increase individuals' adoption of PEBs (Staples *et al.*, 2020), particularly if goals are attractive (Abrahamse and Matthies, 2019). Attractive goals are high, but realistic, something that imposes an element of challenge but where results can be seen or felt, therefore offering an intrinsic reward (Abrahamse and Matthies, 2019). Furthermore, coupled

with implementation intentions, commitment (see Matthies *et al.*, 2006), prompting and/or feedback, the results of goal setting can see PEBs increase (Abrahamse and Matthies, 2019).

Gallo and Gollwitzer (2007, p.37) define implementation intentions as “*the if-then plans that spell out when, where, and how a set goal has to be put into action*”. This enables the goal to be achieved from a logistical point of view. For the when, where, and how to be put into place the goal must be individualised and relevant for the person seeking to change their behaviours.

The prompting and feedback aspects require follow-up information, firstly a reminder of their goal and how they intend to achieve it (prompting) and secondly on how their behaviour is contributing on a bigger scale, or benefitting themselves (feedback) (Abrahamse and Matthies, 2019). Follow-up emails could be sent after participating in an OAA however, this would require additional work by the instructors to write up goals participants have committed to. An additional idea would be to encourage participants to write down their commitment goal on a piece of paper and put it in a stamped, addressed envelope and to have the company post the commitments out a few weeks later. This could be effective as it would reiterate the commitment they made to the instructor as well as to themselves, and the environment.

Giving feedback about PEBs can be challenging, as without statistical evidence (e.g., “you have saved X amount of electricity”) there is little knowledge of whether behaviours are really being carried out. If participants take part in a citizen science activity during their activity, feedback can be shared on the ongoing findings and participation can be encouraged in other projects.

Although it is not common practice in environmental education or psychology, the SMARTER goal acronym was adapted for the goal setting element of the presentation as the strategy is well-known and respected within physical activity (see Figure 17). The idea of adding familiarity to the course, specifically within goal setting, was thought to increase instructor motivation and belief in ability to adapt environmental goal setting into their practice. Having said this, the SMART goals have been critiqued for their lack of scientific underpinning, inconsistency, lack of guidance, and lack of appropriateness within certain companies (Reeves and Fuller, 2018; Swann *et al.*, 2023). To make SMART goals more relevant to OAAs and environmental literacy, some of the points were adapted; ‘measurable’ was changed to ‘meaningful’, as not all PEBs have a measurable outcome (for example, recycling correctly, or choosing public transport over driving cannot be easily measured). ‘Realistic’ was changed to ‘relevant’ as being realistic and being achievable highlights the same characteristic of a goal. Being relevant highlights the individual relevance that the goal has to a person’s life.

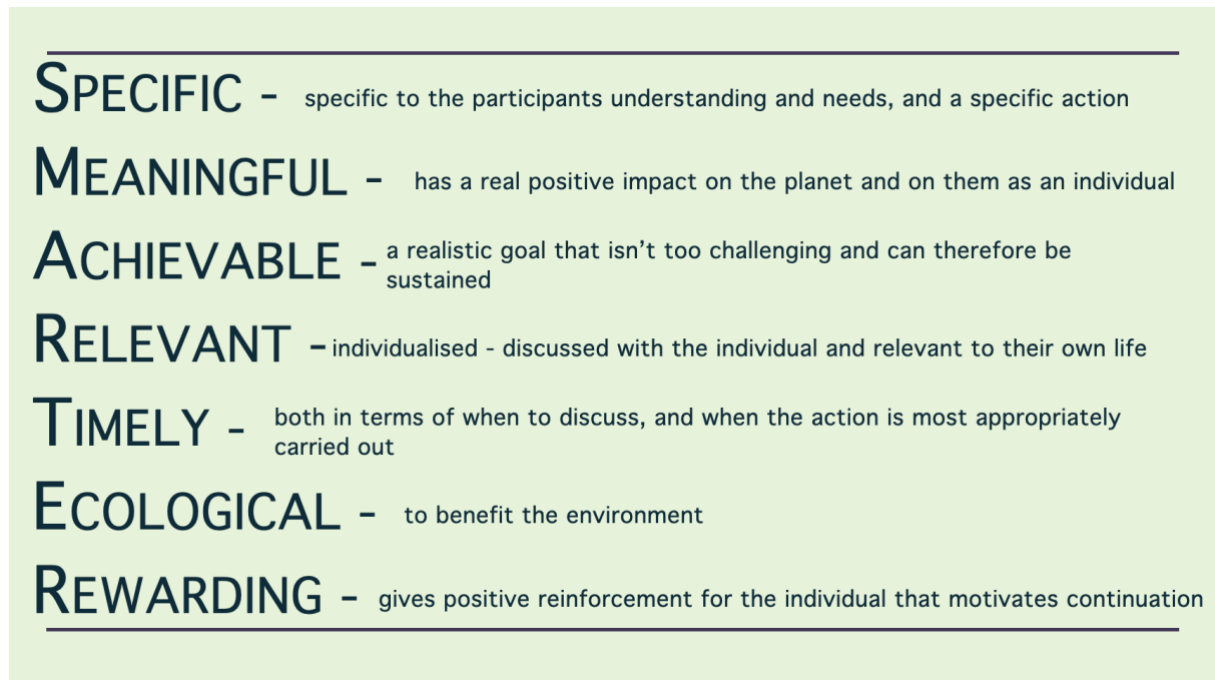


Figure 17: Slide showing an adapted SMARTER goal setting programme

The specific and timely criteria align somewhat with the implementation intention in that both agree with the goal needing to be specific (a detailed goal and how it is going to be achieved) and timely (when and where the behaviour will take place). Two additional characteristics were added to make it SMART-ER goal setting which were ecological and rewarding. Ecological highlights that goals should be set to directly benefit the environment. Rewarding highlights that sticking to the goals and adopting the PEB should give some intrinsic reward and positive reinforcement which will motivate future goals and behaviour changes.

Outdoor instructors are reminded that while instructing they are perceived as role models (see Povilaitis *et al.*, 2019). Assuming they can form a positive rapport with their group, their actions and attitudes are likely to be valued and respected. If they encourage participants to engage in a relevant PEBs, and ask for an element of commitment, participants may be more likely to act and sustain that behaviour change, rather than if actions are merely mentioned in passing. Figure 18 shows possible actions that instructors could suggest in response to the most common barriers to behaviour change. Instructors are asked to think of additional behaviours that could be suggested, how they could apply the adapted SMARTER goal programme, and how different goals might be appropriate for clients with different beliefs about humans and nature.

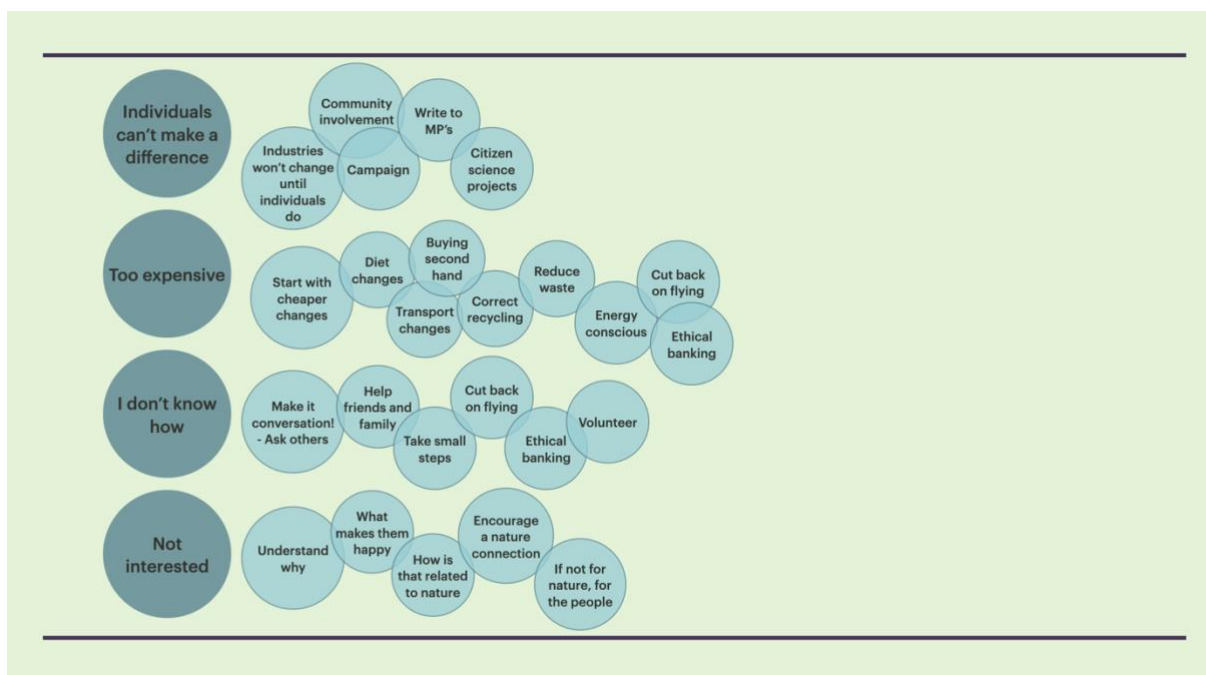


Figure 18: Slide showing barriers and possible solutions for taking part in pro-environmental behaviours. The four circles on the left show the most common barriers as identified by the Office for National Statistics (2021)

#### 5.3.4 Module 4: Nature connectedness

Table 17 summarises the EL-PACK criteria addressed in module 4.

Table 17: EL-PACK criteria addressed in module 4; nature connectedness

| Criteria from EL-PACK framework         |                                  |
|-----------------------------------------|----------------------------------|
| Belief in ability to teach              |                                  |
| 1                                       | Beliefs about outcome expectancy |
| Subject knowledge                       |                                  |
| 4                                       | Knowledge of theory              |
| 5                                       | Knowledge of resources           |
| 6                                       | Knowledge of examples            |
| Subject knowledge in a delivery context |                                  |
| 14                                      | Explanations                     |
| 15                                      | Facilitation strategies          |
| 18                                      | Deconstructing content           |
| 19                                      | Structure and connections        |
| 20                                      | Procedural knowledge             |

Referring to the pedagogies identified in the literature review (see Section 2.2.1), there are many different methods of facilitation and activities that can be used to aid the development of

environmental attitudes and emotions. In addition to these, there are also lots of existing activities used to develop the pathways to nature connectedness. This section of the course covered the influence and limitations of nature connectedness for developing environmental literacy and concluded with a collaborative discussion about different activities used to enhance environmental attitudes and emotions.

Nature connectedness refers to the psychological perception of one's mental and physical connection to nature (Lumber *et al.*, 2017; 2018; Richardson *et al.*, 2020). Influenced by the work of Erich Fromm on Biophilia (see Fromm, 1955; 1973 and; Gunderson, 2014) and the Biophilia Hypothesis (see Kellert and Wilson, 1993), the concept of nature connectedness seeks to (re)connect people with nature for individual and planetary benefits (Charles *et al.*, 2018).

Kellert and Wilson (1993) proposed nine values to represent the construct of biophilia. These values were *utilitarian, naturalistic, ecologicistic-scientific, aesthetic, symbolic, humanistic, moralistic, dominionistic and negativistic*. The values acknowledge a guide to living safely in nature; utilizing its resources conservatively (utilitarian), having a contact (naturalistic) and understanding of non-human nature (ecologicistic-scientific), recognising its power and danger (negativistic) as well as its beauty (aesthetic), finding meaning (symbolic) and an emotional affiliation (humanistic), and making ethical decisions (moralistic) to conserve and protect human and non-human nature (dominionistic). In a similar way that ecocentrism promotes a psychological (re)connection, Kellert and Wilson (1993) hypothesise that biophilic values are innate, however different values become suppressed and distorted through technological advancements. (Re)connecting therefore looks different for different people, according to values they need to develop.

Taken up by the University of Derby, Lumber *et al.* (2017) expanded on the work of Kellert and Wilson to test the ability of using biophilic values as pathways to facilitate nature connectedness. Five of the nine values were deemed to be significant indicators of nature connectedness: naturalistic, symbolic, moralistic, humanistic, and aesthetic (Lumber *et al.*, 2017). These were latterly redefined as contact, meaning, compassion, emotion, and beauty (respectively) and were operationalised as pathways towards developing nature connectedness (Lumber *et al.*, 2017; Richardson and Butler, 2021).

Negativistic, utilitarian, dominionistic and ecologicistic-scientific values were deemed insignificant predictors of nature connectedness in this study. However, activities associated with the negativistic value focused on the removal of oneself from nature; 'staying in town rather than visiting a local park or green-space', 'using a computer rather than a green-space for leisure', 'avoiding areas of wilderness or woodland', which I argue do not represent the negativistic value as constructed by Kellert and Wilson (1993).



Utilitarian, dominionistic and ecologicistic-scientific have been reintroduced as pathways on occasion (Lumber *et al.*, 2018), however they have received less attention than the foundational five pathways, despite being the only values that associate with practical skills, abilities and knowledge to actively participate in PEBs. The conclusion that such values and knowledge do not contribute to a nature connection (Liefländer *et al.*, 2013; Lumber *et al.*, 2017) emphasises a point made by Grace (2020), who recognises work on nature connectedness to focus on an emotional connection, rather than a cognitive connection.

While this focus on an emotional connection does not fulfil environmental literacy theory (see Section 3.2), it does contribute to understanding and developing the ‘attitudes and emotions’ component. Activities and ideas exist to enhance the five ‘pathways’ to nature connectedness which can be used as a useful resource for outdoor instructors. A slide on pathways is included in the presentation (see Figure 19), however it is emphasised that this fulfils one component of environmental literacy, rather than being the ultimate means for empowering PEBs.

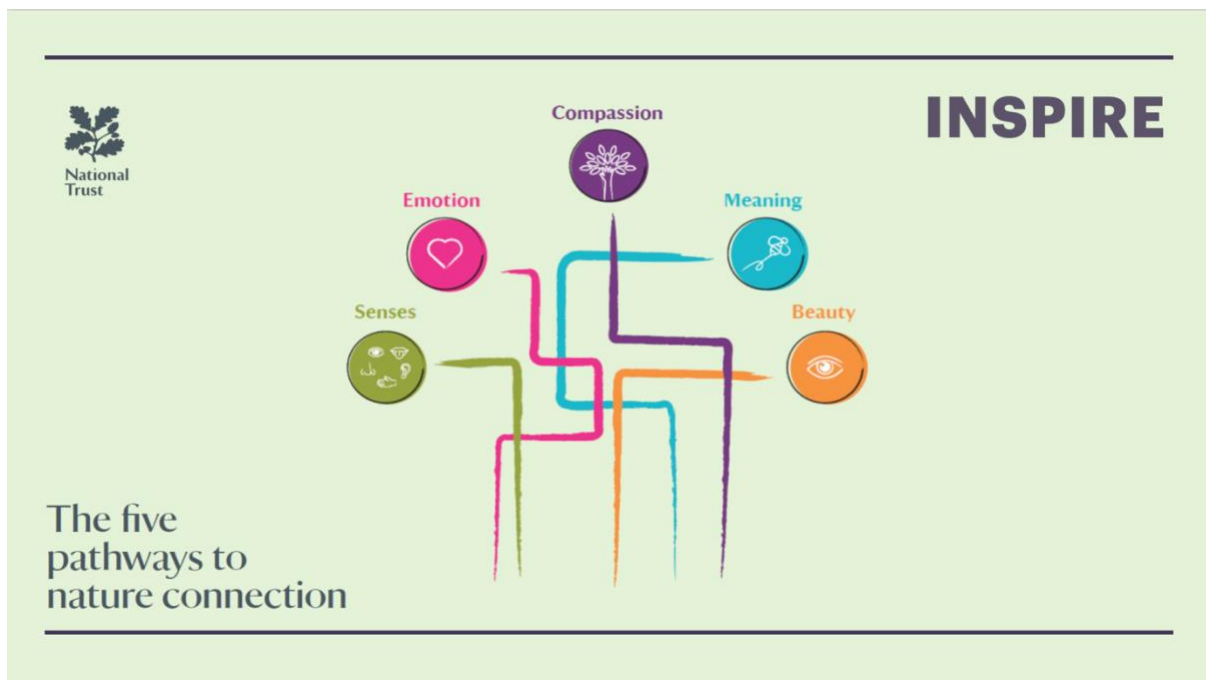


Figure 19: Slide showing the pathways to nature connection. Image from the National Trust based on the work and cited by Richardson (2019)

The ‘senses’ pathway to nature connection has received significant attention for its contribution to forming close relationships between human and non-human nature (Rickard and White, 2021; Pomfret *et al.*, 2023). Ponte *et al.* (2021) were influenced by The Experience Economy books by Pine II and Gilmore (1999; 2011), for developing their understanding of an ideal adventure tourism experience. Pine II and Gilmore (2011, p.88) recommend “*engaging the five senses*” as one of their five principles for designing a quality experience. Pomfret *et al.* (2023, p.7) recognise that it is “*through seeing, hearing, smelling, feeling, and touching, [that] adventure activity participants*

*become immersed in nature in such a way that they may not otherwise realise*". Moreover, Pine II and Gilmore (2011) explain how an experience can be more memorable when more senses are used.

Examples of three different nature connection activities were included in the course material however, instructors were encouraged to share practices that they already do, explaining to one another how the activity contributes to developing environmental attitudes and emotions. This method of course facilitation recognised the andragogical principle to enable learners to voice their experiences and share their knowledge. It was expected that in doing so, instructors would feel motivated to contribute to discussions, give them a chance to listen to other people, and collectively provide ideas as to how activities could be improved or adapted for different contexts.

### 5.3.5 Module 5: Developing knowledge

Table 18 summarises the EL-PACK criteria addressed in module 5.

Table 18: EL-PACK criteria addressed in module 5; developing knowledge

| <b>Criteria from EL-PACK framework</b>         |                                  |
|------------------------------------------------|----------------------------------|
| <b>Belief in ability to teach</b>              |                                  |
| 1                                              | Beliefs about outcome expectancy |
| <b>Subject knowledge</b>                       |                                  |
| 4                                              | Knowledge of theory              |
| 5                                              | Knowledge of resources           |
| 6                                              | Knowledge of examples            |
| <b>Subject knowledge in a delivery context</b> |                                  |
| 14                                             | Explanations                     |
| 15                                             | Facilitation strategies          |
| 18                                             | Deconstructing content           |
| 19                                             | Structure and connections        |
| 20                                             | Procedural knowledge             |

The role of knowledge is key for developing environmental literacy. While it has been argued that knowledge alone is not enough to initiate behaviour change or nature connectedness (Liefländer *et al.*, 2013; Lumber *et al.*, 2017), using it as a complementary pathway can enrich experiences and results (Otto and Pensini, 2017).

Instructor knowledge of local features and challenges is encouraged but is not covered in the content of the course as this would look different for OAAs in different contexts. Instead, the course material on developing knowledge focuses on different methods for sharing knowledge and engaging clients in PEBs.

As found in Section 2.2.1 in the review of pedagogies, knowledge was developed through a number of ways; through experiential facilitation (Preston and Griffiths, 2004; Thomas, 2015), historical and scientific learning (Preston and Griffiths, 2004), storytelling (Stewart, 2008; Jukes and Reeves, 2020; Prins and Wattchow, 2020), critical thinking and problem solving (Preston, 2011), role-based learning (Evans and Acton, 2021) and through transitional and reflexive practice (Thomas, 2015).

Examples of how knowledge-development activities can be integrated into OAAs is included in the course, with time for instructors to discuss and trial different methods in small groups. Attention is given to understanding knowledge through experience (particularly the importance of recognising this in adult clients), storytelling, and participation in citizen science activities. Although not mentioned in the literature review as being linked with OAAs, given the environmental contradiction in OAAs (see Section 2.1.3), contributing to citizen science can not only increase scientific understanding about change in the local area, but it can also directly engage clients in a PEB.

### **5.3.5.1      Module 5a: Knowledge through personal experience**

Brookes (1989) defines knowledge learned through experience as *personal knowledge*. Personal knowledge can be positive or negative and can be acquired through various sensory stimuli such as seeing wildlife entangled in plastic, smelling polluted seas after storms and wastewater treatment plants have overflowed, or feeling the temperature of the sea. Experiences are subjective and instigate a new interpretation and knowledge that cannot be grasped through the telling of second-hand knowledge (Louv, 2008).

Regular interaction and experiences in the same environment promote the development of personal knowledge relating to that space. For example, individuals living, or spending regular time on coastlines have been reported to have greater knowledge of its environment and interest in its conservation (Jefferson *et al.*, 2014). This knowledge may be a mixture of subjective knowledge from experience and factual knowledge about the area, both of which form integral aspects in developing attitudes, interests, skills, and values that shape behaviours.

Understanding past experiences and beliefs is important, particularly when having environmental conversations with adults (see Section 2.2.3.1 on the principles of andragogy). The clients experience of the OAA will also shape future beliefs and perspectives, therefore it is important to meet clients where they are in their understanding and build environmental literacy at a pace to suit them, without overwhelming them.

### 5.3.5.2 Module 5b: Knowledge through storytelling

Unrelated to outdoor adventure, Kahneman (2011) and Gottschall (2013) explain how stories are valued by the human mind through reasoning and emotional systems. From a young age fact and fiction stories are used to entice imaginations and help children understand the world in which they live (Hadzigeorgiou and Judson, 2017). However, the positive effect for engagement and learning is also effective with adults (Rossiter, 2002; Devine *et al.*, 2014).

Stories of landscape, history and culture have been explored in terms of their impact on environmental awareness (Stewart, 2008; Hadzigeorgiou and Judson, 2017), and ‘more-than-human’ stories have been explored as a means for alternative thinking about nature and bringing together aspects of a place-responsive pedagogy (Jukes and Reeves, 2020). Storytelling is not a new concept for the outdoor sector, however telling the right stories, at the right time and with tangible information and messages can all play a part in how influential the stories can be.

An improv game promotes the idea of telling an ‘ACE’ story; the game involves one person telling a story, and others in the room tapping them when they want to hear more Action, more Colour, or more Emotion (ACE) (Improv Encyclopedia, 2001-2022). Within this acronym, the action refers to the story’s narrative, the colour refers to the environmental detail, the smells, sounds, temperature, weather and colour, and the emotion refers to the emotion of the characters or places involved (Improv Encyclopedia, 2001-2022). The narrative could be focused on the history or geology of the place, or it could be focused on a singular organism or flower; its lifecycle, routine, or place within the ecosystem. While reeling off facts may not be helpful for enhancing connections to nature, when the subject is moulded into an engaging story the facts can become more memorable (Hadzigeorgiou and Judson, 2017; Lumber *et al.*, 2017; Peter *et al.*, 2021).

Storytelling can therefore be an influential way to engage participants in the changes that have occurred to the place over time; the different animals and cultures it may have been home to over the years, as well as its seasonal change. It enables the opportunity for participation and creativity, allowing participants to tell a story in the mind of a creature, or facilitate role play to act out life in a particular time and location (Preston and Griffiths, 2004), and its practice can be used to enhance both environmental knowledge, and attitudes, in an informal structure.

The course presents the ACE acronym (Figure 20) and encourages instructors to think about the stories they tell; whether they are fact or fiction (or whether they know!). Time was factored into the course for participants to share stories and collaboratively expand on adding more action, colour, and emotion where necessary.

An additional aspect of storytelling is making the stories relatable and transferrable to adventure clients. This may be challenging however, where possible stories should connect to clients’ lives,

in terms of how an organism fits into an ecosystem that humans are also a part of, or whether there are similar conservation efforts that can be encouraged in their locality to help protect different species. As recognised by Bloom and Holden (2011) behaviour changes are most effective when individuals are knowledgeable of the problem *and* have appropriate skills to address a solution. Therefore, by telling stories that weave together the activity-local, client-local, and global contexts, clients are more likely to leave with tangible information they can apply in their locality at home.

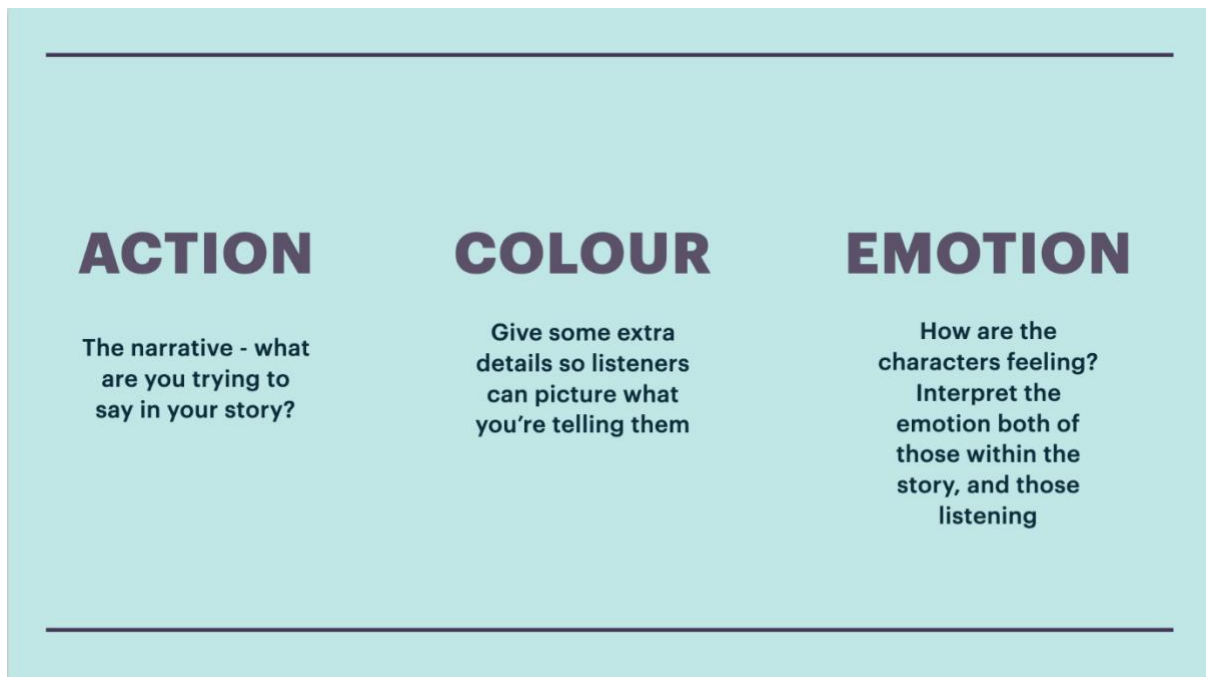


Figure 20: Slide showing an explanation of ACE: how to tell a story full of action, colour and emotion (from Improv Encyclopedia, 2001-2022)

### 5.3.5.3 Module 5c: Knowledge through citizen science

Citizen science is a way of collecting large amounts of data in a participatory manner to increase knowledge and understanding (Haklay *et al.*, 2021). There are various definitions of citizen science, and the priority of the end goal is largely dependent on the exact project being carried out. Some projects are carried out to direct or influence government decisions, so they are end-goal driven, whereas others are carried out as an exploration to further understand and explain an area of scientific interest (Haklay *et al.*, 2021). In its simplest term, they are projects directed by scientists and practically carried out (at least in part) by volunteering members of the public (Haklay *et al.*, 2021). Projects can be carried out in a vast range of subjects including literature, arts, climate, nature, social science and many more, and projects can be conducted online, or in person. In the UK, citizen science is particularly used to collect data relating to the environment. There is always an element of importance placed on the data collected for scientific interpretation (e.g. Hughes and Carter (2021), however projects are also valued for their

promotion of citizen engagement, both in terms of increasing awareness of the project, but also because they can elicit positive benefits for participants such as a sense of purpose, spending time outdoors, and sense of involvement (e.g. Pocock *et al.*, 2023; and White *et al.*, 2023).

Given the environmental contradictions in OAAs (see Section 2.1.3), citizen science could be a way to collectively monitor changes in the locations, while simultaneously providing an opportunity to talk with clients about environmental changes, possible causes and potential solutions.

Citizen science is not yet common practice in OAAs however, it has been recommended for increasing environmental understandings and connections in outdoor learning through schools (see Lee, 2019). Furthermore, there is evidence to suggest that outcomes of such projects could be beneficial to both science and individual participants (Dean *et al.*, 2018; White *et al.*, 2018; NEAR Health, 2020; Peter *et al.*, 2021; Pocock *et al.*, 2023; The Royal Society for the Protection of Birds (RSPB), no date).

As with any research method, there is a host of advantages and disadvantages, including its rate of data collection and ability to collect large volumes of data, to the reliability and potential bias within data collected (Hobbs and White, 2012; Vliet and Moore, 2016; Golumbic *et al.*, 2017). However, despite some uncertainty by scientists over the quality and reliability of data collected, the outcomes from monitoring and recording in locations that OAAs take place could show valuable environmental trends, particularly if carried out on a large scale. In OAAs, citizen science projects could involve recording species numbers, behaviours, or health, weather patterns or geographical changes. It is important to note that numerous projects exist around the country and are available for volunteers, including outdoor instructors and their groups, to participate in. Instructors or companies are therefore not expected to set up their own project, but to participate in ongoing established research.

Mobile apps such as iNaturalist, iRecord and the Welsh Coast Explorer are promoted in the course for their ease of use for taking part in different projects. Figure 21 presents the slide on citizen science, showcasing different apps available. The course allows time for instructors to download and trial a citizen science app and to research projects that are happening in their local area. Participating instructors will be reminded they should place the focus of the activity on the matter being studied as opposed to the science. This enables clients to understand the flora or fauna being studied and why it is important or detrimental in the ecosystem (Peter *et al.*, 2021). Having said this, sharing the monitoring process with clients also enables interested parties to take part in their own projects when they return home.



Figure 21: Slide showing websites and apps that collect data for citizen science projects

#### 5.3.5.4 Module 5d: Sharing knowledge though identifying 'thisness' rather than 'whatness'

Sharing knowledge can be detrimental if the focus is solely on scientific names, or principles which cannot be related to by individuals (Lumber *et al.*, 2017; Peter *et al.*, 2021). Moreover, the objectification through a humanised or 'anthropomorphised' name can isolate the organism from its individuality (Ingold, 2011). Mcphie and Clarke (2015) pose an interesting debate about naming non-human nature, and whether in doing so we are subjecting it to the mere qualities of its human-given name, rather than understanding its being. The concepts of *haecceity* (thisness) and *quiddity* (whatness) are terms introduced by philosopher John Duns Scotus (1266-1308) (see Vos, 2006). Humans have inherited a mode of thinking whereby we see and refer to objects, rather than processes, and thus we alienate ourselves from the individuality of organisms and processes, and the intra-connections we have with the changing world around us (Clarke, 2017). This objectification or identification of something by its 'whatness' is described as a *quiddity*. In contrast, exploring something by its process, connection, or 'thisness', is given the term *haecceity*.

In OAs, pointing out, identifying and naming flora and fauna can be easy, however telling the story of a species, its interconnections to the ecosystem, its intricate biological compilation, or its sound, smells or feels can bring an understanding that goes beyond its name. The course presents a short YouTube clip narrated by Sir David Attenborough, who talks about the relationship between the thynnid wasp and the orchid (see

<https://www.youtube.com/watch?v=6yLnKfhmUzg>). This is followed by a slide with questions to prompt how flora and/or fauna can be understood through its 'thisness' (*haecceity*), rather than its 'whatness' (*quiddity*) (Mcphie and Clarke, 2015). The example used was about the marine species, barnacles (see Figure 22). All pictures used in the slide are from Google Images under the Creative Commons License.

Time was given for instructors to discuss what this might look like for them in practice, whether they have enough knowledge of local species to tell their stories, or whether they agree or disagree with the concept. In addition to the questions on the slide, the concept of thisness and whatness was explained using questions by Clarke (2017, p.313); "*what type of thing is that?*", and "*what is it/they doing/producing?*".

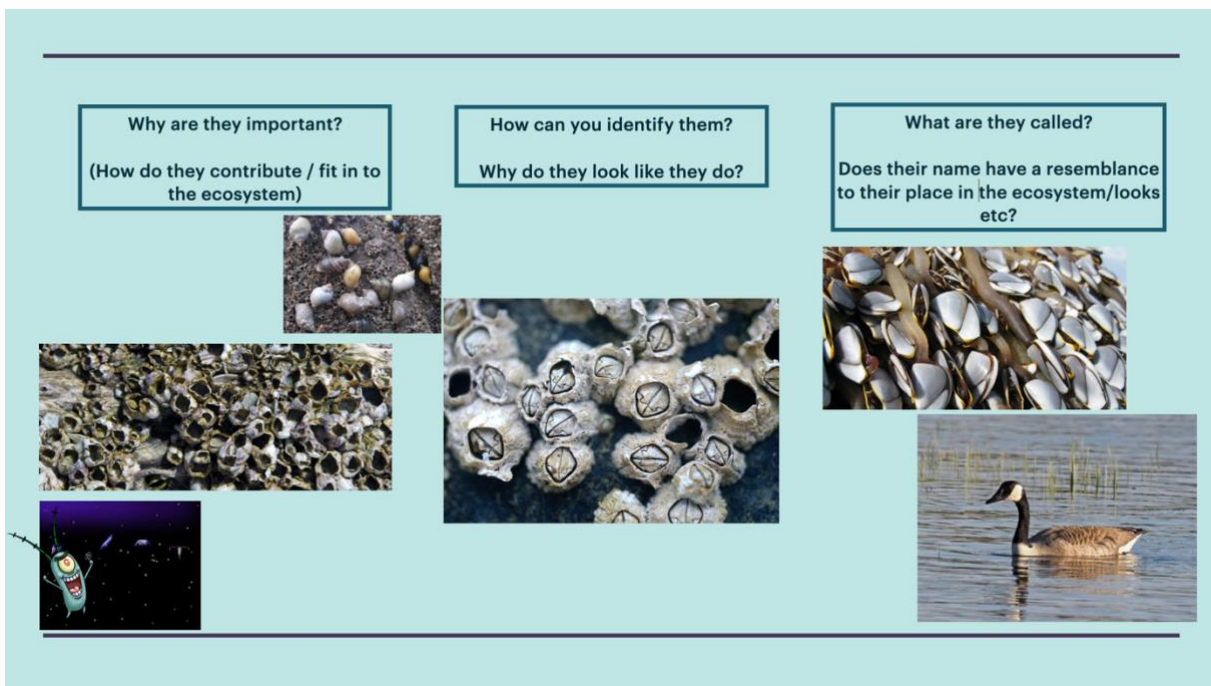


Figure 22: Slide showing questions to prompt discussion on 'thisness' and 'whatness'



### 5.3.6 Practical element of the course

Given that instructors are generally practical learners (see Section 2.2.3.1), a practical element of the course was designed to assist the application of the theory. Activities were designed and facilitated experientially where possible, to encourage instructors to reflect on their personal environmental literacy development, as well as to demonstrate activities which they could facilitate within their OAAs.

The practical element was influenced by the pedagogies identified in Section 2.2.1. Pin-hole photography (influenced by Socha et al., 2016) was planned for use in the modules focussing on 'what is nature' and for engaging the senses for nature connections. Instructors would be encouraged to reflect on what they see, how it might be perceived by others, and how that view influences their practice. Discussions and practice around using moments of intensity and unplanned opportunities (influenced by Foran, 2005) were also used for engagement in knowledge, and hence for practising telling the stories of non-human nature. In addition, practical involvement included trying out and different citizen science apps and projects, trialling nature connectedness activities and practising storytelling through using names, and through using processes.

In addition to these activities, the practical element of the course was also designed to include role play. Role play involves practising realistic scenarios with peers, to explore and apply different approaches of facilitation. Using role play as a teaching method has been effectively used for pre-service teachers, enabling creativity and increasing understanding of learning materials (Kilgour *et al.*, 2015; Hidayati and Pardjono, 2018). In addition, in sustainability education for higher education students, role play has been successful for enhancing learning and developing sustainability skills (Gordon and Thomas, 2018). Having instructors practise the facilitation of environmental literacy-based activities during their chosen OAA was therefore thought to help increase belief in ability to teach and the transfer of knowledge from theory to practice.

## Chapter 6 Phase 2: Expert appraisals

Phase 1 used the components of environmental literacy and the framework for EL-PACK as detailed in the conceptual framework, to outline a structure for an environmental literacy course. Using research based on developing environmental knowledge, attitudes and emotions, phase 1 presented the first-draft prototype for an environmental literacy course.

The aim of phase 2 was to assess the face validity of the course with professionals in the outdoor sector using semi-structured interviews, before carrying out modifications and improvements.

This chapter details the participants chosen, the methodology used for the data collection and analysis, and presents the findings structured by top-level codes. The chapter concludes with an interim discussion of the findings.

### 6.1 Methodology

Figure 23 shows the methodology used for phase 2 from the overarching research design (see Figure 9Error! Reference source not found. in Section 4.3). Phase 2 consisted of one meso-cycle, containing two micro-cycles. This indicates the micro-cycles occurred more than once before moving out of the meso-cycle and on to the course modification. Figure 23 explains there were six iterations of the meso-cycle, indicating the course was appraised and data were analysed six times before conducting any modifications.

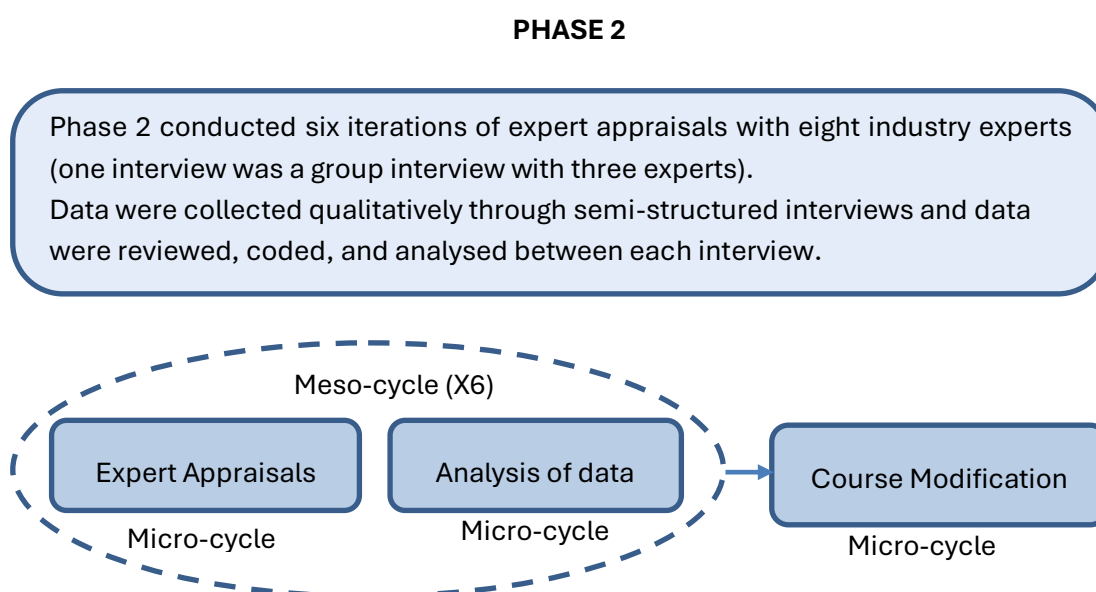


Figure 23: Methodology of phase 2 (from overarching conceptualisation of the research design)

The drafted environmental literacy course was appraised by professionals in the outdoor sector, to refine and improve its quality. Participants were required to read the course handbook and give constructive feedback to improve its structure and content based on semi-structured interview questions. Using expert appraisals in the early stages of prototype development is credited for being a useful way to assess product feasibility and internal validity (Tessmer, 1993; Plomp, 2010; McKenney and Reeves, 2014). However, there are limitations to the use of expert appraisals as the judgement of experts carries subjectivity, and the positionality of the experts (i.e. their background and experiences) can influence their interpretations. To mitigate this limitation, I recruited experts from diverse professional backgrounds and have detailed the organisations approached and individuals interviewed in Section 6.1.1 below.

The research followed an inductive qualitative approach, as the intention was to generate understanding from the point of view of individuals within the population of interest. As guided by Mohajan (2018), qualitative methods were considered appropriate for conducting this kind of exploratory research as it facilitated comprehensive and detailed explanations addressing ‘why’ or ‘how’ the course could meet its expectations within the context of the outdoor sector.

### **6.1.1 Participants**

Individuals were selected for participation through stratified purposive sampling (SPS). SPS is a technique that combines both probability and non-probability sampling methods. Purposive sampling is a non-probability technique commonly used in qualitative methods, where the intention of the research is not to make statistical inferences, but to gain insight into a specific topic (Punch and Oancea, 2014). Stratified sampling on the other hand, is a probability sampling method that identifies sub-groups in the population called *strata*, enabling group representation (Singh and Mangat, 1996). Combining the methods facilitates a technique that can illustrate subgroups, identify participants within the subgroups that would aid the research, and hence reach a broader audience while maintaining a homogeneous interest in the subject (Miles and Huberman, 1994).

The research sample could have chosen just to interview outdoor instructor managers, however whilst they may be clear on what they would like to see in the industry, it was thought they may not be aware of the best teaching practices to suit their instructors. Instead, using the SPS approach, subgroups consisted of best practice directors, outdoor instructor educators and environmental educators. Furthermore, as the study is environmentally focused it was considered beneficial to include a subgroup from a department of outdoor environmental

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education. Table 19 details the subgroups used to find participating organisations and individuals, along with how their participation was expected to benefit the research. Only a sample of the organisations listed were involved in the research. In conjunction with the stratified purposive sampling method, there was an element of convenience sampling used to increase participant recruitment and ease of data collection.

Table 19: Stratified purposive sampling groups for phase 2 participants

| <b>Subgroup</b>            | <b>Organisation</b>                                                            | <b>Justification</b>                                                                                                                                                                                                                                                                                    |
|----------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Best practice organisation | The Outdoor Education Advisors Panel (The OEAP)                                | The OEAP is the lead body for guidance, advice and training related to outdoor learning and educational visits in England and Wales.                                                                                                                                                                    |
| Best practice organisation | Councils for Outdoor Learning (Wales, England, Scotland, and Northern Ireland) | The Outdoor Learning Councils bring together stakeholders and act as a voice for all aspects to do with outdoor learning within their respective countries.                                                                                                                                             |
| Best practice organisation | Institute for Outdoor Learning (IOL)                                           | The IOL offer accreditation to courses and awards that meet their criteria for enhancing learning outdoors. They also facilitate the Field Studies Professional Practice Group and Adventure and Environmental Awareness Professional Discussion Group and share best practice with affiliated members. |
| Best practice organisation | Wales Adventure Tourism Organisation (WATO)                                    | WATO, PCF and POC are all organisations that strive to make adventure tourism more sustainable, within Pembrokeshire and Wales.                                                                                                                                                                         |
| Best practice organisation | Pembrokeshire Coastal Forum (PCF)                                              |                                                                                                                                                                                                                                                                                                         |
| Best practice organisation | Pembrokeshire Outdoor Charter (POC)                                            |                                                                                                                                                                                                                                                                                                         |

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| <b>Subgroup</b>              | <b>Organisation</b>                                                                                                                               | <b>Justification</b>                                                                                                                                                                                                                                                                                                    |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Best practice organisation   | National Governing Body (NGB) Associations (e.g., British Canoeing, Canoe Wales, Mountain Training Association, National Coasteering Charter etc) | NGB Associations have a familiarity of the activities they offer and the intentions and abilities of their instructors and coaches to deliver information around the environment.                                                                                                                                       |
| Outdoor Instructor Educators | University Lecturers'                                                                                                                             | University lecturers have an understanding about how outdoor students learn. Lecturers chosen would be specific to outdoor courses, such as the University of Worcester's Outdoor Adventure Leadership and Management (OALM) course.                                                                                    |
| Outdoor Instructor Educators | Outdoor Instructor Course Deliverers                                                                                                              | To become a qualified outdoor instructor, individuals much be trained and assessed through different activity qualifications. Practitioners who deliver those training and assessments should have an underpinning knowledge of how outdoor instructors learn, and what aspects of training are particularly effective. |
| Outdoor Instructor Educators | Experienced outdoor instructors                                                                                                                   | Experienced outdoor instructors would be able to view the course material and determine whether the content is something that could be realistically integrated into the activities they run.                                                                                                                           |
| Environmental Educators      | Field Studies Council                                                                                                                             | The field studies council work with children and adults to deliver educational experiences in nature. Environmental education is shared through scientific data collection, art, literature, play, and many more.                                                                                                       |

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| <b>Subgroup</b>         | <b>Organisation</b>                                     | <b>Justification</b>                                                                                                                                                                                                                                                     |
|-------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environmental Educators | National Association for Environmental Education (NAEE) | The NAEE is a charity organisation committed to increasing environmental education in UK primary and secondary schools, as well as institutions responsible for teacher education. They share best practice with members through a journal published three times a year. |
| Environmental Educators | Enviro Education                                        | Enviro Education is an organisation that seeks to educate and inspire children and students. They sell 'inspiration sessions' for students as well as training sessions for teachers on how to integrate environmental education into the classroom.                     |

Initial contact was made with organisations and people that I knew, in attempt to increase engagement and recruitment. Being familiar with the participants can be unfavoured for fear of collecting biased results, unsettling the researcher-participant dynamic, using background knowledge to aid questioning, eliciting unexpected responses, and not maintaining confidentiality and distinction between the research environment and subsequent relationships (McConnell-Henry *et al.*, 2010). Furthermore, it was recognised that interview-participant connections may influence whether participants hold back information or lie if they do not want to admit something to someone they know. This is particularly evident in areas of research such as nursing or medicine, where data collected may have greater ethical consideration, however in the relatively small field of outdoor instructing where connections are common, this was thought to be less of an issue.

In other areas of research, being an 'insider' has been of benefit. In researching communities for example, being a trusted and active member of the community prior to initiating research has helped in gaining acceptance to being researched (Luker, 2009).

Despite its intention, being familiar with some of the perspective participants did not appear to aid recruitment; of the six perspective participants that I was familiar with, three agreed and participated, two agreed but then ceased contact and one declined.

The final number of participants in this phase of research was eight. While participants were recruited from specific sub-groups, their experience meant there was cross-over between the subgroups. To enhance the transferability of the research, Table 20 presents a summary of the participants, detailing the sub-group they were chosen from, their experience, and their pseudonym. All participants were given pseudonyms to anonymise their identity. Pseudonyms were chosen over assigning numbers or letters to make the analysis easier to read.



Table 20: Pseudonyms and description of participants in the expert appraisals

| Iteration | Pseudonym | Sub-group                   | Experience                                                                                                                                                                     |
|-----------|-----------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1         | Alex      | Best practice organisation  | An experienced and active outdoor instructor, chair of one best practice organisation and project lead for another best practice organisation (unrelated to environmentalism). |
| 2         | Ben       | Outdoor instructor educator | An experienced outdoor instructor, ambassador of a best practice organisation and has a doctorate in sustainability transitions and social markets in the outdoor sector.      |
| 3         | Elinor    | Environmental educator      | Former outdoor instructor, now managing director of a best practice organisation with a focus on sustainability.                                                               |
|           | Connor    | Directors of best practice  | Former outdoor instructor, now programme manager within a best practice organisation, and associated with two other best practice organisations.                               |
|           | Daniel    | Environmental educator      | Former schoolteacher, now project manager within a best practice organisation with a focus on sustainability education.                                                        |
| 4         | Finn      | Environmental educator      | Former schoolteacher and deputy-head teacher, now education manager within a best practice organisation.                                                                       |
| 5         | George    | Outdoor instructor educator | Former outdoor instructor and manager of an outdoor centre, now trustee of a best practice organisation and facilitator of instructor education programmes.                    |
| 6         | Hayden    | Director of best practice   | Experienced outdoor instructor offering a freelance service for instructor training and adventure guiding. Also, coordinator and secretary of a best practice organisation.    |

### **6.1.2 Data collection**

Participants chosen for the sample were contacted via email to request provisional participation in the study. Subject to agreement, a participant information sheet (PIS) and consent form were sent electronically via Safesend, a service that allows sending and receiving files between the University of Southampton and other locations safely, to formally request participation. The PIS and consent forms (see Appendix B.2 and Appendix B.3, respectively) provided a detailed outline of the study aims, focus, structure, approximate duration of the interview, and their rights as participants. A signed and dated consent form from each participant was returned to me prior to their participation.

After returning a signed copy of the consent form, participants were sent the draft course handbook and interview questions. Participants were asked to read the material and make note of any aspects which they felt needed exploring, changing, addressing, or clarifying etc.

Participants were asked at the beginning of the interview for permission to use the audio recorder. To ensure confidentiality of data, all recordings and transcripts were stored electronically in a password-protected file and on a password-protected computer that only I had access to.

#### **6.1.2.1 Semi-structured interviews**

Semi-structured interviews allowed a discussion between the researcher and participants on how the course could be refined and improved. Each participant was presented with the same draft of the handbook which was discussed before drafting in changes.

Semi-structured interviews allow more freedom than structured interviews as the agenda can be more flexible, and questions are undirected and open ended (Bryman, 2012). This allowed participants to have more control over what they chose to talk about, generating rich data which covered aspects considered most important to the interviewee, as opposed to directed questions that addressed preconceptions. Interviews used sub-questions to form a brief agenda and provided a means for exploration of the research question.

Interviewees have reported to perceive a power difference in interview settings between themselves and the interviewer (Bryman, 2012). To help avoid this, interviews were originally

intended to be carried out with one researcher and two interviewees within each participant group. This style of interviewing is known as ‘dyadic’ (Morgan, 2020). The combination of dyadic interviews and insider relationships was expected to defuse any negative power perception however, it was also recognised to be important to build a friendly and trusting rapport to put participants at ease. In addition, it was important to be mindful when framing questions and responding to participants as to not instil question bias or raise sensitive topics. In this case, it was important not to challenge the current availability of environmental training for outdoor instructors, but instead to build on current understanding to move the industry forwards in a productive manner.

As with focus groups the nature of dyadic interviews allows participants to build on, or challenge, each other’s comments, providing one another with valuable prompts to share information that may otherwise be missed (Morgan, 2020). This was intended to facilitate greater depth and perspective from each participant group than interviewing one person. However, despite the intention being to conduct dyadic interviews, insufficient availability and/or suitability of staff meant all but one of the interviews were carried out on a one-to-one basis. One interview involved myself and three participants, which coincidentally was the interview with participants I knew. Whilst this was expected to be beneficial to the research, it was the only interview conducted where the participants had not read through the handbook and were therefore poorly prepared for the interview. The participants acknowledged their lack of prior reading and suggested during the interview how they expected their colleagues to read it, reasoning they did not have to. While the interview was still useful for the study, the lack of familiarity with the handbook made it more challenging and less fluid than the other interviews.

All interviews were carried out in person, at a time and location that was mutually decided between me (as the researcher), and the participant/s. Face-to-face interaction was favoured to minimise misinterpretations and time restraints that may occur through virtual interactions. In-person interviews were recorded using an audio recorder. Audio recordings enabled comprehensive transcripts to be written up, so annotations or notetaking did not have to be relied upon.

### **6.1.3 Interview questions**

Interview questions were drafted and modified between me and my supervision team. We concluded with 13 questions which sought to identify:

1. The relevance and potential value of the course and its objectives

## Chapter 6

2. Whether the structure of the course is realistic for instructor participation and learning
3. Whether the course content is appropriate and sufficient

The questions were not asked in a specific order, rather they were asked at an appropriate time which continued the flow of conversation. The 13 questions asked:

1. How relevant are the course objectives to the direction of the outdoor industry?
2. How achievable are the course objectives?
3. If successful, would these qualities be valuable to outdoor instructors (e.g. would it benefit a C.V./make them more employable etc)
4. How beneficial or relevant might these qualities be to adventure clients?
5. How do you feel about the length of the course (16-hours total over two-days. Each day split 50-50, theory-practical)?
6. Do you think instructors and/or centres would be prepared to give that time for the course?
7. How necessary is the practical aspect of the course?
8. How necessary do you think the course content is for outdoor instructors?
9. Is there anything missing from the course that you think would be beneficial?
10. Are there any aspects of the course that particularly stood out to you, for better or worse?
11. Is there anything in the course content you think is unnecessary?
12. How appropriate do you think the syllabus criteria are for developing environmental literacy PCK in outdoor instructors?
13. How relevant do you think the syllabus criteria are for achieving the course objectives?

### **6.1.4 Data analysis**

Data were transcribed manually into Microsoft Word using a mixture of typing and dictation. Transcripts were written using the intelligent verbatim transcription method. This method of transcription intentionally omitted filler words such as 'um', 'ah', pauses and background noises that were not useful for understanding the participants views. All interviews were fully transcribed before initiating coding.

I generated the codes inductively from the research and used thematic analysis to categorise codes according to a theme they represented (see Riger and Sigurvinsdottir, 2016). To avoid early interpretation of the data, I used an in-vivo approach for the initial coding process (as recommended by Rivas, 2012). The in-vivo process involved using phrases or words from the transcripts as the code names, rather than creating my own descriptions (Rivas, 2012). This

meant some codes could be slang or phrases that needed some explanation, but that were truly representative of participant voices. An example of this is the code ‘planting the seed’, which represented the sharing of bite-sized information that could lead to onward knowledge development and behaviour change. The idea of ‘planting the seed’ was raised by several participants.

An important factor that was taken into consideration in the coding process was to focus on the action, rather than the individuals. Rivas (2012) makes this point, affirming how the analysis can be distorted if the focus is on the individual. For example, if the code was ‘instructors plant the seed’, it could suggest environmental literacy development occurs through every commercially led OAA. Placing the focus on the action ‘planting the seed’, enables scope for analysis of this belief.

One of the interview transcripts, and a description of the top-level codes were sent to my supervision team to code independently before we reviewed and revised codes (see Appendix C.2 and C.3 for description of top-level codes and coded interview extract, respectively).

### **6.1.5 Reflexivity**

As mentioned in section 4.2.3, reflexivity is an important consideration throughout the process of the research. In relation to this study, I was already an insider to the research because of my background in the sector as an outdoor instructor and because of this I knew people who would both support my research and be valuable assets to have involved in the course development. It was unnecessary to avoid interviewing these contacts because of the insider relationship, particularly as the data being collected for the study was not about individuals, or their workplace; it was discussing their opinions on the value, structure, and content of the course material. There was no anticipated reason as to why insider relationships with the participants should affect the data being collected, however later evidence revealed that it had a negative effect on the research findings, as participants I knew gave less respect for my time as a researcher and the importance of reading the course material.

## 6.2 Findings from the expert appraisals

The analysis of expert appraisals sought to contribute to answering the overarching research question by identifying characteristics of an effective course for outdoor instructors. The analysis is structured by the five themes identified in the coding process, as shown in Figure 24. After the thematic analysis there is a section which details specific recommendations for course modifications. The chapter closes with an interim discussion which explores the findings alongside existing literature to present six initial design principles.

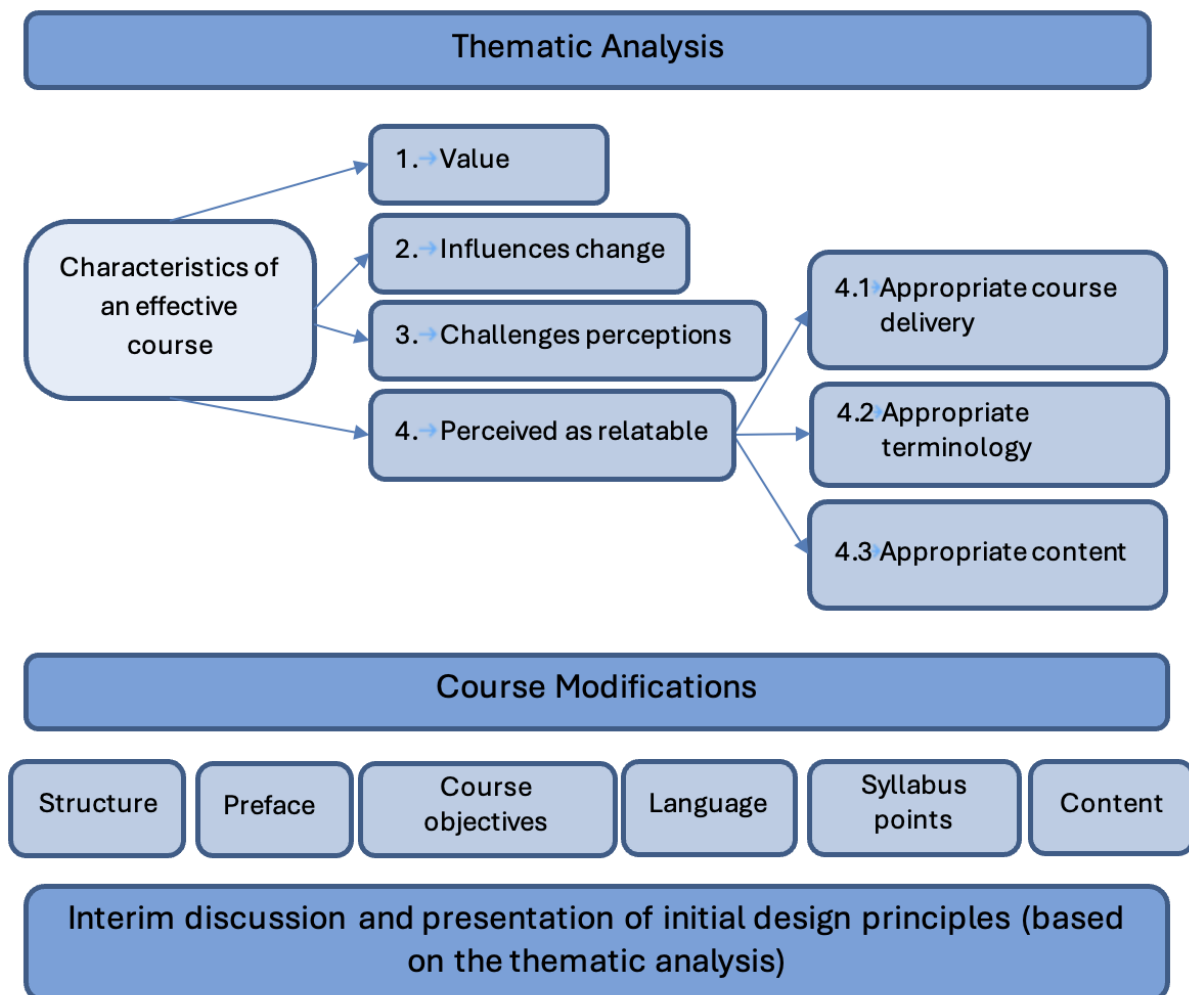


Figure 24: Structure of findings from the expert appraisals

### 6.2.1 Thematic analysis

The coding process revealed four underpinning themes, which are presented with an indicative example quote from the interviews. These themes form the basis of the first design principles for the development of the environmental literacy course for outdoor instructors and are discussed as such in Section 6.4.

#### 6.2.1.1 Value

##### ***“Giving us [instructors] added value” (Alex) and “Ultimately selling the course!” (Elinor)***

All the participants commented on the importance of a course giving instructors added value through personal and/or professional development. Alex credited the course material, saying the concept would *“definitely be valuable to outdoor professionals”* and would be *“beneficial to the adventure client as well”*. Similarly, George talked about participation in the course enabling instructors to *“build an extra value into the delivery of our sessions”*, which could enable additional selling points for the company, and additional employability for instructors. Hayden however questioned *“whether it's going to make us more employable”*, explaining that instructor qualification and value is *“driven by employers”*. Therefore, unless outdoor companies and governing body organisations recognise and promote their role in developing environmental literacy, the perceived value of completing the course by employers will be low.

Several participants commented on the marketing feasibility of the course post-PhD, particularly in relation to its perceived value versus potential financial implications. Alex asked, *“at the end of the day, will somebody pay to come and do this particular course?”*. Current financial challenges such as the cost of living crisis were alluded to by Elinor and Daniel who recognised it has put strain on many individuals and sectors, including that of tourism and OAAs. Alex warned that for instructors wanting to take part in the course, *“two days away from the workplace may be challenging for the employer”*. Similarly, Elinor felt it would be *“an investment that would need weighing up”*.

The value of a course will be perceived differently by instructors, companies, and clients. Connor stated, *“it is important to make sure [the course is] clear on, how it will add value and what that value is”*. Adding value could be through accrediting or certificating the course so that it becomes recognised and sought after. Daniel believed *“there are all sorts of routes to accredit or badge this course”*, however, Connor warned that *“it is a challenge to build that quality mark”*.

To spark interest in the course handbook, Elinor suggested using *“catchphrases and sub-titles and stuff to kind of hook them in or to explain that it isn't that scary”*, warning the title

*“Environmental literacy”* may sound too academic for some people, and therefore put them off. On the other hand, Hayden felt, *“I think the term may actually possibly pique interest in thinking well what does that mean? Let’s go and find out”*. The ties to communication in the marketing of the course were brought up particularly by Elinor and Alex. Alex recognised the importance of *“looking at what the marketing material is, and what the comms say in relation to how you get it out to the audience you want”*. Elinor’s focus was more on the financial side, suggesting that if *“hot concepts”* are used, (such as the term ‘literacy’, as this is currently associated with work on Ocean Literacy and Carbon Literacy) then *“there’s probably going to be funding associated [which] could help deliver these programmes”*.

Creating a valuable course emerged as a key theme from the expert appraisals, however the subjective perceptions around value highlighted the challenges that may be faced when the course becomes marketable. Ben commented that *“for the product to survive, you must entangle this positive good with their [the client’s] world in a way that they can see it has value”*. This statement from Ben emphasised how the course description or selling points may change throughout the course trialling, and in future course marketing, depending on who the course is being advertised or sold to.

#### **6.2.1.2 Influencing change**

##### ***“Planting the Seed” (Finn)***

All experts spoke about the influence of OAAs on promoting environmental knowledge, attitudes and/or behaviours. The idea of *“planting the seed”* (Finn) was brought up as an important strategy for engaging both instructors and adventure clients in environmental literacy. However, whether this engagement was through an informal influencing role, or an educational role was disputed.

In relation to instructors developing client environmental literacy, expert Connor emphasised the influence of place over instructor facilitation. Connor believed that in OAAs *“someone could have an amazing, inspiring moment that life changes them [...] but it’s just slight nudges is all that needs to be there, [education] doesn’t need to be a big, massive part of it”*. Hayden, George and Ben however, despite a common current practice being ‘letting the mountains speak for themselves’ when it comes to environmental learning, all recognised that instructor facilitation would enhance opportunities and potential for environmental literacy development. Hayden commented that, *“certainly around here, it’s ‘just get them out there and they’ll get it’; but it’s not that simple”*. Furthermore, Ben explained that all too often in the outdoor sector, *“because we are engaged with the outdoors professionally all the time, we’ve got this warm fuzzy feeling that we’re actually doing something positive about the environment, but we’re not.”* George also recognised a problem with the current way the outdoor sector is working, saying that by *“exposing*



*people to the outdoors, without educating, we are worsening the problem, cause we're just increasing volume of use of the outdoors".* George felt that within instructor training *"there's always a place for that sort of stuff [environmental conversations] because what you're then doing is seeding that concept which hopefully stays with the person as they grow through that general world of instructing"*. Connor agreed that environmental understanding is important for instructors, however posed the idea of *"determining a remit"* to not set unattainable expectations for instructors. This was supported by Daniel who believed it would help stop instructors getting caught in conversations about *"wicked problems"* (big problems or challenges that are difficult to solve, such as climate change or population growth).

Daniel and Alex also recognised the need for instructor facilitation to enhance learning, offering a middle-ground between nudge theory and education. Daniel recognised that *"going outside and doing those activities is an opportunity for transformative experiences for people"*. Daniel added however, that awe-inspiring moments can be magnified when instructors can *"support their customers at that right time"*. Similarly, Alex believed instructors should *"make the most of those opportunities by sowing a little seed somewhere"*. By sharing knowledge, or facilitating experiential learning through questions or activities, Alex supposed clients would become *"a bit more informed"* and be able to make *"more effective decisions in terms of where they go and what they do, and the conversations they have"*.

While awe-inspiring moments were thought to trigger environmentally positive emotional responses, getting sustained knowledge, attitude or behavioural change came down to the idea of giving clients a *"'thing' that will make it stick"* (Ben). Finn talked about getting clients to *"own it"* (a task, goal or behaviour), saying if clients can *"own it and engage in the landscape, then actually, you're halfway there"*. Finn continued, recognising that information or activities that are memorable are more likely to evoke change; *"then it's that stickability, so they continue with it when they leave"*. Engaging clients in memorable information or activities is favourable for knowledge acquisition and emotional stimulation, however it does not necessarily equip clients with the skills needed to enable competent decision making and positive behaviour change (as per the definition of environmental literacy).

Despite expert support for a more active role in environmental facilitation, Connor felt it was more appropriate for school groups in response to outdoor education and curriculum requirements, as opposed to the adventure tourism market. Connor stated, *"for mum and pop and two kids that want to go out and have a canoeing session, that's a slightly different audience with a potentially different driver"*. In contrast, George stated, *"I think there is a genuine 'I want to understand more', there is a guilt, 'I have just driven here, how can I feel better about myself that I am gonna go away*

*with some knowledge”*, therefore suggesting clients will be receptive of environmental learning, and goal setting for PEB change.

The course content on environmental goal setting and reflection (see Section 5.3.3.3) was applauded by Finn, who stated that if the instructor can *“set something at the beginning and reflect on it at the end, then you’ve got more chance of them [the clients] owning it”*. George and Daniel also supported the inclusion of goal setting and reflection, saying, *“reflection and goal setting as an integral part of what we are supposed to be doing as outdoor providers”* (George), and that *“explicit goal setting, or stating goals at least even if it’s not joint negotiation is good practice”* (Daniel). Furthermore, Connor explained how, *“goal setting and reflection can really add value to any adventure activity session, but building in the environmental aspect of it can have those wider benefits”*. Despite recognising the benefits of the module, Hayden admitted, *“we [instructors] often perhaps don’t do goal setting and whatever as well as we should do”*.

### **6.2.1.3 Challenging perceptions of nature**

#### ***“The nature store cupboard” (Ben)***

For the course to be effective, it should create, respect and promote environmental value within the outdoor sector. Environmental value and the idea of challenging perceptions of nature was alluded to by three of the participants interviewed, George, Hayden and Ben. George suggested the outdoor sector is *“becoming increasingly mindful of the fact that people need to burn carbon etc to get to them”*, and so, *“stuff they can put into their programme that says, ‘we’re also doing the right thing and we’re going to equip you to appreciate the environment more’, would be of value”*. Similarly, Hayden acknowledged *“the environmental agenda is becoming so much more in the forefront of our minds”*. Having said this, Ben felt a need for greater environmental consideration by instructors, saying, *“[instructors have] a responsibility to be more aware of their role as economic actors”*, and went on to say, *“they are taking value from the environment, they are monetising it, and then what are they putting back?”*.

References to ‘othering’ were made by George and Ben, who both implied an environment centred, ecocentric view. George said, *“to me personally, I like the idea of us all being one thing and then understanding my part in it. It makes it a bit real, and I feel less ‘other’”*. In an alternative use of the word ‘other’, Ben stated *“despite what outdoor education might think, it is ‘othering’ nature”*. Ben alludes to the human-centred approach of the outdoor sector that has been a *“very comfortable place to be for generations”*, however, challenges that unless there is a fundamental change in perceptions and epistemologies *“nature’s going to become so valuable, outdoor educators won’t be allowed anywhere near it”*. Ben continued to explain how *“the problem [in the outdoor sector] is nature’s voice is not mediated through anything other than our current*

*economic structure [...] it's the store cupboard that we go to, to get things we need"*. This is a key problem for Ben which he referenced several times during the interview. In doing so, he highlights how OAAs use (usually free) natural spaces to create money, but that the influence the activities have on nature are rarely recognised, despite the assumed ideologies of outdoor instructors.

Hayden supported the need for change in the sector by *"getting instructors to take that personal responsibility that's also about promoting other people's behaviours"*, however, for some that will be *"changing the way instructors think about what they're doing"* (Hayden). Ben promoted the idea of change in the sector, insisting instructors need to take responsibility and to consider *"what [value] they are putting back"* into the environment. In contrast, Connor believed that engaging clients in environmental conversations *"is not a responsibility, but it's important to be doing it to help protect our business"*. This comment by Connor reinforces Ben's point, that in some cases nature is valued purely for economic and business means, rather than for its own value.

#### **6.2.1.4 Perceived relatability**

All participants from the expert appraisals mentioned that for the course to be effective and valued by the participants, it must be relatable to them in terms of its (a) delivery, (b) terminology and (c) content. These sub-themes are explored respectively below.

##### **6.2.1.4.1 Appropriate course delivery**

###### ***"Learning in very different ways" (Alex)***

Participant needs and preferred styles of learning will always vary within a group of people. Three of the interviewed experts referred to instructors preferring practical methods of learning and referenced proportionally higher special educational needs, than in other sectors. Alex explained *"there is a lot of dyslexia amongst instructors"*, and that *"because of different literacy challenges [...] we learn in very different ways; we retain information and knowledge in different ways, and we think, and we take information on in different ways"* (Alex).

Dyslexia was also mentioned by George, who said, *"there were four times the rates of dyslexics declared in the 26,000 people estimated at working in the outdoor sector delivery than in the national population"*. Commenting on the same study, George added, *"the learning styles people declared they had, were massively weighted towards practical as well"*. Additionally, while not alluding to specific learning differences, Ben added, *"it's really important to have some practical aspect [...] that's important for the type of learners that are predominant in the outdoor sector"*.

While learning styles and dyslexia are “*not necessarily linked*” (George), there was a recognition for the importance of a practical aspect of the course. Referencing his personal experience, George said, “*I've seen nothing in my years working in the outdoors that hasn't said get people hands on!*”. The belief that “*for most outdoor people, reading stuff doesn't really work*” (George) was similarly stated by Hayden, who said, “*for outdoor instructors, two days of theory just wouldn't work!*”. Alex credited the structure of the course saying, “*it works in terms of 50-50 practical – theory*”. Similarly, Finn responded, “*the way you've structured it – absolutely. Theory, practical. Theory, practical; because you've got to be able to do both haven't you?*”.

Despite the importance given to practical learning, George suggested experience as a potential variable which could influence participant receptiveness to theory. George commented, “*while experienced instructors are still generally practitioners rather than theorists, [...] you might find they could engage with two evening online learning courses and have the wherewithal to follow it through from there*”. Similarly, Ben spoke from his experience saying he had taken part in a Carbon literacy course, run online, and vouched for its success saying, “*it worked easily*”.

#### **6.2.1.4.2 Appropriate terminology to reach the identities of the intended audience**

##### **“A broad field” (Alex)**

The first draft of the handbook referred to the intended audience as ‘outdoor instructors’. The wider field of businesses was referred to as the ‘outdoor industry’. This terminology was problematic for some of the interviewed experts, particularly Alex and Ben. Alex felt “*the use of the term instructor narrows the field a little bit*”, and the term “*outdoor ‘industry’ jarred me a little*” (Ben). Alex recognised the different terminologies used in the field saying, “*some businesses will always use “‘guide’, [...] and ‘instructor’ has always been a term used in the outdoors but actually, [what about] ‘outdoor professional’, ‘outdoor practitioner’, or ‘outdoor facilitator’*”. Alex summarises the identities to be “*all the same thing in one sense, depending on who you're talking to*”.

Ben alluded to the different labels “*all meaning something to us, but to the person in the street they don't mean jack!*”. Depending on the context, Ben labelled himself using terminology that would “*mean something to them*”; rather than saying, “*‘I'm a mountain leader’ [...] I would just say I'm a guide, because I know that that's going to mean something to them*” (Ben).

Similarly, with reference to the ‘outdoor industry’, Alex recognised the different terminology available, but stated “*it's a whole host of terms that people can get hung up on*”. Ben on the other hand argued against the use of the term ‘industry’, saying “*I don't think there is an ‘outdoor industry’ per se. ‘Industry’ is about efficiency, and I don't think the outdoor sector is about efficiency somehow!*”

A “*glossary of terms*” was advised by Alex to define the intended audience and key terms and to “*maintain consistency*” throughout the course material.

In addition to the terminology used to identify the ‘instructor’ and the ‘sector’, expert Ben emphasised the importance of terminology influencing ecocentric motives. Commenting on the language used throughout the course material, Ben noted, “*the language you used is about, ‘the’ environment, ‘where we are in ‘the’ environment’*”. He recommended being “*really cautious about that affirmation and reification of ‘us’ and ‘the environment’*”. While this point was not addressed by other experts, it influenced a course modification given that it aligned with the epistemology of my research.

#### 6.2.1.4.3 Appropriate content

**“*[There’s a] divorce in the actual environmental knowledge from how to deliver environmental knowledge*” (Hayden)**

Three of the interviewed experts mentioned the challenge in the application of processes (environmental conversations or activities) if environmental knowledge is low. This reinforced the importance of the pedagogical and andragogical content knowledge principles. Hayden “*struggled with it as a stand-alone course [because of the] divorce in the actual environmental knowledge from the how to deliver environmental knowledge*”. Finn and Connor also recognised the challenge, saying, “*you can’t apply it unless you’ve got skills, but you can’t apply it unless you’ve got the knowledge and actually you need the whole package*” (Finn). Hayden added that “*for people who have got reasonable environmental knowledge, [a pedagogical focus] makes sense*” however, he suspected that, “*the majority of outdoor people don’t deliver environmental stuff to their clients because they don’t have the knowledge and obviously because they don’t have the skills of how to deliver it.*”

A pre-requisite was suggested by two of the participants; Ben suggested “*an online element that [instructors] would have to do before the course took place*”, so instructors start the course with a common level of foundational environmental literacy knowledge. This idea was also brought up by George, who said he was “*a big fan of pre-reading for all sorts of reasons*”. George explained how pre-reading can “*demonstrate a level of commitment, [...] help people engage, [...] and can break down some barriers before they arrive, because they feel like they’ve got a slight knowledge of the topic*”. In contrast, Elinor guessed pre-course material “*would have limited success with anyone, and especially this audience*”.

George introduced the concept of instructor experience being a precursor to being able to integrate environmental literacy conversations and activities. For entry-level instructors, experience is low and therefore “*the lower down [the experience levels] you go, the more there*

would need to be a content kind of ‘aid’”. Furthermore, George adds that for inexperienced instructors, their “*pie graph of effort is completely full by just keeping people safe*”, whereas “*once I’ve been doing it for a bit I can actually have some headspace to be thinking about how I’m doing it, what I’m doing and adding another value*” (George).

### **6.3 Course modification**

In addition to the findings that emerged through the thematic analysis, instructors also commented on some specific elements of the course which required modifications to the handbook. The modifications were made based on all iterations of expert appraisals and once their analysis had been completed. This was the final micro-cycle in phase 2 (see Figure 23 in Section 6.1).

#### **6.3.1 Structure**

From the findings above, the practical aspect of the course was deemed important to engage and appeal to outdoor instructors’ preferred learning techniques, however time and financial implications were raised as potential caveats to running a two-day course.

Rather than modifying the duration of the course, the two-day (12-16 hour) course was still offered to participants in phase 3 of research (the course trialling). To maximise participation however, I adopted a flexible approach to suit the time availability of the businesses and individuals. As shown in the next chapter, the duration of course trials were significantly reduced to less than the initially intended two-days.

Adding a pre-requisite of being fully qualified to lead at least one activity increased participant experience and therefore gave access to a more flexible approach to course delivery. More experienced instructors were expected to cope with more theory and less practical, and an online format where necessary. This enabled greater flexibility for recruiting participants for course trialling.

#### **6.3.2 Preface**

Alex advised the preface “*could have been a little more punchy*”. He recommended using “*a quote from somewhere from the environmental perspective that really flags up what it is about*”. In response to this, the preface was updated and extended to include the quote by Alison Lugg (2007) which underpins the motive for the course. Alex and George also suggested stating a course aim either at the beginning of the handbook or as a sub-title. Alex suggested the course

*“provides opportunities for outdoor professionals to consider the relationship between what you say and what you do in the context of the environment”.*

### 6.3.3 Course objectives

With reference to the course objectives, it was largely agreed there was *“nothing wrong with the objectives themselves”* (Ben). They *“make perfect sense”* (George), and were *“very clear, very understandable”* (Alex), *“very achievable”* (Ben) and *“all relevant”* (Hayden). Finn stated, *“the objectives are right; understand, build the confidence, here's how you're going to do it, make sure you're picking the right horses for courses”*. On an epistemological level however, Ben questioned *“to what extent do you want to challenge that fluffy outdoor ed reality of, ‘we're doing a great job cause we love the outdoors’”*. Ben added, *“that kind of human centric epistemology is where it's all going wrong for us”* and advised the outdoor sector needed an epistemological shift.

Elinor noted how some of the objectives are *“transferable into other stuff that they deliver”*, adding, *“objective 4 is really useful and probably, well I'd like to think has come up in their training in the past, but it's a really good one to reiterate again”*. In contrast to the favouring of reiteration, Hayden commented *“number 4, is that not something that you do as an instructor all the time anyway in the context of the activities that we're in?”*. Hayden believed *“number 2 to be a big one”*, but that *“three and four maybe belong together [...] so there is understanding the concept, being confident and competent, and then having the ability to do it”*.

The first objective was unchanged. Changes were made to objective 2 to recognise that instructors may already possess some competence and confidence. Objective 3 was merged with objective 2 to specific conversations (engagement) and activities (facilitation strategies). Objective 3 was replaced to reflect the attention given to the ecocentric/anthropocentric discussions and responses to participant thinking. Objective 4 had slight word alterations to reflect the building and use of existing knowledge, to put new knowledge into practice. The revised objectives are shown in Figure 25.

1. Understand the concept of environmental literacy and why it is important for a sustainable future.
2. Increase competence and confidence for engaging adventure clients in environmental conversations and activities.
3. Develop an understanding of human-centred and environment-centred views, climate anxiety, participant thinking and common misconceptions.
4. Use understanding of group dynamics and participant thinking to integrate appropriate activities and goal setting into OAAs.

Figure 25: Updated objectives for the environmental literacy course

#### 6.3.4 Syllabus points

The syllabus points were written in the course handbook at the end of each module (see example in Figure 26 for the syllabus points related to understanding environmental literacy). Several experts indicated that the syllabus points came across as confusing, leading to questions about whether the course was going to be examined. Alex asked, *“‘syllabus’, is that outcome, is that objective, or is that criteria?” maybe it should be “output or outcome”*. Given that the course was not being assessed on a pass or fail basis, the points were modified to ‘by the end of the course you should be able to...’.

##### **Syllabus**

Demonstrate an understanding of the concept of environmental literacy and why it is important.

Display relevant knowledge and skills for developing environmental literacy while in the outdoor environment.

Identify and discuss an environmental problem in an outdoor activity context and suggest possible solutions.

Figure 26: Example of the syllabus points related to understanding environmental literacy



### 6.3.5 Language

To increase the perceived value of the course, references made to ‘outdoor companies’ or the ‘outdoor industry’ were changed to the ‘outdoor sector’, so that language was consistent, and it did not narrow the field of intended audience. The audience was labelled ‘instructor’, to maintain consistency, however, to further explore this matter of identity, the pre-course survey asked the question ‘How do you identify your role in the outdoor sector?’. In the survey, participants were given a list of possible identities, along with the opportunity to write additional labels. Participants were asked to tick all labels they believed represented their identity. The findings from this survey question are discussed in phase 3.

The course title remained ‘environmental literacy’ to keep consistent with other growing areas of environmental work (such as carbon literacy and ocean literacy). However, a sub-title was added to present a summary of the course aim. A glossary of terms was added to the course handbook.

Changing the language around ‘the environment’ and ‘us’ was challenging, with little direction or advice as to how else to converse about them (the environment and us), as a singular rather than a duality. Figure 27 shows an extract from the initial and updated participant handbook. The left-hand image shows where Ben highlighted “*all the times you talked about the environment belonging to humans*”. While this was unintentional when I was writing the handbook, it emphasises the societal acceptance of thinking of ‘the’ environment and ‘us’. The image on the right shows how the same extract was rewritten to subtly promote ecocentrism.

Being in **the outdoor environment** can boost people's mood, making them feel happier, healthier, more peaceful, creative, less anxious, or less stressed. But not only can it make us *feel* better, we rely on **our environment** to continue living. The oxygen we breathe comes from plankton in the oceans and the trees on our lands. The materials we use in our daily lives to clothe ourselves, keep warm, travel, eat etc are all sourced from naturally existing resources. As outdoor enthusiasts we are dictated to by the nature of our weather conditions, not just of the day, but of days or weeks leading up to adventures. Our interaction **with nature** is constant.

Being present outdoors can boost people's mood, making them feel happier, healthier, more peaceful, creative, less anxious, or less stressed. But not only can it make us *feel* better, humans rely on environmental connections to continue living. The oxygen breathed comes from plankton in the oceans and the trees on land. The materials we use in our daily lives to clothe ourselves, keep warm, travel, eat etc are all sourced from naturally existing resources. As outdoor enthusiasts we are dictated to by weather conditions, not just of the day, but of days or weeks leading up to adventures. Our interaction with nature is constant and inseparable.

Figure 27: Extracts showing where expert Ben highlighted anthropocentric connotations (shown left) and the updated alternative (shown right)

To increase instructors' consideration of language, an additional topic was also introduced following expert concern for 'othering' nature (see Section 6.2.1.3). A slide was added to the presentation to discuss the anthropocentric words used to describe actions in OAAs. The slide shares an extract from a blog-post by Bradley and Tufts (2023), who explain how language can unintentionally devalue the surroundings (see Figure 28). The slide offers an opportunity for group discussion on the subject and encourages instructors to think about words that have softer connotations.

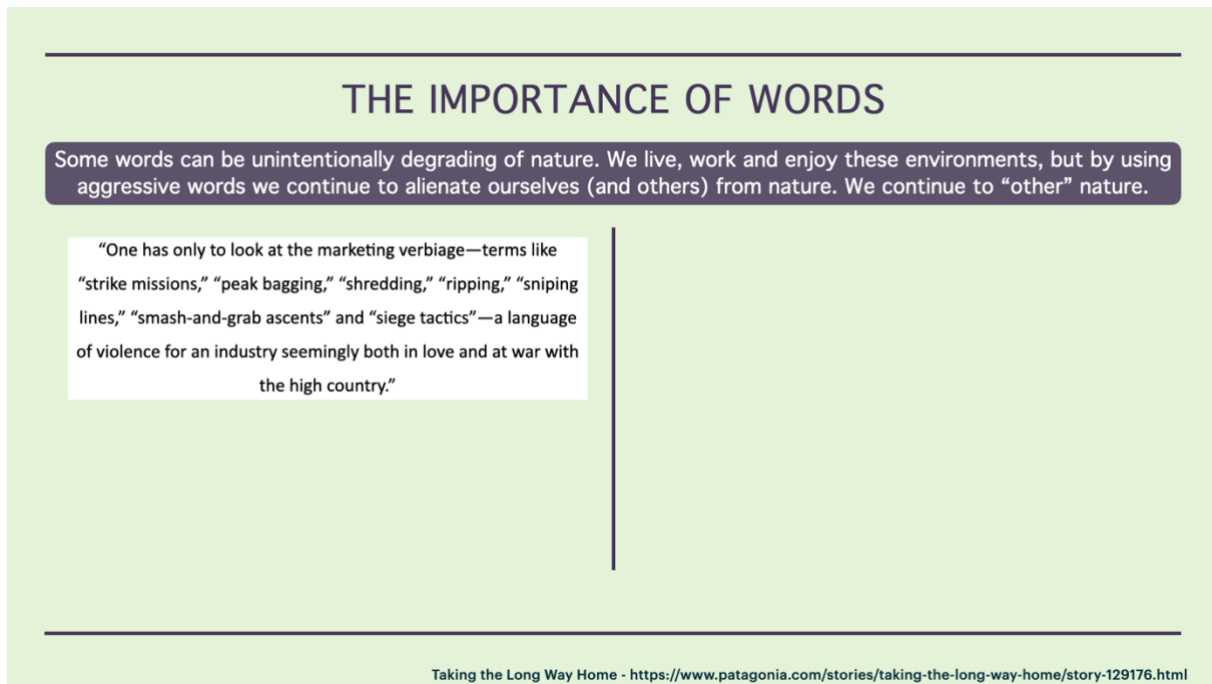


Figure 28: Presentation slide to promote discussion about the importance of words

### 6.3.6 Content

The lack of content knowledge was recognised as an issue. Given the time limitations of the course and variation of instructor activities and locations of work, environmental content would be challenging to write for group courses, unless instructors all work at the same sites.

Pre-reading was suggested to introduce subject and content knowledge; however, it was not introduced for the course trialling as participating instructors were already required to answer a survey prior to taking part in the course. Giving pre-reading in addition to a survey was anticipated to reduce willingness to participate. Response rate to the survey however was monitored as it gave an indication of instructor willingness to prepare for a course, which could then be introduced later.

To optimise environmental content knowledge among course participants, a pre-requisite required instructors to be fully qualified in at least one outdoor activity. Experience in the field was anticipated to increase likelihood of environmental knowledge.

## 6.4 Interim discussion of expert appraisals

The concept of the environmental literacy course was endorsed by the experts and the content of the course material was broadly approved. Experts focussed on the finer details of the course, particularly to enhance marketing and future participation.

Based on the themes identified in the findings and the changes made to the course, six preliminary design principles were devised. These are presented and discussed below.

### **6.4.1 Design principle 1: Participating in an environmental literacy course must enhance outdoor instructor value by contributing to their professional development.**

As with any course, participants investing time and/or money in attending, should be rewarded with knowledge acquisition and/or certification that can benefit their professional development. However, the outcome instructors are looking for may vary depending on their adventure orientation. Section 2.2.2 in the literature review highlighted the qualities of different instructors, depending on whether they enter the sector through the leisure, outdoor pursuits, or adventure orientation. For instructors coming from the leisure orientation, increasing their value could be centred around their personal and social characteristics related to environmental learning; teaching instructors to be supportive, positive role models, and to provide feedback (Wagstaff, 2016; Povilaitis *et al.*, 2019). Characteristics of the instructor being knowledgeable, empathetic and inspiring add additional value for participating outdoor adventure clients (Schumann *et al.*, 2009). Although the environmental literacy course highlights instructor positionality and responsibility with the intention of inspiring instructors to advocate for PEBs, the pedagogical focus is aimed more towards instructors from the outdoor pursuits and adventure orientations.

Adding value or increasing professional development for instructors from the outdoor pursuits or adventure orientation requires a greater focus on content knowledge and pedagogical skill to enable effective teaching and learning (Wagstaff, 2016). Instructors from the adventure orientation (or transitioning from the outdoor pursuits, into the adventure orientation) are expected to have mastery of different teaching styles (such as using experiential models), conduct reflections, and be competent employing indirect pedagogies (Maurer and Curtner-Smith, 2019). These instructor characteristics align with the EL-PACK criteria from which the environmental literacy course is based and thus, it is expected that attending an environmental literacy course should increase instructors' professional development through developing EL-PACK.

### **6.4.2 Design principle 2: The course should aim to initiate environmental change among adventure clients**

Influencing change, particularly when it comes to environmental behaviours is challenging, however some experts suggested there is appetite among OAA clients for greater environmental focus (see Section 6.2.1.2). Evidence from previous research supports this expectation. A report

conducted in Wales concluded ‘getting closer to nature’ to be one of the biggest reasons for individuals taking part in OAAs, and ‘adrenaline and excitement’ as far less important (see Miller *et al.* (2023), p.17). ‘Getting closer to nature’ was not elaborated on in the report by Miller *et al.* (2023), therefore it is unclear whether participants are referencing a physical and/or emotional characteristic. Similarly, based on findings from 459 questionnaires collected from tourists of OAA experiences in South Africa, Giddy and Webb (2018) concluded interactions with nature to be a key motivator for participation. Whether the interactions are cognitive or psychological, these findings suggest that clients may be more willing to take part in environmental conversations or activities than perhaps instructors expect. In addition, Novotná *et al.* (2024) conducted a survey study in the region of the Czech Republic, to determine the potential of OAAs as a sustainable tourism practice. They concluded that participants in OAAs feel their impact on the environment during the activity to be “*relatively important*” (Novotná *et al.*, 2024, p.3). While this also suggests that clients of OAAs may be open to conversations about environmental behaviour changes, it should be noted that the survey was administered using a snowball sampling method, originating from university students on a sustainability tourism course (see Novotná *et al.*, 2024). The findings therefore may be skewed on the basis that many of the participants have a primary interest in sustainability.

One challenge raised by experts for introducing environmental conversations was the risk of talking about ‘wicked problems’; topics which cause divisive opinions with no clear answers (Balint, 2011). Some experts warned that wicked problems could be inappropriate to introduce during OAAs as they could affect the instructor-client rapport. Instead, these experts referred to the practice of ‘nudging’, suggesting it is the indirect pedagogies and subtle influences that are more suited to OAAs than specific environmental conversations or activities. Other experts however, recognised that inspirational opportunities could have greater impact if the instructor is able to aid their facilitation, reflect on the experience and discuss outcomes that could lead to pro-environmental goals.

Grilli and Curtis (2021) conducted a review of four methods and approaches for encouraging PEBs, of which ‘nudges’ was one. They discovered that while nudge treatments are often successful for initiating PEBs, there is little understanding of whether these behaviours are sustained (Grilli and Curtis, 2021; Weijers *et al.*, 2021). In educational or workplace settings, nudge treatment can be used over a prolonged period to increase likelihood of behaviour change. However, during OAAs, instructors are with their clients for such a short time, the likelihood for creating impact through nudge treatment could be questioned. Furthermore, the extent of ‘nudging’ can impact the outcome; a sign directing behaviour for example (see Wielenga *et al.* (2024) may have more impact than suggestive comments, or ‘musing’, as indicated by the experts.

As outdoor instructors are seen as positive role models (Povilaitis *et al.*, 2019), there are opportunities to encourage PEBs through effective communication, fostering commitments, and facilitating feedback or reflection (otherwise known as social influencing) (Grilli and Curtis, 2021). While social influences have been proven an effective means for influencing short-term behaviour change, there is little evidence to suggest it can influence sustained behaviour change (Grilli and Curtis, 2021). Experts in the appraisal did not mention the influence of role modelling, however it has been evidenced in previous work (e.g. Schumann *et al.*, 2009).

If instructors can be taught the importance of an ecocentric ideology and how to value the more-than-human, then social influences may play an important role in ‘planting the seed’ to outdoor adventure clients. This is also a reliance however, on instructors gauging their groups epistemological assumptions and their understandings of environmental concepts, so that a constructive rapport can be created, and conversations or communications can be tailored to suit the clients. Understanding participant thinking and misconceptions is an important module within the course (see Section 5.3.3 for slides).

An additional aspect of social influencing that can aid its success is encouraging some form of commitment (Grilli and Curtis, 2021). The idea of instructors co-setting environmentally related goals with clients of OAAs was favoured by some experts more than others. While some felt goal setting was not suited to OAAs, others believed it was a way to engage clients to ‘own’ their learning and behaviours. Goal setting or commitment making requires greater conversation and reflection than passive or subtle methods of communication. It requires careful consideration of necessary resources and abilities to ensure the client is set an achievable task and does not feel defeated if unachieved (Grilli and Curtis, 2021). Goal setting is a fundamental element of experiential learning, which has provided the roots for outdoor education (see Section 2.1.2). It is associated with the ‘active experimentation’ aspect of Kolb’s experiential model (Kolb (2015), and is a recognised expectation of instructors ability. Experts warned however that while goal setting (not in an environmental context) is often associated with OAAs, many instructors do not apply it.

As the purpose of the course is to go beyond instructor development and to influence the end user (i.e. the adventure clients), there is an importance in setting achievable and tangible objectives. The idea of identifying a remit with participating instructors was suggested by one expert, to avoid being caught in conversations that imply blame or that could cause tension within a group. As the breadth of environmental concepts is so vast, having a remit was considered unfeasible, particularly as different instructors will have different areas of knowledge. What was highlighted however, was the importance of recognising ‘I don’t know’, and for instructors to be

honest and open about the extent of their knowledge, without trying to identify as an environmental expert.

This design principle emphasises the roles of several criteria from the EL-PACK framework which contribute to influencing change (see Table 6 in Section 3.3). In particular, the principle reinforces the importance of pedagogic and andragogic knowledge; for understanding the client/s, their values and beliefs, and their willingness to engage in environmental conversations and activities. It also highlights the influence of delivery knowledge in a subject context; for the importance of appropriate goal setting and reviewing.

### **6.4.3 Design principle 3: The course must challenge instructor perceptions of nature**

Experts alluded to anthropocentric actions in the outdoor sector which have been passed on through generations and go largely unnoticed by outwardly ecocentric instructors. Experts such as Ben, Hayden and George in particular vouched for a greater environmental focus which listens and accounts for the voice of nature, before taking advantage of its economic worth. The contridication between expert perspectives of athropocentrism and the expectation of OAAs reinforces findings about the environmental contradiction as alluded to in the literature review (see Section 2.1.3). As described by Bradley and Tufts (2023), it highlights “*an industry seemingly both in love and at war with [nature]*”. Similar reports about a paradoxical connection and (dis)connection from nature was found by Martínez and Mackenzie (2022) in their study on how climate change and nature connection influences adventure guides’ well-being. Their findings showed instructors valued nature anthropocentrically in terms of it being used a resource, however in contradiction, the same instructors valued a strong emotional connection which enhanced feelings of responsibility (Martínez and Mackenzie, 2022).

Challenging instructor perceptions of nature requires recognition of accountability; that OAAs such as mountain biking, hill walking, skiing, canyoning, coasteering, climbing and kayaking all have an environmental impact (Tyler-Walters, 2005; Sutton, 2020; Evju *et al.*, 2021; Pickering, 2022), which should be considered at the forefront of the activity. Recognising environmental impact and listening to nature’s voice must be prioritised over economic worth if the areas in which we work are to be sustained.

There was a prevailing belief that OAAs can be a vehicle for environmental development, and all experts agreed that OAAs could influence PEBs. Opinions over whether the extent to which raising client awareness outweighs the invasive nature of the activities, however, was divided. Some experts believed the OAA experience to be powerful enough in itself to influence PEBs, without having environmental conversations or activities actively facilitated.

Academics have warned of the outdated values of the outdoor sector and the need to respond to current societal challenges (Brown and Beames, 2017), as well as the need for knowledgeable instructors to actively facilitate environmental conversations and activities (Lonergan and Andresen, 1988; O' Connell *et al.*, 2005; Lugg, 2007; D' Amato and Krasny, 2011; Collins and Brymer, 2018; Huynh and Torquati, 2019; Moseley *et al.*, 2020). The differences between the academic values and the actual facilitation of OAAs suggests a gap in knowledge exchange which is hindering the outdoor sector from reaching its educational and developmental potential.

Given the preferred practical methods of learning over reading theory, it is perhaps unsurprising that not all outdoor instructors are affiliated to academic outdoor journals, particularly when the language used for academia is not easily accessible to non-academic minds. The Institute for Outdoor Learning (IOL) is affiliated to the Journal of Adventure Education and Outdoor Learning, which members can subscribe for through an account, and they (IOL) publish a magazine, where they encourage instructors, practitioners, and academics to write specifically for the intended audience, in a magazine style. Both the magazine and the journal raise awareness of the academic side of the outdoor sector; however, both also require a membership subscription.

The barrier of knowledge exchange between academia and practice is not only a problem in the outdoor sector (e.g. see Robinson (1992) for why educational research does not always influence education in practice). It is hoped that developing a course through an academic pathway can contribute to both theory and practice, addressing the rhetoric reality gap, upskilling instructors, and importantly, emphasising the responsibility and ability for adaption to respond to societal and environmental needs. Changing perceptions of nature however is no small feat, particularly when OAAs can be as short as 2-hours. The principles discussed above explain what a course should consist of to engage participation and influence behaviour change. However, in attending to the needs of the participants first (over environmental needs), the course unintentionally reinforces an anthropocentric epistemology. In effect, to make a course attractive to outdoor instructors and feasible to deliver, we are encouraged to listen to the voices of humans, as opposed to the voices of non-human nature.

There exists a fine balance in juggling a course that is feasible and attractive, but that also challenges instructors beyond their comfort zone to reevaluate the way in which their activities 'use' nature. There is a concern for both the feasibility of the course, and for future outdoor instructors applying the course that it is either preaching to the converted, or it will be too much for people to (want to) comprehend. The importance in this principle is that the course *challenges*, not necessarily *changes*. Challenging perceptions can be done through different styles of facilitation and communication, based on individual and group dynamics. Asserting



beliefs or perpetuating guilt will have adverse effects, therefore there should be a consideration of the language and delivery to effectively challenge perceptions.

#### **6.4.4 Design principle 4: The course delivery must be relatable to outdoor instructors' learning preferences**

The literature review commented on the lack of research around the learning preferences of outdoor instructors. To appeal to the adult learner, the development of the course was influenced by the andragogical and heutagogical assumptions by Knowles (1977) and Kerry (2013) (respectively), coupled with my personal experience of specific learning differences (SpLDs) and experiential or practical-based learning preferences (see Section 2.2.3).

The statement by White and Groves (2023, p.16) about many instructors having SpLDs (see Section 2.2.3.1) was mirrored by the views of experts. While there was no empirical research found to quantify this belief, several experts alluded to instructors having a variety of SpLDs. While experts gave no suggestion of the course content being changed for instructors with SpLDs, it was an important consideration to be aware of when facilitating the course. Gallardo *et al.* (2015) recommend using clear colour differentiation to aid those who are colour-blind and White and Groves (2023) recommend using experiential or task-based activities where possible. Time was allocated in the course for breaks, and active discussion between participants was promoted to maintain engagement.

Experts also believed instructors typically favour practical, hands-on learning. While this mirrors many outdoor qualifications (learning to paddle a kayak in an online course would likely be ineffective!), there have been a rise in online courses for higher education and professional development courses, particularly since the Covid-19 pandemic (Smith *et al.*, 2016). Instructors affiliated with certain governing body associations (such as the Mountain Training Association) are required to attend training courses or workshops to maintain a level of points, many of which are now provided online. Courses such as 'wildlife and habitats of the UK's mountains and uplands', and 'climbing for all disability awareness', are offered as online events to all Mountain Training members, whether part of the association or not. Similar CPD is offered by Canoe Wales, such as 'standards for development – club support webinar', and the 'winter CPD webinar series', facilitated by Paddle Up Training.

Despite favouring practical learning, one expert (George) alluded to the ability of transferring theory into practice as experience in OAAs increases (see Section 6.2.1.4.3). In terms of EL-PACK, this suggests novice instructors taking part in an online course may gain subject knowledge and a theoretical understanding of subject knowledge in a delivery context, however they may be less likely to transfer this knowledge into delivery than an experienced instructor. Bridging the gap

between ‘knowing what to do’ and ‘doing what you know’ has been explored in educational research (e.g. Mavhunga and van Der Merwe, 2020), with experience being recognised as a factor that influences effective teaching (Kim and Ko, 2020).

Research has shown some evidence of the benefits of outdoor education being facilitated online, including increased opportunities for intellectual engagement and increased opportunity for participation (Smith *et al.*, 2016; Dymment *et al.*, 2018a). As the environmental literacy course is theory based as opposed to skills based, (i.e., it is not teaching a physical skill performance like rolling a kayak), increasing intellectual engagement would be favoured. Furthermore, Dymment *et al.* (2018a) conclude that for students, an online module can be an effective method of delivery if the course is designed appropriately. While students of outdoor education courses are likely to be relatively inexperienced as outdoor instructors, they also possess a readiness to learn that drives their engagement with a university course, which could influence the findings about the success of online courses. Whether being facilitated online or in person, the course must use appropriate methods of facilitation to effectively engage and enthuse participants, to enhance their learning and to motivate further development.

The course trialling will assess the relatability of the course delivery, and whether the andragogical assumptions hold true for outdoor instructors, or whether alternative learning preferences (such as heutagogy) are discovered. Based on the work of Knowles (1977, p.211) and influenced by the expert appraisals, seven preliminary assumptions are made about instructor learning:

1. The concept of the instructor is increasingly self-directed.
2. The role of the instructors’ experience is a rich resource for learning.
3. Their readiness to learn develops from life’s tasks and problems.
4. The preferred orientation to learning theory is task or problem centred.
5. Instructors’ motivation to learn is directed by internal incentives and curiosity.
6. There is a relatively high percentage of specific learning differences (SpLDs) (i.e. dyslexia and AD(H)D) among instructors.
7. The preferred orientation to learning practice is experiential.

#### **6.4.5 Design principle 5: The course must use appropriate terminology to reach the identities of the intended audience**

Identities and labels used in the outdoor sector have been discussed by several theorists. Collins and Collins (2012), highlight key differences between the labels ‘guide’, ‘teacher’, and ‘coach’ and Lloyd (2010) has explored the different leadership traits of outdoor adventure education instructors and guides. However, while some theorists agree there are fundamental differences and similarities between identity labels, others argue that for the sector to advance as a profession there needs to be a generic title that encompasses all outdoor professionals (White and Groves, 2023).

White and Groves (2023, p.5) understand professional identity as “*being both how society sees your profession and how you see yourself as that professional*”. This explains expert Ben’s comment about how he uses different labels in different contexts to be understood by the audience he is talking to (see Section 6.2.1.4.2).

Collins and Collins (2012) deliberately avoid the use of the term ‘instructor’ due to its perceived generic nature, encompassing the identities of the teacher, guide and coach combined. This however works in the favour of using it for a course, for engaging and appealing to a wide audience. While for the purpose of the thesis the label ‘instructor’ is used, for the future delivery of the course the label used may benefit from being changed as per the group of participants.

Experts suggested the importance of terminology to be a matter of instructor identity, but also a matter of marketing for course feasibility. For a course to be feasible, it must attract its intended audience by using a suitable title and being inclusive of different identities. To understand instructor identity in more depth there was a question added to the pre-course survey.

#### **6.4.6 Design principle 6: The course must have appropriate content to enhance instructor BiAtT and EL-PACK**

The framework for EL-PACK was presented in Section 3.3 of the conceptual framework, and throughout the development of the course prototype (Chapter 5). Rouse (2006) identifies ‘knowledge’ as a fundamental element of effective practice, paired with the belief that one can make a difference, and the ability to use different methods of facilitation to share the knowledge. In the same way, EL-PACK identifies content knowledge, along with pedagogical and andragogical knowledge, as essential for developing environmental literacy. Environmental knowledge shared during an OAA will be different depending on the location and activity being facilitated, as well as instructor subject knowledge.

Expert Hayden suggested that many instructors choose not to have environmental conversations due to their lack of content knowledge, on both a local and global scale. This supports existing literature, which has highlighted that despite attitudes towards environmental conservation being high, local knowledge is variable (Langley, 2010). From the EL-PACK framework (see Section 3.3), this suggests criteria under ‘subject knowledge’ to be an instructor weakness. A question was formulated for the pre-course survey to gauge an understanding of instructor subject knowledge in a local and global context, before changes to the course were made.

Expert George alluded to novice instructors having less ability to facilitate additional learning in the OAA context, due to having to focus on the delivery and safety of the activity. This perception about the influence of instructor experience is supported by the work of Mees *et al.* (2020) on instructors’ adaptive expertise. Mees *et al.* (2020) presents two models of thinking for less- and more- experienced instructors, concluding significant differences about the information instructors process to maintain adaptability. Although expert George did not quantify what he classified as ‘experienced’, in a five-stage table about the development of outdoor professionals, Wagstaff (2016) concludes the third stage ‘engagement’ (6-11 years of experience) to be when instructors have a greater capacity for developments and responsibilities that go beyond the thrill of the OAA. According to Wagstaff (2016), instructors with fewer than six-years of experience are in stage one ‘exploration’, or stage two ‘contemplation’. In both stages instructors exhibit enthusiasm for the OAA, however they may also be tentative and consumed by safety factors, or overconfident and therefore make poor judgement or decision making (Wagstaff, 2016). The importance of pedagogic agility for teaching instructors with varied levels of experience is highlighted by Mees *et al.* (2020). The EL-PACK criteria are broadly assessed in the pre-course survey to give a self-reported indication of instructors’ self-efficacy, subject knowledge, pedagogical and andragogical knowledge and delivery knowledge.

It was expected that instructors would have different strengths and weaknesses in the EL-PACK framework based on their experience in the outdoor sector and their previous education. The sixth design principle highlights the course must have appropriate content to increase instructors EL-PACK and BiAtT. Given that these qualities are expected to vary among individuals as well as among groups, it also reinforces that the course should be tailored to suit the specific audience.

### **6.5 Interim conclusion**

This chapter presented the first element of empirical research used to assess the face validity of the drafted environmental literacy course. Eight participants with different backgrounds of expertise in the outdoor sector took part in semi-structured interviews to collect data about their views on the drafted environmental literacy course handbook. Findings revealed the importance

of making an academic study applicable on a practical level for instructors, and therefore how to appeal to instructors through appropriate terminology, course structure and course content, while minimising time and financial barriers. A redrafted course handbook was developed based on expert advice (see Appendix C.1). The six design principles identified are used to aid the development of the pre-course survey to explore whether the views of experts are shared by instructors.

## **Chapter 7 Phase 3a: Pre-course survey (CH7)**

The expert appraisals in Chapter 6 informed the development of six design principles for an effective course for outdoor instructors. It also reinforced the literature findings suggesting a need for a change in epistemological thinking within the outdoor sector and suggested a feasible market for an environmental literacy course. The course material was modified as per expert recommendations.

Chapter 7 presents the methodology, findings and interim discussion of the pre-course survey, administered to outdoor instructors prior to their participation in an environmental literacy course.

The intention of the pre-course survey was to:

1. Identify instructor experience, preferred identity, and any environmental concepts they talk about during their outdoor adventure activities (OAAs)
2. Gauge instructor perceptions about their belief in ability to teach environmental concepts to clients
3. Gauge instructor environmental literacy pedagogical and andragogical content knowledge (EL-PACK)
4. Gauge instructor perceptions of the human-nature relationship

### **7.1 Methodology**

The pre-course survey occurred as a sub-phase within phase 3 of the overarching research design (see Figure 29 for the methodology of phase 3A, and Figure 9 in Section 4.3 for the overarching research design).

The survey was developed based on existing surveys and frameworks (see Section 7.1.3) and used predominantly Likert-style questions to collect quantitative data.

Data were analysed descriptively, and results were used to (a) refine design principles, and (b) influence course trialling.

**PHASE 3A**

A pre-course survey was administered before each course to collect quantitative data about instructors EL-PACK and BiAtT.

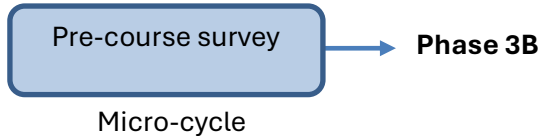


Figure 29: Methodology of phase 3 (from overarching conceptualisation of the research design)

### 7.1.1 Participants

A total of 34 instructors took part in the pre-course survey. The sample of outdoor centres trialling the course were chosen through stratified purposive sampling techniques (see Miles and Huberman, 1994). This involved finding a subgroup of businesses within the population of the outdoor sector that prided themselves on valuing and teaching for pro-environmental outcomes. The intention was to run the course with instructors from at least five different activity centres, with at least five instructors in each group. This meant a minimum of twenty-five instructor participants.

Findings from the expert appraisals highlighted the course may be most appropriate for experienced outdoor instructors who have the capacity to integrate environmental conversations and activities into their work, without having to consciously focus on safety principles. Based on this, two National Outdoor Training Centres were contacted for their recognised standard of highly qualified outdoor instructors. An additional four centres were chosen based on their ethos towards the environment, for example, recognising the value of nature beyond its anthropocentric value and/or seeking ways to inspire, educate and encourage clients in becoming more sustainably minded.

Of the six centres that were contacted only one allowed me to run the course at their centre. Reasons given for not taking part were predominately time and financial restrictions, however one also stated a lack of interest in environmental topics by instructors (despite their website showcasing environmental ethics).

An alternative route was taken to recruit instructors through governing body membership schemes. Two courses were delivered for members of the Mountain Training Association, and one course was delivered for members of Canoe Wales.

A pre-requisite of the course was that participants were fully qualified to instruct at least one activity. Although this was stated in the participant information sheet, and in the introduction to the survey, it was not adhered to by all participants. The result was that two participants were not qualified but were working towards qualification either to develop their skills for recreation, or to enable them to work in the sector. While this was not the initial intention, it was accepted given the foreseen challenges of recruiting substitute instructors that would meet the criteria within the timeframe. In addition, should the course be successful in becoming a recognised and accredited course, the demographic of participants was thought to indicate an accurate representation of future participants.

### **7.1.2 Data collection**

Contact with the gatekeepers (outdoor centre and affiliation bodies) was made to request participation in the research and to discuss suitable dates for running the course. Subject to agreement, the participant information sheet (PIS) and a gatekeeper letter were sent electronically via Safesend to the relevant member of staff to be signed and returned before contacting participants (see Appendix B.2.2 and B.4, respectively). Upon agreement with the gatekeepers, course participants were sent the PIS and a consent form which they were required to sign and return (see Appendix B.3.2 for consent form).

Data collection required participation in the online pre-course survey, hosted by Qualtrics. The pre-course survey collected quantitative data in the form of Likert-style questions to understand instructor environmental literacy prior to attending a course.

### **7.1.3 Survey development**

The survey created was a unique compilation of questions, created specifically for this piece of research in response to the design principles and the conceptual framework. Design principle one was not explored during the pre-course survey as it related to enhancing participant value. This principle was thought better to be explored after instructors had participated in the course, rather than before.

The pre-course survey consisted of four sections:



1. Introductory questions about experience and qualifications as an outdoor instructor and the environmental concepts they talk about. Questions were influenced by the design principles that emerged from the expert appraisals and the conceptual model of environmental literacy development.
2. The Inclusion of Nature in Self scale (INS) by Schultz (2002).
3. The environmental literacy belief in ability to teach instrument (EL-BiAtT); sixteen Likert-style questions relating to environmental teaching efficacy beliefs (influenced by the work of Moseley *et al.*, 2016).
4. The EL-PACK criteria; eight Likert-style questions relating to beliefs about EL-PACK for effective teaching.

#### **7.1.3.1 Introductory questions**

Design principles 2, 4, 5 and 6 influenced the introductory questions asked. Table 21 shows how some of the design principles and the conceptual model of environmental literacy development influenced the survey questions. See Appendix D.1 for a summary of all questions influenced by the design principles.

Table 21: Table showing the development of the pre-course survey questions. These were developed to further understand the influence of the conceptual model (CM), and design principles (DPs) underpinned from the expert appraisals

| Influencing concept |                                                                                                 | Question asked in the survey |                                                                                                                                                                             | Justification                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------|-------------------------------------------------------------------------------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DP5</b>          | “The course must use appropriate terminology to reach the identities of the intended audience”. | 1                            | How do you identify your role in the outdoor sector?<br>Please tick all that apply (instructor, guide, coach, outdoor professional, adventure sports coach, leader, other). | Experts alluded to instructors having different identities and therefore the course may not reach its audience if using the term ‘instructor’. This question was added to understand whether terminology is a matter for identity for ‘instructors’.                                                                                                                                                              |
| <b>DP4</b>          | “The course delivery must be relatable to outdoor instructors”.                                 | 2                            | How long have you worked as an outdoor instructor? (< 1 year, 1 - 5 years, 5 - 10 years, 10 – 15 years, > 15 years).                                                        | Experts agreed that practical methods of learning are most suited to instructors, however some believed those with more experience could equally benefit from online learning. Asking how long instructors have worked in the sector, and how qualified they are would give an idea of how well the course could be received, and whether those with more experience feel they benefit more than those with less. |
|                     |                                                                                                 | 3                            | Are you qualified to lead at least one activity (this can include an in-house sign-off). (Yes or No).                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>DP2</b>          | “The course should aim to initiate change among adventure clients”                              | 4                            | Which environmental concepts (if any) do you talk about during your activities?. Please tick all that apply (flora, fauna, air pollution, plastic pollution,                | Instructors may already be having conversations and delivering activities that contribute to the development of environmental literacy. This                                                                                                                                                                                                                                                                      |

# Chapter 7

|                                                        |                                                                                                                                                         |          |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>&amp;</b></p> <p><b>DP6</b></p>                  | <p>“The course must be tailored to instructor needs according to their PACK”</p>                                                                        |          | <p>global warming, geology, citizen science, nature connectedness, other).</p>                                                                                                                                                                                                                                             | <p>question sought to understand how instructor practice could be initiating environmental literacy change among their clients. The question would also give an indication of instructors’ local and global subject knowledge prior to taking part in the environmental literacy course.</p>          |
| <p><b>DP6</b></p> <p><b>&amp;</b></p> <p><b>CM</b></p> | <p>“The course must be tailored to instructor needs according to their PACK”</p> <p>Ability, Motivation, Opportunity theory (AMO) (see Section 3.2)</p> | <p>5</p> | <p>With reference to the environmental concepts you didn’t tick (from question 4), what are the barriers that stop you talking about these environmental concepts during your activities? Please tick all that apply (time, knowledge, my ability to teach, it’s not what my clients want, I’m not interested, other).</p> | <p>The conceptual framework highlighted AMO as the bridge between behaviour intention and actual behaviour change. This question sought to understand reasons why instructors may not talk about environmental concepts and whether the reasons indicate ability, motivation, and/or opportunity.</p> |

### 7.1.3.2 Inclusion of nature in self (INS)

Design principle 3 stated “*The course must challenge instructor perceptions of nature*”, as experts alluded to there being anthropocentric values and actions among instructors and their practice. The INS is a one-question scale developed by Schultz (2002) to assess a person’s perceptions of their relationship with nature. The scale presents seven options, each with two circles that have varying degrees of overlap. One circle is labelled ‘self’ and the other ‘nature’. From these options participants are asked to indicate which they feel most accurately represents their relationship with nature (see Appendix D.4 or Figure 30 in Section 7.2.2 below). According to Schultz (2002, p.72), the scale is representative over time and is an indicator of ecocentrism and self-reported PEBs. The INS was considered a useful way to understand instructor perceptions about their relationship with nature, without being too time consuming.

### 7.1.3.3 Environmental literacy belief in ability to teach instrument (EL-BiAtT)

In environmental education, teacher efficacy beliefs have been measured using the Environmental Education Efficacy Beliefs Instrument (EEEBI) (Sia, 1992). Since Sia’s publication, the instrument has been modified into the Environmental Education Teacher Efficacy Belief Instrument (EETEBI) (Moseley *et al.*, 2016), and the similar Climate Change Teacher Efficacy Belief Instrument (CCETEBI) (Li *et al.*, 2021). As the instruments were each designed with schoolteachers in mind, some of the statement wording refers to *students*, *assessment*, and *curriculum*. The EETEBI was more depth than the CCETEBI, so was examined and altered as necessary to meet the subject audience. The newly adapted instrument was labelled the ‘environmental literacy belief in ability to teach instrument (EL-BiAtT).

The EETEBI has 20 statements: seven statements are categorised under ‘Environmental Education Outcome Expectancy’, and 13 are categorised under ‘Personal Environmental Education Teaching Efficacy’. Of these statements, 13 were used to influence the EL-BiAtT instrument, though their wording was changed to meet the role of the instructor and the context of their work. For example, “*When students’ grades in environmental education improve, it is due to the teacher using effective teaching strategies*” (Moseley *et al.*, 2016, no page number), was changed to “The way the instructor facilitates the activity can improve client attitudes and emotions towards the environment”. Statements that were not used to influence the EL-BiAtT were either because the situation would not typically be transferred to an instructor’s role (i.e.

statements about parents commenting on their child's learning), or because the question was represented by more than one statement (e.g., "I can find effective ways to teach about the environment", and "I cannot teach about the environment effectively", or "When teaching about the environment, I encourage student questions", and "I welcome learners' questions on the environment").

I added three of my own questions under the personal environmental education teaching efficacy category to reflect the setting of OAAs (for example, "A client's perception of the environment is generally influenced by the place, rather than the instructor". The final version of the EL-BiAtT consisted of 16 statements, some of which were reverse coded. See Appendix D.2 for the drafting and final version of the EL-BiAtT.

### **7.1.3.4 Environmental literacy pedagogical and andragogical content knowledge (EL-PACK)**

Beliefs about EL-PACK were going to be assessed in the pre-course given their importance in the conceptual model of environmental literacy development, however the importance was reaffirmed through design principle 6, "The course must have appropriate content to enhance instructor BiAtT and EL-PACK".

I used the framework for EL-PACK to write Likert-style statements to gain an understanding of instructors' subject knowledge, pedagogical and andragogical knowledge, subject knowledge in a delivery context and delivery knowledge in a subject context. Fifty-two potential statements were drafted from the EL-PACK criteria; however, this was reduced to 18 for the first draft to minimize the survey length. The 18 questions represented an aspect of subject knowledge, pedagogical and andragogical knowledge, subject knowledge in a delivery context and delivery knowledge in a subject context. Ten statements were removed after piloting the survey, however five statements used for the EL-BiAtT also contributed to understanding EL-PACK, therefore the final EL-PACK survey consisted of 13 statements. The drafting and selection of survey questions for the EL-PACK survey is shown in Appendix D.3.

The decision to focus on beliefs about teaching and EL-PACK was not without limitations. It was recognised that beliefs are subjective, therefore some individuals may over interpret their knowledge, and others may report their understanding modestly (as seen in a report on environmental literacy by Murphy, 2004). However, as there was no viable way of accurately assessing instructor knowledge of the environment (given its magnitude), it was thought most productive to maintain the theme of beliefs.

#### 7.1.4 Survey piloting

The survey was piloted by eight outdoor instructors; seven instructors completed the survey remotely, sharing any feedback they had at the end of the survey. A cognitive interview was held with one instructor. Cognitive interviews are used for survey piloting to understand how respondents might react to different questions (Sexton *et al.*, 2023). The process takes place in person, usually one-to-one, and involves the researcher observing body language and reactions in response to reading a question, followed by the participant verbalising their thought process to find their answer (Sexton *et al.*, 2023). Cognitive interviews can highlight questions that are confusing and allows participants to suggest ways in which questions might be rephrased. This method was recommended by Desimone and Le Floch (2004) to improve the reliability and validity of survey instruments.

One instructor stated she found the negative statements in the EL-BiAtT instrument challenging to answer, e.g. 'I cannot effectively explain environmental problems to clients', as you are either agreeing with a negative statement, 'I agree, I cannot...', or creating a double negative, 'I disagree, I cannot...'. The two statements being referred to made up a sample of reverse-coded statements, included to account for response style bias as recommended by Weijters *et al.* (2010) and Brown and Maydeu-Olivares (2012). It was recognised that statements containing double-negatives have been criticised in research for being confusing (Kelley *et al.*, 2003). In addition, critiques about reverse-coded statements have suggested they require additional linguistic skills to answer and can alter the statistic validity of the test (Suárez-Alvarez *et al.*, 2018). However, given that results were being analysed descriptively rather than inferentially, and no other instructors in the pilot study commented on the statements being confusing, they were included on the basis they could highlight any compromised results. Furthermore, the negative statements used were also used by Moseley *et al.* (2016) in the EETEBI, who did not comment on the instruments validity being affected due to their inclusion.

The complexity of the wording of some statements in both the EL-BiAtT and the EL-PACK instruments caused confusion; the instructor completing the cognitive interview asked several questions to clarify different statements or had to read them multiple times out loud to understand what was being asked. Following this some of the language and sentence structure was changed for a less academic tone, thus making for easier interpretation (e.g., 'I understand strategies to subtly introduce environmental conversations', was altered to 'I can subtly introduce environmental conversations through the activity', and, 'An improvement in client attitudes and emotions towards the environment is generally due to the way the instructor has

facilitated the activity.’ was changed to ‘The way the instructor facilitates the activity can improve client attitudes and emotions towards the environment.’).

Having altered the survey, one instructor and my supervision team re-assessed the second draft. It was mutually decided that the length of the survey was still too long and as a result, ten statements were removed from the EL-PACK. The statements for removal were chosen on the basis that EL-PACK was also being explored during the course using the wonky-wood diagram.

#### **7.1.5 Data analysis**

The pre-course survey was analysed descriptively rather than inferentially. Mean Likert scores are presented for clarity in response to statements about BiAtT and EL-PACK, however it is recognised that these values may obscure the variability in individual responses. Full results are shown in Appendix D.5.

### **7.2 Findings from the pre-course survey**

The pre-course survey intended to provide an initial response to some of the design principles (e.g., whether terminology was a matter for identity, instructor perceptions of human-nature relationships, and current practice for influencing clients) as well as giving an indication of instructor EL-PACK and BiAtT, prior to participating in an environmental literacy course.

The survey was started by thirty-seven participants; however, three people did not complete it. Incomplete responses were not included in the analysis.

The findings of the pre-course survey are structured by sub-headings, using the design principles and conceptual model that influenced the survey questions (see Section 7.1.3) before looking at responses to the EL-BiAtT and the EL-PACK statements. Structuring the findings in this way meant I could explore whether experts’ beliefs about the characteristics of an effective course were mirrored by instructors, and therefore how important (or not) the design principles were. As explained in the survey design (Section 7.1.3), design principle 1 was not used to influence questions in the pre-course survey and therefore is not commented on in this section.

### 7.2.1 Design principle 2: The course should aim to initiate change among adventure clients

The definition of environmental literacy used in this thesis (see page 21), specifies a positive outcome as, “*individuals taking some form of positive action to benefit the environment*”. To understand if instructors may already be influencing client behaviour change in their practice, question 4 asked instructors, “Which environmental concepts (if any) do you talk about during your activities? (Please tick all that apply)”. Table 22 details the options and responses given to question 4. Additional topics of discussion listed in ‘other’ included dilute pollutants, electric cars, generic respecting the countryside and keeping it clean, history, human history, human impact, river pollution, the water cycle, water pollution and wind and waterpower.

Table 22: Instructor responses to Q4 “Which environmental concepts (if any) do you talk about during your activities? (Please tick all that apply)” (n=34)

|                               | Frequency | Percent |
|-------------------------------|-----------|---------|
| <b>Flora</b>                  | 27        | 79.4    |
| <b>Fauna</b>                  | 27        | 79.4    |
| <b>Geology</b>                | 27        | 79.4    |
| <b>Plastic pollution</b>      | 26        | 76.5    |
| <b>Global warming</b>         | 16        | 47.1    |
| <b>Nature connectedness</b>   | 13        | 38.2    |
| <b>Air pollution</b>          | 11        | 32.4    |
| <b>Citizen science</b>        | 3         | 8.8     |
| <b>Other (please specify)</b> | 10        | 29.4    |

As shown in Table 22, results showed instructors talk to their clients about local features such as flora, fauna, geology, and plastic pollution, more than about global issues such as air pollution and global warming. However, despite including environmental conversations in their practice, in a later response to a statement in the EL-BiAtT, 16 participants stated they did not know how to motivate clients to adopt PEBs. As expected, conversations about nature connectedness and citizen science were particularly infrequent and so were already incorporated within the course material as methods to enhance components of environmental literacy (see Sections 5.3.4 and 5.3.5.3 for slides on nature connectedness and citizen science, respectively).



### 7.2.2 Design principle 3: The course must challenge instructor perceptions of nature

The Inclusion of Nature in Self Scale (INS) gave an indication of epistemological views on the human-nature relationship. None of the participants opted for the most extreme options in the scale, suggesting no one viewed humans and nature as inherently connected, or disconnected (see Figure 30). A slide was introduced to the presentation to revisit this scale and to discuss what influenced participant choices.

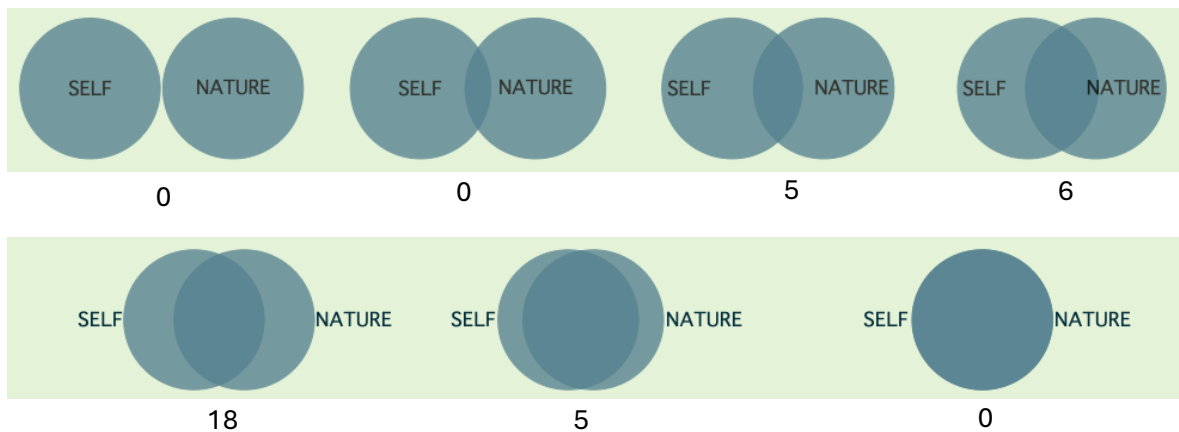


Figure 30: Participant responses to the Inclusion of Nature in Self (INS) Scale (n=34)

### 7.2.3 Design principle 4: The course delivery must be relatable to outdoor instructors' learning preferences

The question “How long have you worked in the outdoor sector?” was asked to determine instructor experience within each group. Thirteen instructors had over fifteen years of experience working in the sector, while four had less than one-year of experience (see Figure 31).

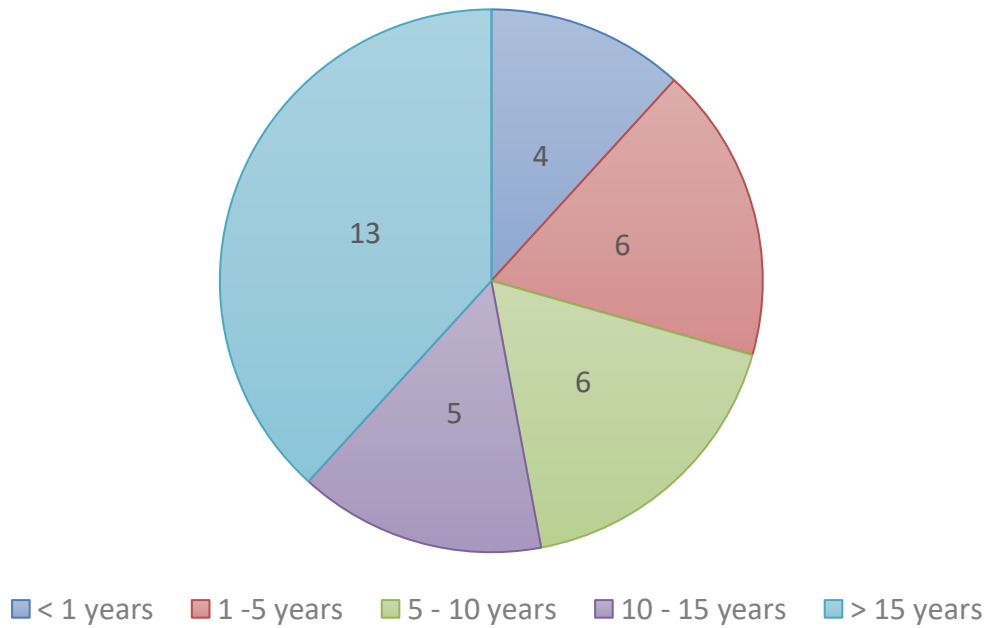


Figure 31: Pie chart illustrating participating instructors' years of experience working in the outdoor sector (n=34)

#### 7.2.4 Design principle 5: The course must use appropriate terminology to reach the identities of the intended audience

The discussion of terminology by the experts in phase 2 highlighted a potential issue in that a course marketed for “outdoor instructors” might not appeal to all its intended participants. The question ‘How do you identify your role in the outdoor sector?’, yielded 105 responses, averaging three responses per person. Figure 32 illustrates four of the seven options stood out the most: leader, instructor, coach and outdoor professional. Identities added as ‘other’ included trainee leader, Mountain Leader trainee, trainee outdoor professional, Duke of Edinburgh coordinator, senior instructor and tutor, rock climbing development instructor and development coach, researcher, manager, course educator and teacher.

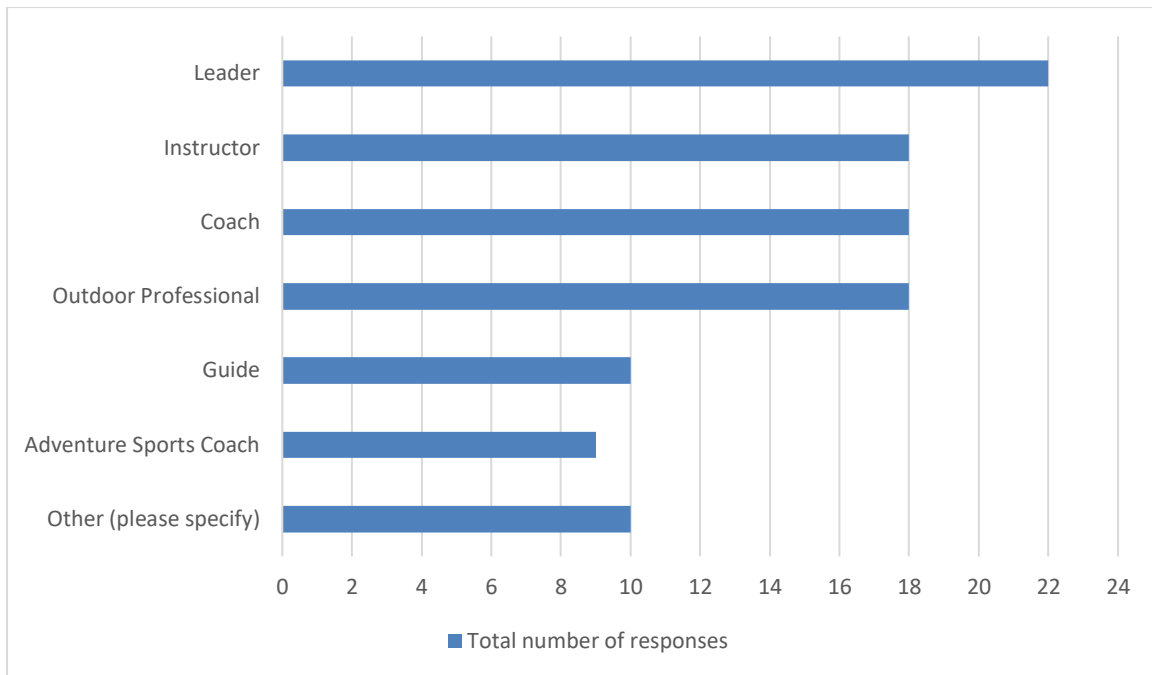


Figure 32: Graph presenting instructor answers to the question “How do you identify your role in the outdoor sector?” (n=34)

## 7.2.5 Design principle 6: The course must have appropriate content to enhance instructor BiAtT and EL-PACK.

### 7.2.5.1 Belief in ability to teach (BiAtT)

The environmental literacy belief in ability to teach instrument (EL-BiAtT) was based on the work of Moseley *et al.* (2016) and is outlined in Section 7.1.3.3.

Table 23 presents the statements related to environmental literacy outcome expectancy and personal environmental communication efficacy. The average scores highlighted that on average, participants felt more confident in their environmental outcome expectancy than in their personal environmental communication efficacy.

Thirty-one (out of 34) instructors stated they could subtly introduce environmental conversations through their activities, and 33 agreed the way the instructor facilitates the activity can improve client attitudes and emotions towards the environment. When asked however, if they could find effective ways to talk about the environment during their OAAs, only 20 responded to say they could. This suggests that local environmental concepts spoken about (e.g. flora and fauna) may be pointed out or named in passing, rather than being integrated into a conversation about the ecosystem or their interconnections.

Table 23: Pre-course survey results looking at instructors' self-reported belief in ability to teach (n=34)

| Environmental literacy belief in ability to teach instrument (ELBiAtT) |                                                                                                                                                    | Strongly disagree   |          |          | Strongly agree |          |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------|----------|----------------|----------|
|                                                                        |                                                                                                                                                    | 1                   | 2        | 3        | 4              | 5        |
| Environmental literacy outcome expectancy                              |                                                                                                                                                    | Average Score*: 80% |          |          |                |          |
| 1                                                                      | The way the instructor facilitates the activity can improve client attitudes and emotions towards the environment                                  | 0                   | 0        | 1 (3%)   | 13 (38%)       | 20 (59%) |
| 2                                                                      | An increase in a client's environmental knowledge is generally due to the instructor's effective communication                                     | 1 (3%)              | 0        | 5 (15%)  | 20 (59%)       | 8 (24%)  |
| 3                                                                      | When clients are engaged in environmental learning, it is usually because the instructor has made an effort to talk about an environmental concept | 0                   | 2 (6%)   | 9 (26%)  | 17 (50%)       | 6 (18%)  |
| 4                                                                      | The instructor is responsible for clients becoming more environmentally literate                                                                   | 1 (3%)              | 4 (12%)  | 6 (18%)  | 18 (53%)       | 5 (15%)  |
| Personal environmental communication efficacy belief                   |                                                                                                                                                    | Average Score*: 64% |          |          |                |          |
| 5                                                                      | I can find effective ways to talk about the environment during adventure activities                                                                | 2 (6%)              | 6 (18%)  | 6 (18%)  | 12 (35%)       | 8 (24%)  |
| 6                                                                      | I can't engage clients in environmental conversations as well as I can in other topics**                                                           | 3 (9%)              | 10 (29%) | 9 (26%)  | 10 (29%)       | 2 (6%)   |
| 7                                                                      | I can subtly introduce environmental conversations through the activity                                                                            | 1 (3%)              | 1 (3%)   | 1 (3%)   | 23 (68%)       | 8 (24%)  |
| 8                                                                      | I can't effectively explain environmental problems to clients**                                                                                    | 2 (6%)              | 12 (35%) | 10 (29%) | 9 (26%)        | 1 (3%)   |

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| Environmental literacy belief in ability to teach instrument (ELBiAtT) |                                                                                                          | Strongly disagree Strongly agree |          |          |          |          |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------|----------|----------|----------|----------|
|                                                                        |                                                                                                          | 1                                | 2        | 3        | 4        | 5        |
| 9                                                                      | I can generally answer clients' questions about the environment                                          | 0                                | 8 (24%)  | 8 (24%)  | 15 (44%) | 3 (9%)   |
| 10                                                                     | I have the outdoor teaching skills to incorporate environmental activities into the adventure            | 2 (6%)                           | 6 (18%)  | 10 (29%) | 12 (35%) | 4 (12%)  |
| 11                                                                     | I would prefer not to start conversations about the environment during my activity**                     | 2 (6%)                           | 5 (15%)  | 8 (24%)  | 9 (26%)  | 10 (29%) |
| 12                                                                     | I encourage clients to ask questions about the environment                                               | 0                                | 4 (12%)  | 11 (32%) | 9 (26%)  | 10 (29%) |
| 13                                                                     | I don't know how to motivate clients to adopt environmentally responsible behaviours**                   | 1 (3%)                           | 8 (24%)  | 9 (26%)  | 16 (47%) | 0        |
| 14                                                                     | A client's awareness of the environment is generally influenced by the place, more than the instructor** | 3 (9%)                           | 10 (29%) | 10 (29%) | 10 (29%) | 1 (3%)   |
| 15                                                                     | Environmental advocacy does not have a place within the activities I instruct**                          | 8 (24%)                          | 1 (3%)   | 3 (9%)   | 6 (18%)  | 16 (47%) |
| 16                                                                     | I try to incorporate activities that will help clients feel connected in the environment.                | 1 (3%)                           | 3 (9%)   | 11 (32%) | 11 (32%) | 8 (24%)  |

\* Average scores were calculated using  $(\text{actual score} \div \text{theoretically possible score}) \times 100$ . Where statements were reverse coded (marked by \*\*), the numbering system was reversed for the purpose of calculating the average, i.e. 'strongly disagree' was given the value 5, and 'strongly agree' was given the value 1.

Shaded statements (5, 7, 10, 12, and 15) indicate statements that were used to understand EL-BiAtT and EL-PACK.

#### **7.2.5.2 EL-PACK**

The framework for instructor environmental literacy pedagogical and andragogical content knowledge (EL-PACK) was outlined in the conceptual framework in Section 3.3. Table 24 presents an overview of instructor EL-PACK according to 13 statements.

Findings indicated an element of instructor EL-PACK, with over half the instructors stating they ‘agree’ or ‘strongly agree’ with the statements in each section, apart from the ‘delivery knowledge in a subject context’. This suggests that while instructors may have a knowledge of the subject, and a theoretical knowledge of the ‘doing’, they may not always be able to transfer the theory into practice. It is recognised that not all the criteria were explored or accounted for due to time constraints in making the survey too long, however the survey did provide an indication of commonalities among instructors, which were used to inform the research.

The responses to statement 3 in Table 24 stood out to me as particularly interesting. Of the 34 participating instructors, 28 believed the experiences they lead change the way their clients value nature and the environment. This reinforces the literature that environmental development through OAAs is not only an expectation of schools, organised groups, tourists or outdoor centres, but it is largely an expectation of the instructors too. Despite this however, although ‘valuing nature and the environment’ may suggest an incentive for behaviour change, only 14 instructors stated they were able to engage clients in activities that would help contribute to solving environmental problems. Therefore, in what ways do the instructors believe the experiences they lead change the way clients value nature and the environment? This response was explored in more detail in phase 4.

Design principle 6 stated, “The course must have appropriate content to enhance instructor BiAtT and EL-PACK”. Tailoring the course to focus on delivery knowledge in a subject context would be favoured through practical (in-person) learning. Creative activities such as those used to inspire nature connections or citizen science projects could be trialled alongside other instructors followed by discussions of what felt easy and what felt more challenging. Unfortunately, as most centres I contacted declined an in-person course (see Section 7.1.1 for details), the focus was on the course slides and discussions that could be held online.

Table 24: Pre-course survey results looking at EL-PACK (n=34)

| EL-PACK Criteria                        |                                                                                                                    | Strongly disagree |         |         | Strongly agree |          |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------|---------|---------|----------------|----------|
| Subject knowledge                       |                                                                                                                    |                   |         |         |                |          |
| 1                                       | I feel happy facilitating environmental activities within my main activity                                         | 0                 | 5 (15%) | 9 (27%) | 18 (53%)       | 2 (6%)   |
| 2                                       | I understand the purpose of developing environmental literacy through adventure activities                         | 0                 | 2 (6%)  | 3 (9%)  | 18 (53%)       | 11 (32%) |
| Pedagogical and andragogical knowledge  |                                                                                                                    |                   |         |         |                |          |
| 3                                       | I believe the adventure experiences will change the way clients value nature and the environment                   | 0                 | 1 (3%)  | 5 (15%) | 20 (59%)       | 8 (24%)  |
| 4                                       | I am able to establish a balance in activities between adventure, technical skills and environmental conversations | 0                 | 7 (21%) | 9 (27%) | 15 (44%)       | 3 (9%)   |
| Subject knowledge in a delivery context |                                                                                                                    |                   |         |         |                |          |
| 5                                       | I make use of places and their features to start conversations about the environment                               | 0                 | 3 (9%)  | 4 (12%) | 17 (50%)       | 10 (29%) |
| 6                                       | I take advantage of unplanned learning opportunities that arise during activities                                  | 0                 | 1 (3%)  | 3 (9%)  | 17 (50%)       | 13 (38%) |
| 7*                                      | I can find effective ways to talk about the environment during adventure activities                                | 2 (6%)            | 6 (18%) | 6 (18%) | 12 (35%)       | 8 (24%)  |

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| EL-PACK Criteria                               |                                                                                                       | Strongly disagree Strongly agree |          |          |          |          |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------|----------|----------|----------|----------|
| 8*                                             | I can subtly introduce environmental conversations through the activity                               | 1 (3%)                           | 1 (3%)   | 1 (3%)   | 23 (68%) | 8 (24%)  |
| 9*                                             | I encourage clients to ask questions about the environment                                            | 0                                | 4 (12%)  | 11 (32%) | 9 (26%)  | 10 (29%) |
| <b>Delivery knowledge in a subject context</b> |                                                                                                       |                                  |          |          |          |          |
| 10                                             | I use creative activities to help clients notice and appreciate non-human life                        | 2 (6%)                           | 12 (35%) | 12 (35%) | 6 (18%)  | 2 (6%)   |
| 11                                             | I am able to engage clients in activities that will help contribute to solving environmental problems | 2 (6%)                           | 5 (15%)  | 13 (38%) | 12 (35%) | 2 (6%)   |
| 12*                                            | I have the outdoor teaching skills to incorporate environmental activities into the adventure         | 2 (6%)                           | 6 (18%)  | 10 (29%) | 12 (35%) | 4 (12%)  |
| 13*                                            | I try to incorporate activities that will help clients feel connected in the environment.             | 1 (3%)                           | 3 (9%)   | 11 (32%) | 11 (32%) | 8 (24%)  |

Statements in the darker shade and marked with an \* (7, 8, 9, 12, and 13) indicate statements that were used to understand EL-BiAtT and EL-PACK.



### 7.2.6 Conceptual model for understanding instructors' environmental literacy

The conceptual model of environmental literacy development (see Section 3.2) predicted ability, motivation and behaviour (AMO) to bridge the gap between behaviour intention and actual behaviour change. Instructors were given a multiple choice question to explore barriers that stopped environmental concepts being introduced in OAAs, and whether these related to instructor ability, motivation, or opportunity.

Table 25 shows responses to survey question 5. An important note is this question focused only on the environmental concepts instructors **did not** talk about during their OAAs, as per question 4 (see Table 22 in Section 7.2.1 above).

Table 25 Instructor responses to question 5: "With reference to the environmental concepts you didn't tick in Q4, what are the barriers that stop you talking about these environmental concepts during your activities? (Please tick all that apply)" (n=34)

|                                      | Frequency | Percent |
|--------------------------------------|-----------|---------|
| <b>My knowledge</b>                  | 25        | 73.5    |
| <b>It's not what my clients want</b> | 12        | 35.3    |
| <b>Time</b>                          | 11        | 32.4    |
| <b>My ability to teach</b>           | 7         | 20.6    |
| <b>I'm not interested</b>            | 2         | 5.9     |
| <b>Other (please specify)</b>        | 10        | 29.4    |

Ability and opportunity featured as the biggest reasons for not introducing certain environmental concepts within OAAs. The biggest barrier was knowledge (ability) particularly of global warming, nature connectedness, air pollution, and citizen science (see Table 25). This was followed by the belief that it is not what their clients want (perceived opportunity), and their time (perceived opportunity).

Not being interested was listed by two instructors as a reason why they did not include conversations about environmental concepts. Both instructors did however include conversations about several other concepts (see Table 26).

Table 26: Results from two instructors about environmental concepts they did talk about, and those they did not talk about because they were not interested

|              | Flora | Fauna | Air pollution | Plastic pollution | Global warming | Geology | Citizen science | Nature connectedness |
|--------------|-------|-------|---------------|-------------------|----------------|---------|-----------------|----------------------|
| Instructor 1 | ✓     | ✓     | ✓             |                   | ✓              | ✓       |                 | ✓                    |
| Instructor 2 | ✓     |       |               | ✓                 | ✓              | ✓       |                 |                      |

### 7.3 Interim discussion of pre-course survey

In the sections above, the pre-course survey elicited findings which contribute to understanding the current progress of environmental literacy development in the outdoor sector and help to understand the characteristics of an effective course for outdoor instructors to advance environmental literacy development.

This interim discussion firstly details how the findings have contributed to developing the design principles. Secondly, it explores how the findings help us to understand the current potential for environmental literacy development during OAAs, according to instructor ability, motivation and opportunity (AMO).

#### 7.3.1 Design principle 1: Participating in an environmental literacy course must enhance outdoor instructor value by contributing to their professional development.

This design principle was not explored or altered during this phase of research.

#### 7.3.2 Design principle 2: The course should aim to initiate environmental change among adventure clients

Expert George in the appraisals suggested that clients have a readiness to engage in environmental learning, to address their underlying guilt from their travel and impact (see Section 6.2.1.2). In contrast, 12 of the 34 instructors indicated they did not include discussions about certain environmental concepts as they believed “it’s not what clients want” (see Table 25 in Section 7.2.6). This supports expert Connor’s opinion, that in an adventure tourism context, the

audience has a different driver to that of outdoor education (see Section 6.2.1.2). The finding contrasts previous research however, by the likes of Giddy and Webb (2018), Miller *et al.* (2023) and Novotná *et al.* (2024) (see Section 6.4.2).

Instructors indicated they shared knowledge about local environmental concepts, however despite believing the experiences they lead change the way their clients value nature and the environment (see statement 3 in Table 24), less than half the instructors indicated they could contribute to solving environmental problems or engage clients in activities that would make them feel more connected to nature (see statements 11 and 13, respectively, in Table 23). Instructors therefore indicated a basic level of environmental knowledge which suggested links were not being made between local and global concepts, as recommended by Devine-Wright (2013). Furthermore, although most instructors (88%) indicated they took advantage of unplanned learning opportunities that arose during activities, the lack of creative teaching strategies or ability to engage in activities suggests that instructors may be pointing out and/or fact sharing about the local surroundings of flora, fauna and geology, without engaging in deeper conversations about their wider connections in the ecosystem. Pointing out and naming flora and fauna (particularly if using the scientific name) if done in passing has proven to have adverse effects when it comes to enhancing nature connections, as individuals are unable to make tangible connections between themselves and the non-human nature (Mcphie and Clarke, 2015; Lumber *et al.*, 2017; Peter *et al.*, 2021). To establish a sustained environmental literacy, instructors need to couple this method of education with more immersive activities so that clients can learn and empathise with the stories of non-human nature and understand their part in the interconnected world.

A high percentage of instructors (92%) stated they could ‘subtly introduce environmental conversations through the activity’. Subtleness coupled with lack of knowledge could be suggestive of ‘nudging’, as applauded by some of the experts (see Section 6.2.1.2). Despite the limitations of nudge theory, previous literature has supported the use of subtle cues to aid client engagement and consideration for their surroundings (Wielenga *et al.*, 2024).

The current potential for environmental literacy development through OAAs is relatively small, given that instructors lack aspects of ability (both EL-PACK and BiAtT), and some experience perceived barriers to opportunities and/or motivation. Instructors’ beliefs about current environmental outcomes from OAAs highlighted that instructors also need to be aware of the remit of their actions. Understanding that fact sharing (Mcphie and Clarke, 2015; Lumber *et al.*, 2017; Peter *et al.*, 2021), nudge theory (Grilli and Curtis, 2021), being immersed in nature

(Richardson *et al.*, 2021), and being a role model (Grilli and Curtis, 2021) all have limitations in the role of developing sustained environmental literacy.

The importance of design principle 2 reinforced the need for instructors to be better equipped with local and global environmental concepts, and methods to facilitate conversations and activities around them.

### **7.3.3 Design principle 3: The course must challenge instructor perceptions of nature**

The INS scale presented a mixture of perceptions around the human-nature relationship, suggesting instructors felt they were neither completely disconnected, nor connected to nature. Previous literature has documented instructors having strong emotional connections to the environments in which they work (Huynh and Torquati, 2019), and that higher sense of connection is associated with greater feelings of environmental responsibility (Martínez and Mackenzie, 2022). Having said this, as discussed in Section 6.4.3 following the expert appraisals, Martínez and Mackenzie (2022) support the presence of a dual interaction between instructors and nature. The dual interaction reinforces expert Ben's view of the paradox of instructors working in nature; that instructors display anthropocentric actions, which are disguised behind ecocentric values.

The results of each group's INS results were added to their respective presentation slides to explore what influenced their feelings about their nature connection.

Design principle 3 remained an essential principle for the course, emphasising the importance of instructors to critically evaluate their epistemological views about how they value nature.

### **7.3.4 Design principle 4: The course delivery must be relatable to outdoor instructors' learning preferences**

The course attracted instructors with a range of experiences, with most instructors having over 5-years of experience in the sector. According to the five stages of outdoor leader career development by Wagstaff (2016), this would suggest the majority of instructors are beyond the exploration and contemplation phases (stage one and two), and possess characteristics of stage three engagement, stage four professional involvement and stage five the career professional. Instructors in these stages of career development should display strong leadership ability and a desire to address systematic issues (Wagstaff, 2016). Similarly, Maurer and Curtner-Smith

(2018) highlight instructors that stay in the role for several years (in the outdoor pursuits or adventure orientation), possess high levels of content knowledge and pedagogical skill for delivering OAAs.

Given the experience of the instructors in this research, it is expected that most participating instructors should have the ability and motivation to effectively apply knowledge from the course into their practice.

The expert appraisals highlighted the advantages of a course for outdoor instructors being held in person. However, due to challenges explained in Sections 7.1.1 and 8.1, three of the four courses were facilitated online. Although in-person courses may have been preferred by some individuals, 29 out of the 34 instructors signed up to the course knowing it would be run online (the remaining five took part in an in-person course). This suggests that an online market could be a feasible option. Furthermore, as discussed in Section 6.4.4, there are advantages of courses being held online, particularly for intellectual collaboration (Smith *et al.*, 2016; Dymont *et al.*, 2018a). As experienced instructors were thought to have a better capacity than novice instructors for attending online learning and subsequently applying it in practice, it may explain why the course attracted predominantly experienced instructors.

### **7.3.5 Design principle 5: The course must use appropriate terminology to reach the identities of the intended audience**

The identity terminology chosen for the course did not appear to put off participation. Despite not all participants identifying themselves as ‘instructors’, they still completed the survey and attended a course. The reason for multiple identities may be due to the terminology used in outdoor qualifications, e.g. Paddlesport *Instructor*, or Mountain *Leader*. A sample of qualifications offered by different activity bodies is shown in Appendix D.6. The list is not exhaustive of either the number of National Governing Bodies, or the qualifications they offer. However, the table does highlight the different terminologies used in different settings and therefore could suggest why individuals identify with more than one label. Instructors using their qualification to help define their professional identity has been evidenced by Cox (2022) in his study on outdoor leadership students’ professional identity development. Cox (2022) concludes outdoor leader students to have multiple identities, influenced by an array of factors such as family and friends, experience, qualification and education. However, White and Groves (2023) argue that while qualification is key for professional development, it does not define a person’s identity.

To advance the sector in being seen as a profession rather than a hobby, experts from the appraisals were more concerned about the market audience for the course, rather than its impact on perceived professionalism. For instructors, the label ‘outdoor professional’ was ticked by 47% of instructors (16 out of 34). This supports previous findings that many instructors find the concept of a ‘professional identity’ challenging to understand, or something they have not considered before (White and Groves, 2023).

The identity terminology used in the course was not changed as it was considered unlikely that it would deter people on the basis that ‘they don’t identify as an instructor’. Furthermore, given its association as a generic term (Collins and Collins, 2012), I felt it was most inclusive of the participant group I intended to reach.

Design principle 5 was still felt to be an important principle, however the wording was altered slightly to remove the focus of ‘identity’. The new design principle 5 states:

“The course must use appropriate terminology to reach the intended audience”.

### **7.3.6 Design principle 6: The course must have appropriate content to enhance instructor BiAtT and EL-PACK.**

The EL-BiAtT survey indicated participating instructors felt more competent in environmental outcome expectancy than in their personal environmental teaching efficacy. This suggests that instructors believe the experience of taking part in an OAA has a greater role in clients environmental literacy development, than their direct facilitation. This reinforces the reality gap that drives the research; despite existing research showing OAAs as a vehicle for enhancing environmental awareness, knowledge or developments (Hanna *et al.*, 2019; Talebpour *et al.*, 2020; Puhakka, 2023), data is usually collected immediately post-trip or activity, when feelings towards nature are naturally at a high. There has been little data collected about long-term environmental outcomes from OAAs, however Prince (2021) conducted a thematic analysis of four reports from residential centres delivering OAAs to young people, to investigate the impact of the experiences after 12 months. While outcomes such as improved self-confidence and communication were evidenced in all cases, environmental outcomes were evident in only one of the four reports (Prince, 2021). This result is unsurprising when coupled with the beliefs of O’Connell *et al.* (2005), Lugg (2007), D’Amato and Krasny (2011), Long *et al.* (2018) and Collins and Brymer (2018), who insist that sustained environmental developments must be facilitated by instructors who are trained in environmental concepts; yet said training for instructors is sparsely available in the UK, unless run in-house at outdoor centres (Langley, 2010).

In addition to EL-BiAtT, findings showed instructors did have some traits of EL-PACK. Experts perceived lack of subject knowledge to be the main reason why instructors would not include conversations or activities about environmental concepts. In contrast however, almost 80% of instructors reported local environmental knowledge of flora, fauna, geology and plastic pollution. Where instructors did indicate knowledge as the biggest barrier, it related to global concepts such as air pollution and global warming, and activities such as citizen science and pathways to nature connections.

Additional EL-PACK findings suggested instructors were confident in their subject knowledge in a delivery context (i.e. instructors alluded to being able to talk and include conversations about environmental concepts during their OAA), however they were not so competent in their delivery knowledge in a subject context (i.e. intentionally facilitating activities to enhance environmental literacy during OAAs). Despite this, most instructors (83%) still believed that the experiences they lead change the way their clients value nature and the environment (see statement 3 in Table 24).

Findings revealed the importance of the course focusing on methods of facilitation that move beyond fact sharing, to have a greater impact on lasting environmental development.

### **7.3.7 Conceptual model for understanding instructors' environmental literacy**

The conceptual model for understanding the development of environmental literacy (see Section 3.2) predicted that for behaviour intention to evolve into actual behaviour change, instructors must have the ability to perform in the specific situation, the motivation to perform, and the opportunity to perform (Appelbaum *et al.*, 2000). The pre-course survey gave an indication of instructor AMO, suggesting instructors lack certain aspects of situational ability and some perceive barriers related to opportunity. Figure 33 shows the conceptual model of environmental literacy development (from Section 3.2), coupled with added explanations of text around the edges of the model indicating how the pre-course survey has enriched my understanding of instructor ability, motivation and opportunity for integrating environmental literacy development into their OAAs.

In terms of instructor motivation, two instructors stated they did not include conversations or activities about certain environmental concepts because they were not interested, however both instructors did include conversations about other local and global concepts (see Table 26), therefore motivation was not highlighted as a significant barrier. Having said this, given that the course was voluntary, it was expected that instructors were motivated to attend the course

## Chapter 7

based on their personal interest in the subject (Knowles, 1977; Barnes, 1999), therefore it unlikely reflects the motivations of the wider population of instructors.

Time as a barrier would benefit from additional research. During OAAs there is often a period of travelling or walking to or from the activity location, where conversations or activities could be facilitated. In cases where instructors believe they have no time it would be interesting to understand whether it is really a lack of opportunity, or whether it is a lack of motivation to make the opportunity. This area of research is beyond the scope of the thesis; however, it would benefit from being studied in the future to contribute to the understanding of instructor AMO.



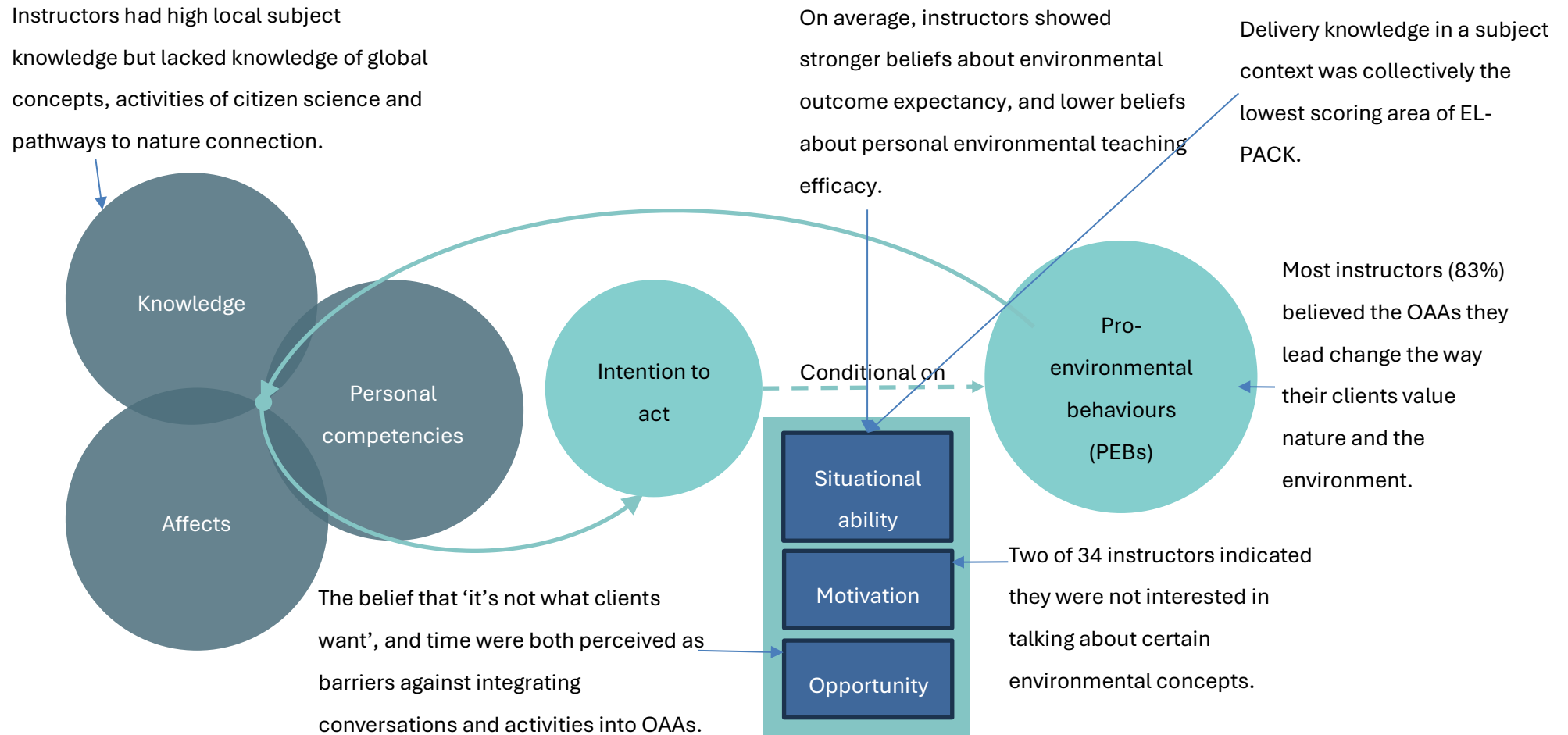


Figure 33: Model outlining the current potential for environmental literacy development in OAs, as facilitated by the instructor

## **7.4 Interim conclusion**

This chapter presented the second element of empirical research which constitutes phase 3A of the overarching research design. Thirty-four instructors took part in the pre-course survey, from different locations and companies around the UK. The survey collected data from instructors about their EL-PACK and BiAtT before attending an environmental literacy course and enriched my understanding of the design principles and conceptual model. Findings revealed instructors to possess elements of EL-PACK, particularly local subject knowledge and subject knowledge in a delivery context. Instructors were weakest in their delivery knowledge in a subject context, indicating a lack of directed facilitation including goal setting and reviewing. In terms of BiAtT, instructors showed stronger beliefs about the outcome expectancy than of their personal teaching efficacy. This suggests instructors maintain the view that the experience itself (taking part in an OAA) is powerful for enhancing environmental developments, regardless of instructor facilitation.

The chapter contributed to understanding five of the six design principles identified from the expert appraisals, in more detail. Findings from the instructors supported the importance of the design principles and provided additional information to inform the delivery of the course. Having administered and analysed the pre-course surveys, the next stage of research involved trialling the course with outdoor instructors. Chapter 8 details the methodology and findings of four iterations of course trialling.

## Chapter 8 Phase 3b: Course trialling

Chapter 8 presents the methodology and findings related to trialling the environmental literacy course with outdoor instructors. Instructor perceptions about the course were explored qualitatively to gain a deeper understanding of how the course could be improved to enhance its value. The course material was updated between each iteration of trialling and changes made are presented alongside the findings.

### 8.1 Methodology

Figure 34 shows the conceptualisation of phase 3 from the wider research design (see Figure 9 for full conceptualisation of the research design). The course trialling took an iterative approach as per the intention of DBR, which is highlighted by the presence of the meso-cycle in Figure 34. Qualitative data were collected during the course trialling which was analysed and used to modify the course before the next iteration.

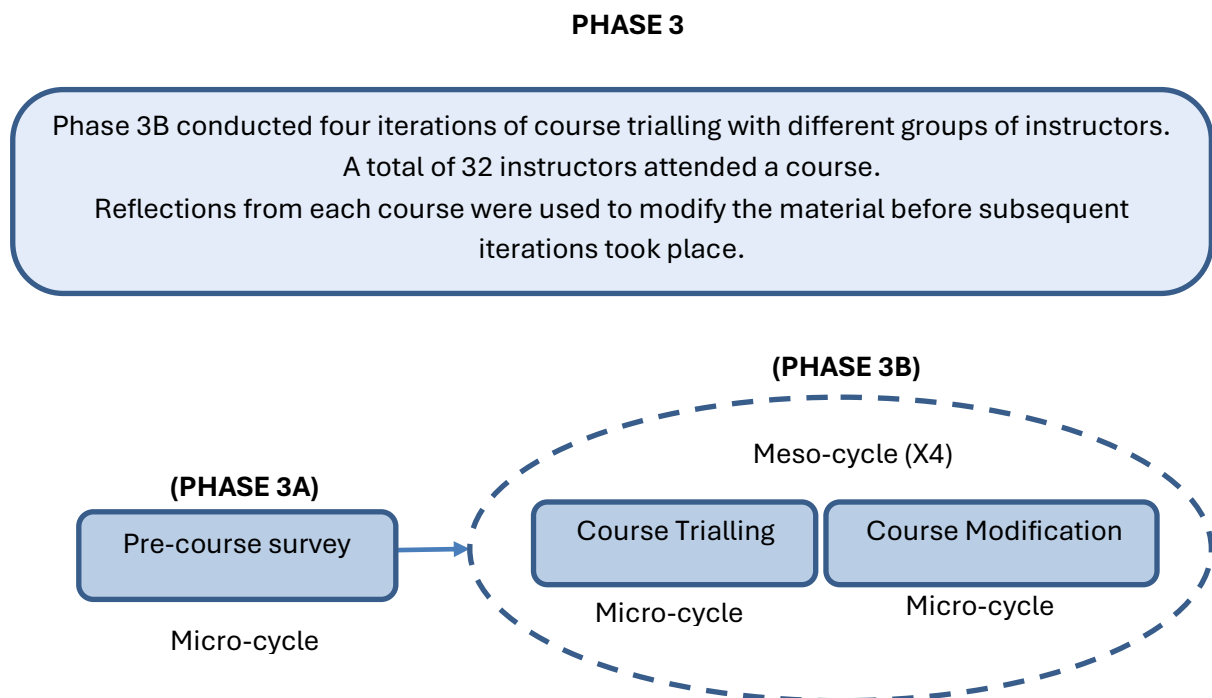


Figure 34: Methodology of phase 3 (from overarching conceptualisation of the research design)

Each course was offered as a 12–16-hour course, however in each case the gatekeeper requested it be shorter in duration due to financial and time implications. Furthermore, it was requested by gatekeepers of the National Governing Body groups (Mountain Training Association

and Canoe Wales) that the course be online to make it more accessible to their members. Trialling the course therefore involved participants attending either:

- a) One full day course, in person. Or,
- b) Two evening courses, online.

Both courses covered the same content with the exception that the in-person course had a practical element. This is expanded upon in iteration 2 (Section 6.2.2). The duration of the courses varied depending on interaction from the participants. The average course length was 4-hours, 45-minutes, however the longest course was 6-hours, and the shortest course 3-hours (see Figure 35).

Four courses were trialled through April to July 2023. The course was refined between each iteration based on participant feedback and observed engagement. Figure 35 shows the period over which the four iterations (labelled 1 to 4) were carried out (x-axis). It also shows the number of participants involved in each course (y-axis), the duration of each iteration (width of ovals), and the method of delivery (online are blue; ovals one, three and four and in-person is yellow; oval two).

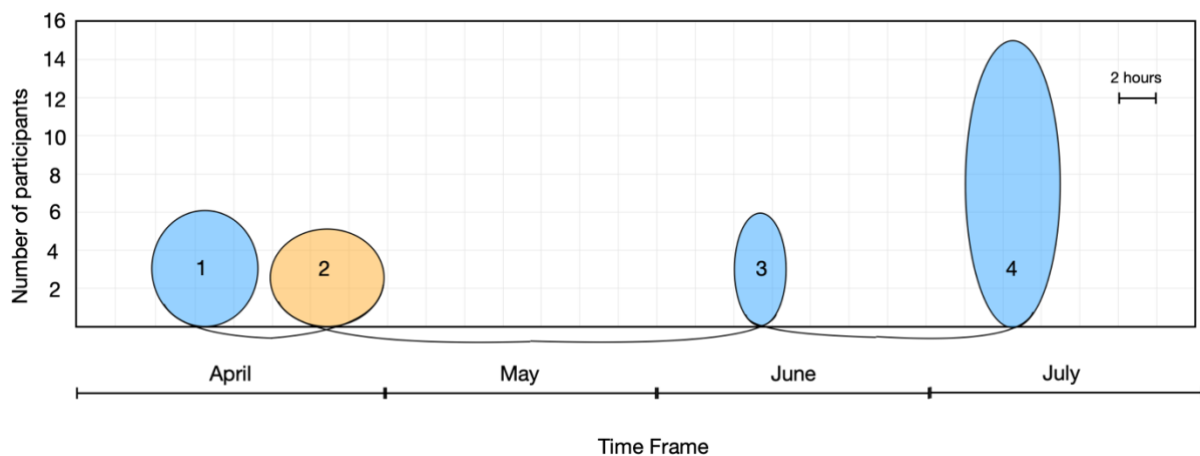


Figure 35: Iterations of phase 3 showing when each iteration was carried out, the number of participants involved, the duration of each iteration and the method of delivery (online = blue, in-person = yellow)

### 8.1.1 Participants

Participants of the course trialling had all taken part in the pre-course survey. Of the 34 instructors that completed the pre-course survey, 32 attended one of the four environmental literacy courses. See Section 7.1.1 for participant recruitment.

### **8.1.2 Data collection**

Where possible, online courses were recorded with an automatic transcription on Microsoft Teams. During the iterations one online course was moved to Zoom, where auto-transcription was not possible. Zoom meetings were video-recorded and rewatched, to gather small extracts that had significant meaning. The in-person course could not be recorded due to technical resources. Field notes were taken during all the courses and direct comments were written down where appropriate. A summary of each course was written up directly after its finish while it was fresh in my mind.

#### **8.1.2.1 Data collection during course trialling: wonky wood diagram**

Wonky wood diagrams (otherwise known as wonky wheels, or cookie wheels) have been used particularly in Forest School practice to audit or gauge practitioner strengths and weaknesses, and encourage reflective practice (Forest School, 2014; Cree and Robb, 2021). Like radar charts, wonky wood diagrams have one continuous axis and one categorical axis. This enables multivariate comparisons to be made and the visual identification of patterns in similarities and differences. However, unlike radar charts where it is important that the coordinates are arranged equidistant from each other to enable polygon data to be analysed, wonky wood diagrams can take on more irregularity. Their name alludes to the concentric growth rings within tree trunks and is therefore favourable in Forest Schools as the name and relationship to trees would likely generate greater interest than being tasked with a 'radar chart'.

The intention of using the wonky wood diagram for this research was to provide a visual aid for me and the participating instructors to understand and discuss their environmental knowledge, skills, attitudes and behaviours. I favoured calling it a wonky wood diagram over a radar chart as that is what it is most referred to in other similar practices (i.e. Forest Schools). I also felt it could be a useful tool for instructors to include in their end-of-trip reviews if they are working with school groups, therefore wonky wood diagram was deemed more suitable to the audience than radar chart.

Where course trialling took place in person, participating instructors were asked to draw their own circles and plot their responses accordingly. For the online courses, an interactive setting on Microsoft Teams and Zoom was used, to enable participants to anonymously add dots to the diagram, indicating their agreement to the statements (outer circle = strongly agree, inner circle = strongly disagree).

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The purpose of the exercise was to visually highlight areas of strengths and weaknesses for the participants, and to explore any commonalities among responses.

Statements for the wonky wood diagram were based on the principles of environmental literacy (knowledge, affects, personal competencies and behaviours) coupled with the criteria for EL-PACK. Statements beginning 'I know', explore instructors' knowledge of theory (criterion 4), focusing on ecological knowledge in a local context and whether instructors believe they can identify and address environmental issues caused by OAAs. Statements beginning 'I feel', explore the affects component (environmental sensitivity, values and attitudes), as well as instructors' beliefs about their personal capacity to make a difference (criterion 2). Statement 7 contributes to understanding instructors' motivation, as a contributor to bridging the gap between intention and behaviour change. Statements beginning 'I have the skills to' explore personal competencies and pedagogical and andragogical knowledge, addressing criterion 11; participant effect in relation to content. The final statements, beginning 'during the activities I run, I', explore instructors' practice. The statements contribute to understanding what environmental behaviours instructors are using in during their OAAs, and whether they are applying existing delivery knowledge (i.e. goal setting and reflection, which are used in other areas of OAAs) in a subject context for environmental learning.

Given that the EL-PACK criteria assist in the development of outdoor instructors' environmental literacy for PEBs within an OAA context, the wonky wood diagram is titled 'self-reported environmental literacy'.

Figure 36 presents the wonky wood diagram as shown as part of the course slides.

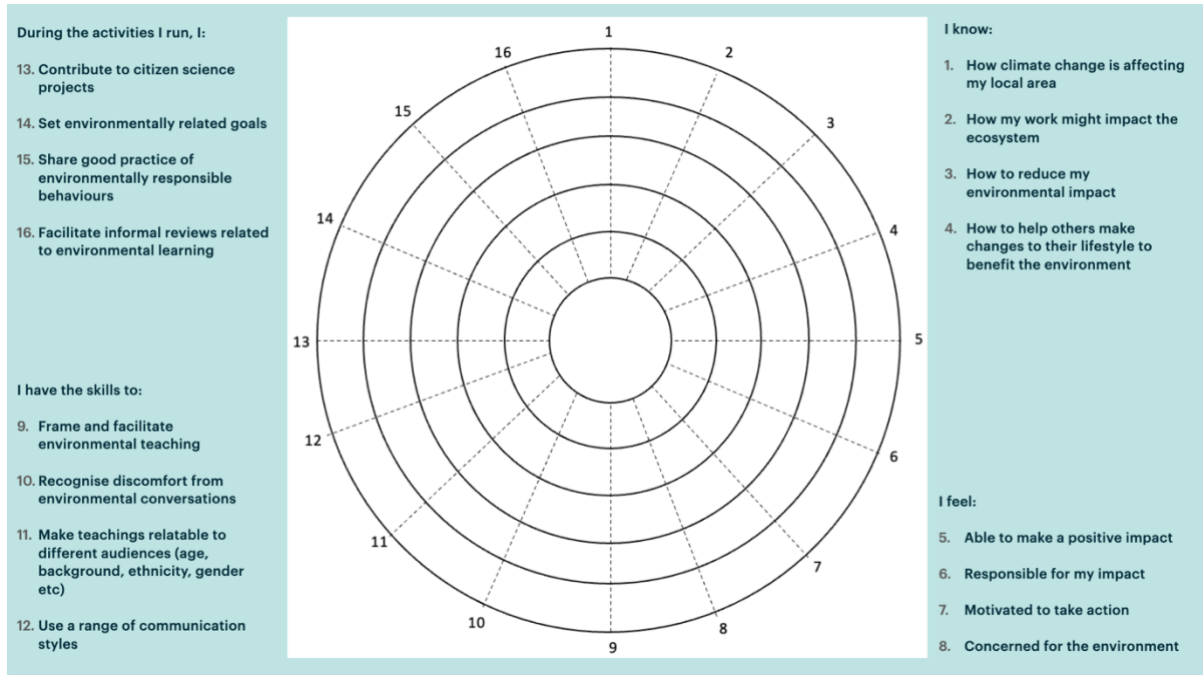


Figure 36: Wonky Wood Diagram

### 8.1.2.2 Data collection during course trialling: field notes and transcription analysis

Qualitative data were collected during the course trialling in the form of field notes, video recordings and automatic transcriptions. Collecting field notes has its advantages as it enables fast and cheap data collection and the recording of initial thought (Tessier, 2012). However, field notes can be biased and because they are not able to be replayed, they lack reliability (Tessier, 2012). Tessier (2012) recommends using a combination of field notes, transcripts and recordings to alleviate the disadvantages accumulated by using each method individually. This approach also increases the credibility of the research by applying triangulation of data collection.

### 8.1.3 Data analysis

Data from the wonky wood diagrams are presented in the findings within their respective iteration, under the heading 'self-reported environmental literacy'. Data from the diagrams were analysed descriptively rather than inferentially and are presented with the mean values from each course, as opposed to individual responses. This was done to simplify complex distributions and make it easier to understand visually. The limitation of this however, is that the diagrams do not reflect the full range of participant responses. Findings should therefore be considered indicative of a trend summary, rather than a definitive representation of all participant data.

Recordings and field notes were coded thematically under the headings ‘overall value’ and ‘responses to the course content and consequent changes for the next iteration’. These codes were kept the same for each iteration and comments only used within the context in which they were said. In doing so, I made every effort to reduce my researcher bias. Data that emerged in the recordings or field notes that needed greater explanation were addressed in the post-course survey and/or the evaluation interviews. This method of triangulating data increases the dependability of the data collected.

## 8.2 Findings from iterations of course trialling and modification

For an overview of the course material used for the presentations, see Section 5.3.

The four iterations are presented in chronological order, firstly giving an overview of the course setting and participants, then using the sub-headings ‘overall value’, ‘self-reported environmental literacy’, ‘responses to the course content and consequent changes for the next iteration’ and ‘personal reflection’. Details of course modifications are presented in response to their relevant comment.

### 8.2.1 Iteration 1

The first course took place online and was hosted by a National Governing Body organisation via their membership association. Six individuals completed the course. A summary of course participants is shown in Table 27.

Table 27: Summary of course participants for iteration 1 of course trialling

| Pseudonym | Experience                                                                            |
|-----------|---------------------------------------------------------------------------------------|
| Oscar     | Senior instructor and tutor at a semi-rural outdoor centre. Age bracket 25-35.        |
| Kit       | Trainee climbing instructor. Age bracket 35-45.                                       |
| Miriam    | Duke of Edinburgh <sup>1</sup> Co-ordinator at a secondary school. Age bracket 45-55. |

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<sup>1</sup> The Duke of Edinburgh Award was pioneered by HRH Prince Philip 1956 as a scheme to help boys transition from school into National Service. In 1980 the age limit was extended so the award was open to 14- to 24-year-olds. It was also opened to other genders, as opposed to just boys. The award comprises of four modules: volunteering, physical, skills, and an expedition. See more at <https://www.dofe.org/about/>.



| Pseudonym | Experience                                                           |
|-----------|----------------------------------------------------------------------|
| Leanne    | Instructor at a semi-rural outdoor centre. Age bracket 25-35.        |
| Noah      | International mountain leader. Age bracket 55-65.                    |
| Jerome    | Trainee mountaineering instructor and researcher. Age bracket 25-35. |

### 8.2.1.1 Overall value

At the end of the course, participants were asked to share some feedback. Jerome said the course was *“incredibly useful”*, and Oscar said it *“really opened my mind to go ‘OK, this is how I do it’”*. Noah said he had *“had a particular request recently about getting people thinking differently about the environment and what they can do or how they can make improvements in their life in general”*, he added that the course had given him *“a lot of food for thought”*.

To increase the course value Oscar recommended a practical aspect within an in- person course. Oscar said, *“It would be really good to do this presentation with the discussion points, but then also go out for a bit of a walk and see things and do things while you're out there and have the discussion points while you're out and about as well”*. This was already a planned aspect of the in-person course; however, the unprompted recommendation supported the potential impact of a practical activity to reinforce the theory being talked about.

Several instructors questioned whether they would have access to additional or supplementary materials. Oscar asked if there were *“any posters or documents that say, ‘this is some of the stuff you can do’, and ‘this is how you can incorporate it into your working lives’”*, that instructors could put up in their place of work as a reminder both for themselves, and for their clients to read. Leanne agreed, saying, *“I think a poster, or some fact cards would be really useful to share with colleagues [particularly as] we have a lot of staff turnover, so it would be really useful for sharing with new staff”*.

A copy of the slide pack was sent to instructors following the course, with permission to print and use slides as they wish to serve as reminders. Posters of environmental content (such as information on flora, fauna, geography, climate change etc) were not created as:

- 1) local environmental content is activity and place specific, therefore someone working in the area should be more qualified to identify and compile the necessary resources than myself, and

2) Information on environmental good practice in relation to different OAAs is available by different governing bodies, therefore should not need to be recreated.

In addition to the course slides, useful links to existing resources and blogs were sent to instructors.

### 8.2.1.2 Self-reported environmental literacy

Completion of the wonky wood diagram highlighted instructors were most sure of their environmental feelings, e.g. “I feel concerned about the environment”. Self-reported environmental knowledge was relatively consistent, with instructors feeling that they are familiar with how climate change is affecting their local area, how their work might impact the ecosystem, how they can reduce their environmental impact, and how they can help others to make changes to their lifestyle.

Most variation occurred in the skills section, particularly around statement 11; “I have the skills to make teachings relatable to different audiences (age, background, ethnicity, gender etc)”. The lowest score was related to behaviours (e.g. statement 13 “I contribute to citizen science projects”). Figure 37 presents a summary wonky wood diagram showing the average scores of all participants in iteration 1. An example of the raw data collected during the course can be seen in Appendix E.1.

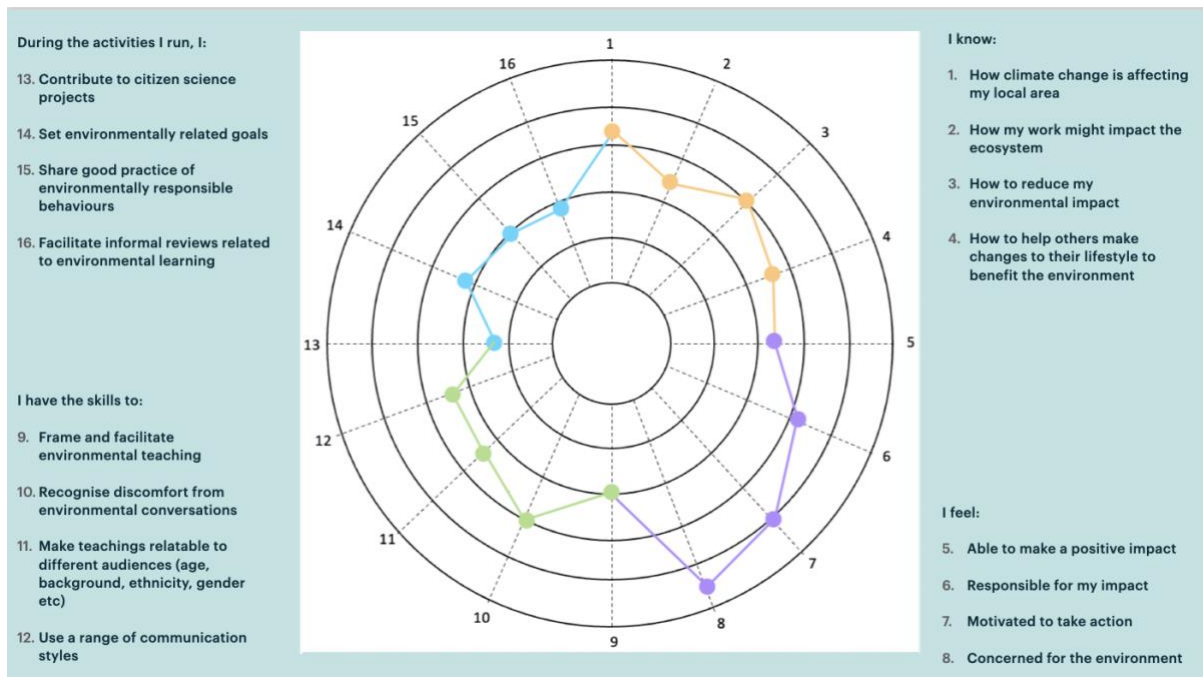


Figure 37: Summary wonky wood diagram for course iteration 1

### 8.2.1.3 Responses to the course content and consequent changes for the next iteration

The modules on knowledge (citizen science and storytelling) and participant thinking (environmental behaviours) generated discussion by instructors in iteration 1. Interest in these areas supported instructors' self-reported weaker areas as per the wonky wood diagram.

The idea of incorporating citizen science into activities was well-received and seemingly understood by participants. Oscar believed *"it could work depending on the experience of the instructor"*, suggesting that *"for newer instructors it would be quite a lot more for them"*. Having said this, Kit, the trainee instructor, was enthusiastic in saying *"I haven't done any citizen science yet, but after watching this [the course slides] I definitely will"*. He shared his ideas about *"monitoring the rock quality [while climbing] to have a record of its degradation"*. This suggests less experienced instructors may be able to incorporate citizen science too, provided they are enthused and know what to do.

Miriam, the Duke of Edinburgh (DofE) co-ordinator valued the idea of citizen science, suggesting its use as an internal project for silver DofE students. Miriam stated:

*Silver DofE students could take it on as an external project because they're always going back to the same area. [...] They could do a hand me down project that one-year group counts or monitors whatever, and then the next year the next group picks it up and monitors the changes for that year, and then every year they pass it on to the next lot. That way they would have the annual change in whatever they're monitoring.*

A facilitation strategy that was less new to participants was the idea of storytelling in the outdoors. Undirected, participants shared stories they had been told as children, or stories they tell their clients during OAAs. Although the topic was discussed by participating instructors, its benefit for improving one's storytelling techniques could be questioned as it felt as though participants were more eager to share their own stories than to learn how to improve their skills as an environmental storyteller.

Slides on citizen science and storytelling were not altered, however for the next iteration more emphasis was placed on the ACE acronym – Action, Colour and Emotion (see Figure 20 in the explanation of storytelling). For the next iteration I also made myself more prepared to challenge instructors on the purpose of their story, and question which aspects of their story contributed to its ACE.

All instructors contributed to adding ideas to the map of PEBs that could be shared with clients (see Figure 38).

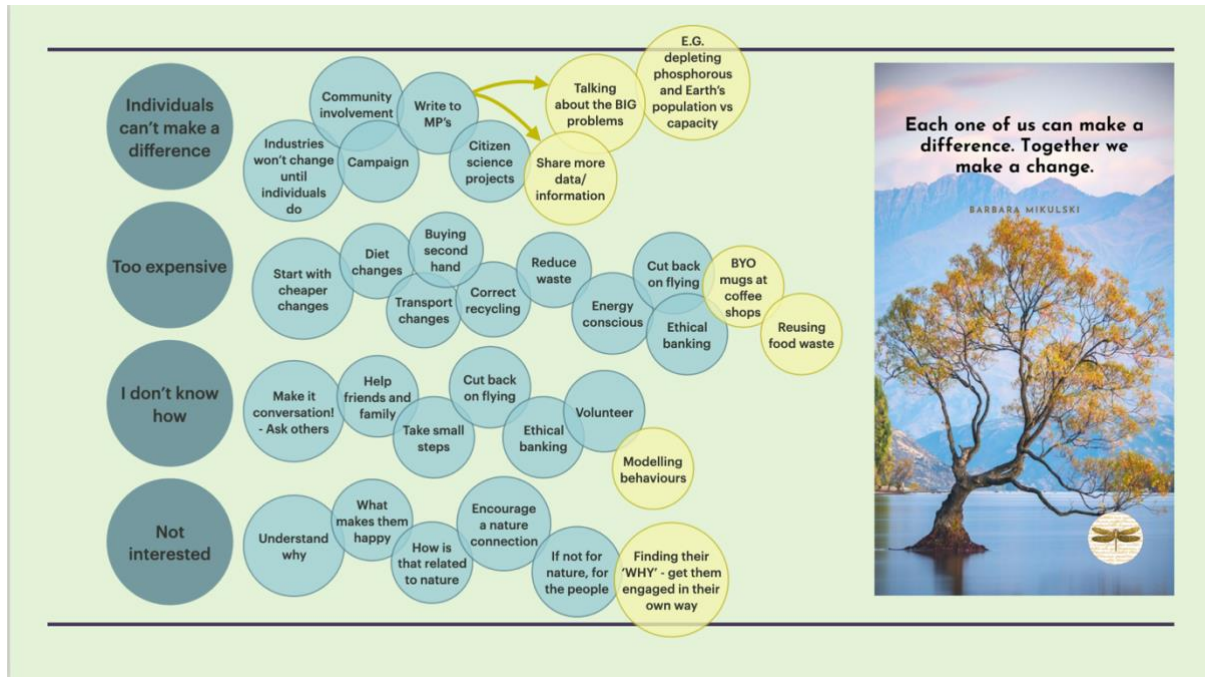


Figure 38: Presentation slide showing suggested behaviour changes in relation to most common barriers. Items in yellow show additional ideas suggested by course participants

Despite recognising the importance of these behaviours, Kit felt the environmental behaviours and solutions being discussed were “*really just scratching the surface*”. He felt the course should be talking about “*the bigger problems*”, such as “*the depletion of phosphorous, and the rapid and unsustainable population growth*”.

‘Big’ or ‘wicked’ problems were mentioned by Daniel and Connor in the expert appraisals as being tricky to discuss without compromising the instructor-client rapport, as topics have no clear answers but could elicit strong opinions (see Section 6.2.1.2). A slide was added to the course material (see Figure 39) to encourage instructors to identify wicked problems, to discuss their remit of knowledge, and to consider the influence of ‘musing’ (as suggested by Daniel in the expert appraisals), as opposed to informing. In addition, the slide prompting discussion around environmental behaviours and solutions was moved to the end of the presentation, rather than having it in the middle. This decision was taken so that participating instructors could use their whole learning experience from the course to apply to discussions over behaviour change, and was intended to focus on achievable goals, as set out in the goal setting slides.



Figure 39: Presentation slide to prompt conversations around wicked problems and the role and remit of outdoor instructors

#### 8.2.1.4 Personal reflection

I felt there was a good rapport created within the group and instructors appeared comfortable to share and build on their personal experiences. Occasionally I felt a lack of control when instructors continued to give examples of their stories, hence why additional content was added to challenge instructors to think more critically about the stories they tell and the messages they share. Overall, I felt there was a positive balance of teaching, questions and sharing of experiences which benefitted the course both for me and for the participating instructors.

#### 8.2.2 Iteration 2

The second iteration of course trialling took place in person at an outdoor centre. The centre has highly recognised environmental credentials, is a recognised B-Corporation and advertise their efforts in sustainable adventure. Nine instructors from the centre (a mixture of highly qualified and experienced contracted and freelance staff) signed up for the course, however four dropped out on the day. The centre manager (Sam) recognised the dropout rate to be due to the course being free, therefore individuals did not lose anything financially by not turning up. A recommendation was to have a nominal fee to be paid in advance which he advised would reduce rate of dropout. As the course was being trialled as part of research, the ethics of making people pay for the course was considered problematic. Rewards of CPD points were offered

through supporting governing body associations, however this could have been made more explicit during the sign-up process.

Table 28 presents a summary of the course participants.

Table 28: Summary of course participants for iteration 2 of course trialling

| Pseudonym | Experience                                                  |
|-----------|-------------------------------------------------------------|
| Pheobe    | Climbing instructor and coach. Age bracket 25-35.           |
| Tommy     | Mountain leader and climbing instructor. Age bracket 35-45. |
| Sam       | Centre manager, instructor and coach. Age bracket 35-45.    |
| Ross      | Mountain leader and climbing instructor. Age bracket 45-55. |
| Vince     | Mountain leader and climbing instructor. Age bracket 45-55. |

### 8.2.2.1 Overall value

In contrast to the first course trialled, participants in the second iteration were all familiar with each other and the outdoor centre. Theory of environmental literacy was therefore discussed in relation to their shared experiences in the workplace and how they could improve their own practises and activities together. Tommy suggested there was value in doing the course as a homogenic group saying, *“it has been really useful to spend some time talking about what it is we are trying to say and do, and how we can do it more effectively”*.

### 8.2.2.2 Self-reported environmental literacy

The instructors used pen and paper to draw and colour their own wonky wood diagrams. I collated the results into a digital version and have presented a summary of the average scores in Figure 40. As in the first iteration, environmental attitudes and emotions scored the highest.

It could have been expected that environmental knowledge, skills and behaviours might have been higher for instructors in this iteration compared to iteration 1, given the environmental credentials of their workplace. In contrast however, instructor responses about their knowledge, skills and behaviours were varied, with all responses being considerably lower than those in iteration 1. Although it cannot be proven, instructors in this iteration scoring low in their

knowledge may be because they do in fact have a greater awareness of environmental concepts and therefore are aware of how much they *don't* know, as well as what they do.

In addition, the low reported skills and behaviours reflect their beliefs about what their clients want, rather than their actual ability. Pheobe alluded to meeting customer demand as having to be a priority over having environmental conversations, stating, *“I think it’s not always suitable or easy to have environmental conversations or activities because it doesn’t match the group expectations”*.

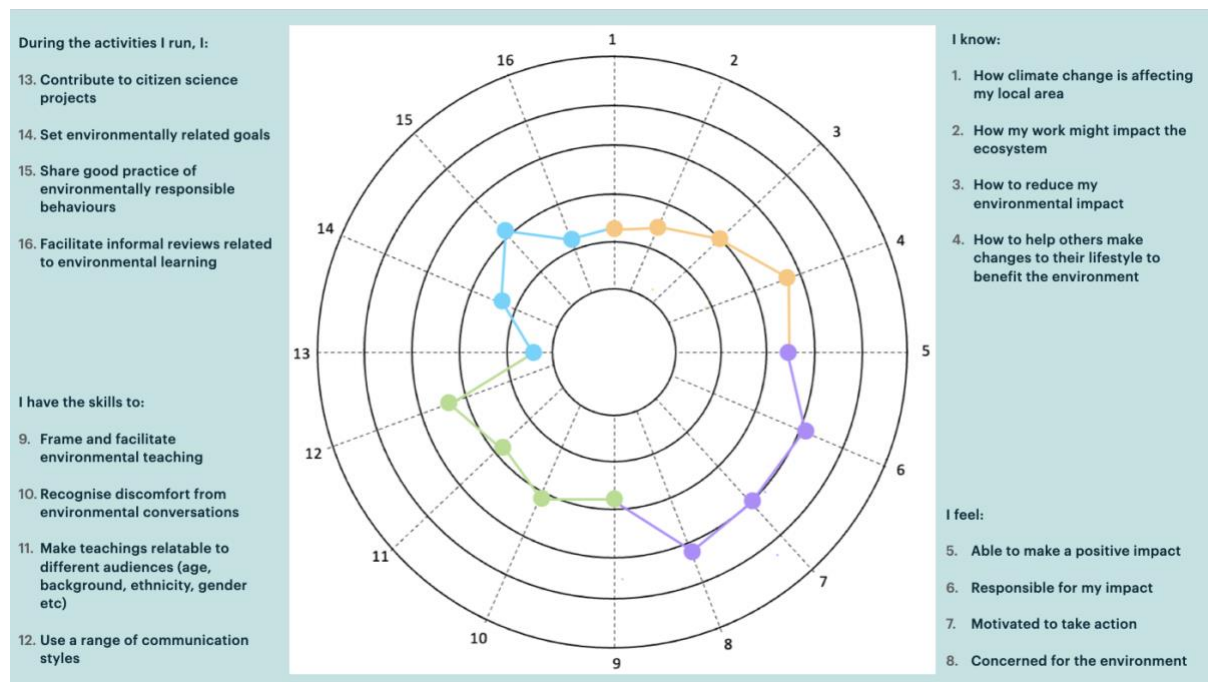


Figure 40: Summary of wonky wood diagram for course iteration 2

### 8.2.2.3 Responses to the course content and consequent changes for the next iteration

As indicated by the wonky wood diagram, instructors did not contribute to citizen science projects. Instructors revealed they had not heard of citizen science projects before but showed enthusiasm to learn about them. All instructors downloaded iNaturalist and during the practical walk used their phones to take pictures and practise logging records.

Given that knowledge of citizen science and nearby projects was so low, the course was updated to include more information about existing projects. An example of the RSPB’s well known Big Garden Bird Watch was used so that instructors could relate to the intentions of the task and how it could contribute to a wider environmental understanding.

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During the presentation module on storytelling, Vince gave an analogy of using a microscope; altering the zoom to understand different aspects of the environment, *“I like the idea of knowledge being hyperlocal, looking at what the group are seeing and then linking the small scale to the big scale to tell them about how they can help”*. Instructors were challenged by asking about the purpose of their stories, where they get their information for the stories, and whether they favour the action, the colour, or the emotion.

A ‘grey’ area highlighted was how stories tend to evolve between fact and fiction, by enhancing the colour and emotion. *“I tend to start with the facts, and then embellish it with a story, because that’s the bit that people will remember”* (Tommy).

Vince recognised that storytelling is *“something we do already to a certain extent”* but explained that *“really thinking about what story we are trying to tell, and which are the important bits to get across is something I need to think about some more”*.

The added emphasis on the purpose of stories and ACE for this iteration meant instructors did think more critically about their facilitation. To emphasise it further, and to give instructors additional material for them to reflect on, the ACE acronym was expanded on in the slides to highlight the process of storytelling (see Figure 41). In addition, an example of a story was integrated into the course, following Vince’s recommendation of starting local and expanding to global (see Figure 42, Figure 43, and Figure 44). Examples of a story were changed for iterations depending on whether the group were water-based or land-based instructors, to increase subject relevance.





Figure 41: Presentation slide expanding on ACE storytelling

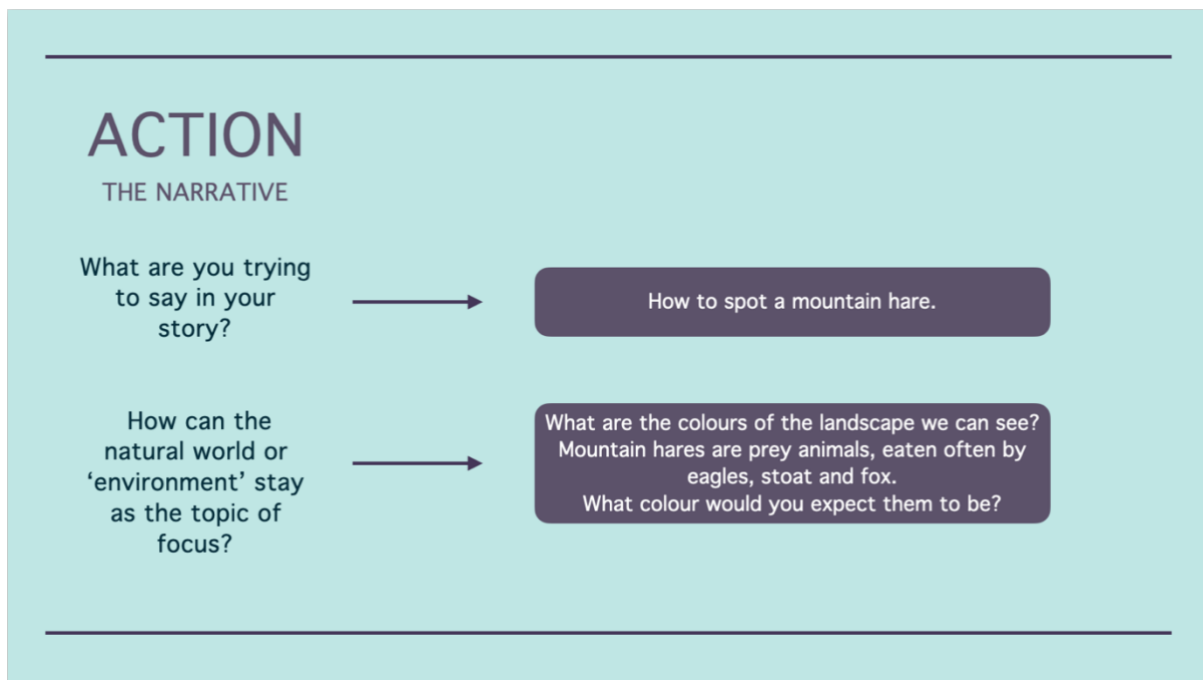


Figure 42: Slide on telling an ACE story: Action

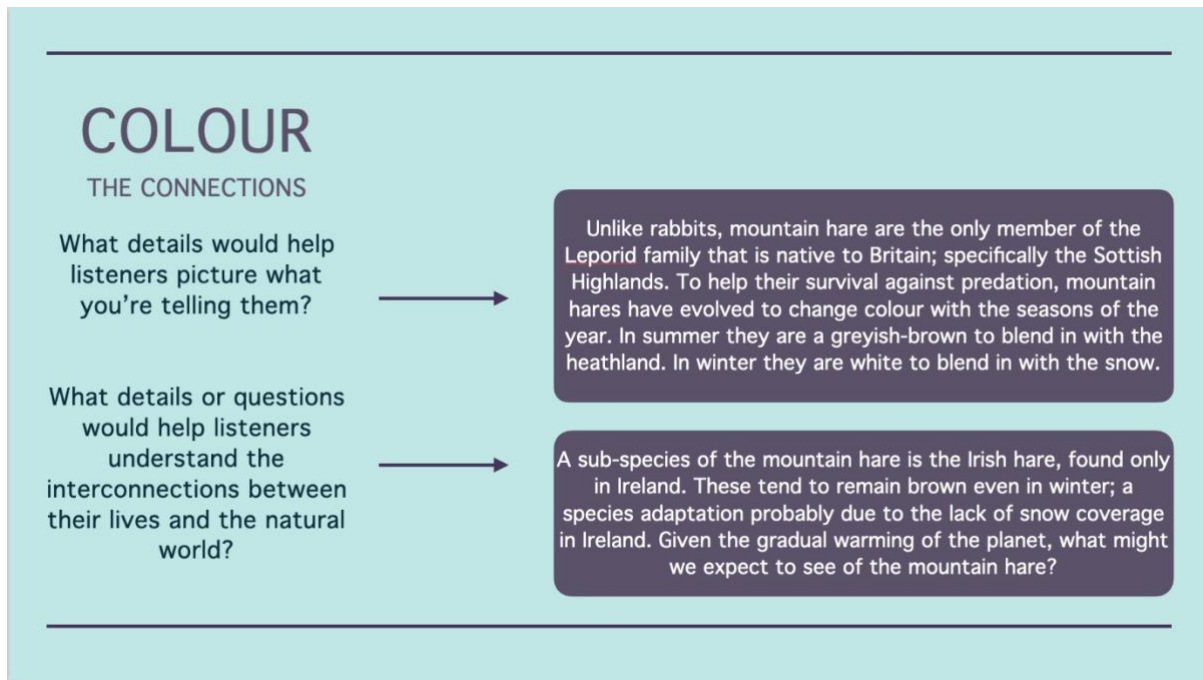


Figure 43: Slide on telling an ACE story: Colour

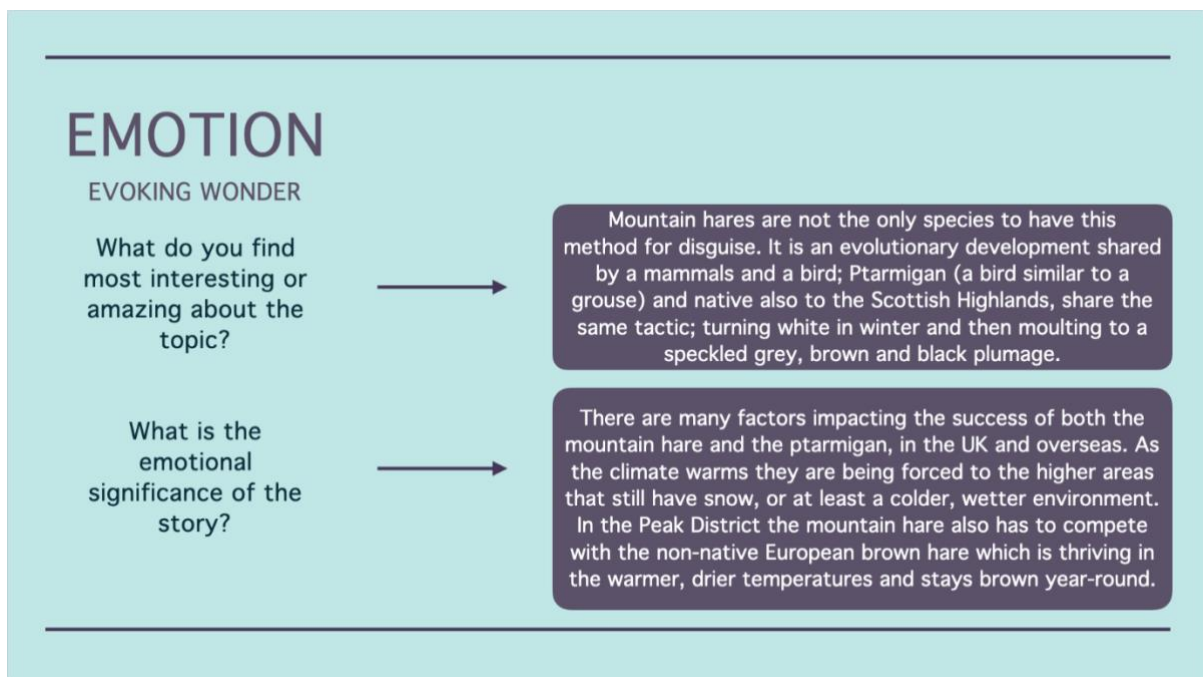


Figure 44: Slide on telling an ACE story: Emotion

In a similar way that the storytelling examples were to be updated to be made context specific for the type of instructors, the slide prompting discussions around species 'thisness' as opposed to 'whatness' (see Figure 22 in Section 5.3.5.4) was also updated to be contextualised for the

prospective group. This was prompted after a comment by Pheobe about the several references to barnacles as examples within the presentation.

A key difference with this iteration being run in person was the inclusion of a practical element. The context of the practical involved a short (40 minute) walk around the local centre countryside, with frequent rain showers. Participating instructors played with citizen science apps, and we spoke about different activities that could be used to promote nature connectedness, however individuals appeared reluctant to use role-play with each other to test them out. Interestingly, while discussing activities in the classroom, Phoebe said “*the problem sometimes in trying to get adults involved in these kinds of activities is they feel embarrassed to do it; adults forget how to play*”. While this comment was made in a context relating to their clients, it appeared to remain true when attempting to engage the instructors in role play to practise the activities. A consideration for the next in-person course would be to give each person (or in pairs, depending on numbers) a card explaining an activity. During the practical participants would then be asked to run their activity with the group; therefore, all activities get practised as opposed to spoken about, and each person has a role in participating and running an activity. An alternative way to run an in-person course would be to run the whole theory integrated into an activity. For example, running the course for surf instructors could mean sitting on the beach and using the sand as a blackboard to help illustrate aspects of the theory. Between the different sections of the course instructors could then paddle out into the surf and in small groups have discussions or do role-play activities to incorporate stories, nature connectedness activities, and citizen science into their surf lesson.

#### **8.2.2.4 Personal reflection**

Once again I felt as though the course was positively received. Instructors were able to have interesting conversations to directly link the course material to their workplace and identify where they could make improvements. For the practical aspect however, my facilitation needed to be improved to take greater group control and to encourage instructors to try out different activities as opposed to just listening. The practical therefore needed to be more clearly defined and planned, knowing in advance what the activity would be and allowing time to plan which aspects of the theory would be covered.

### 8.2.3 Iteration 3

The third course was run online and hosted by the same National Governing Body association as iteration one. The course was fully booked with twelve participants, however only six attended. A lack of interaction by participants during the course meant it lasted only three hours. While most participants had their cameras turned on, Zoe and Archie gave little contribution throughout course, and kept their cameras and microphones turned off unless directly asked something.

Table 29 presents a summary of course participants.

Table 29: Summary of course participants for iteration 3 of course trialling

| Pseudonym | Experience                                                                            |
|-----------|---------------------------------------------------------------------------------------|
| Wayne     | Duke of Edinburgh Co-ordinator. Age 35-45.                                            |
| Clive     | Outdoor educator, Duke of Edinburgh Co-ordinator, mountain leader. Age bracket 35-45. |
| Archie    | Duke of Edinburgh Co-ordinator. Age bracket unsure.                                   |
| Yannis    | Mountain leader and paddlesport instructor. Age bracket 45-55.                        |
| Bradley   | Duke of Edinburgh Co-ordinator. Age bracket 35-45.                                    |
| Zoe       | Mountain leader and paddlesport instructor. Age bracket 35-45.                        |

#### 8.2.3.1 Overall value

Participants shared positive feedback about the course at the end of the presentation. Zoe said the course had *“given me different methods of how to introduce environmental literacy on my hikes”*. She added, *“I just need to go and think about some of the tools you’ve given us and some of the methods you’ve given us and combine it with what I’m already doing”*. Bradley thanked me for the course, recognising, *“it was a tough group”* and that it was *“not as interactive as I imagine you would have liked”*. Bradley complimented my facilitation saying, *“You did good and carried the group through! You knew the subject and presented on it really well; entertaining, informative and thought provoking”*. A recommendation by Bradley to increase the value of the course and to *“get people to start to chat a bit more between themselves”* was to *“split the group into break out spaces, with small tasks at the beginning of the session”*. In response to this, breakout rooms were added for the next iteration, both at the beginning and throughout the course, with specific questions and tasks for participants to think about and discuss.

An example of questions for a breakout room discussion following the wonky wood task is shown in Figure 45.

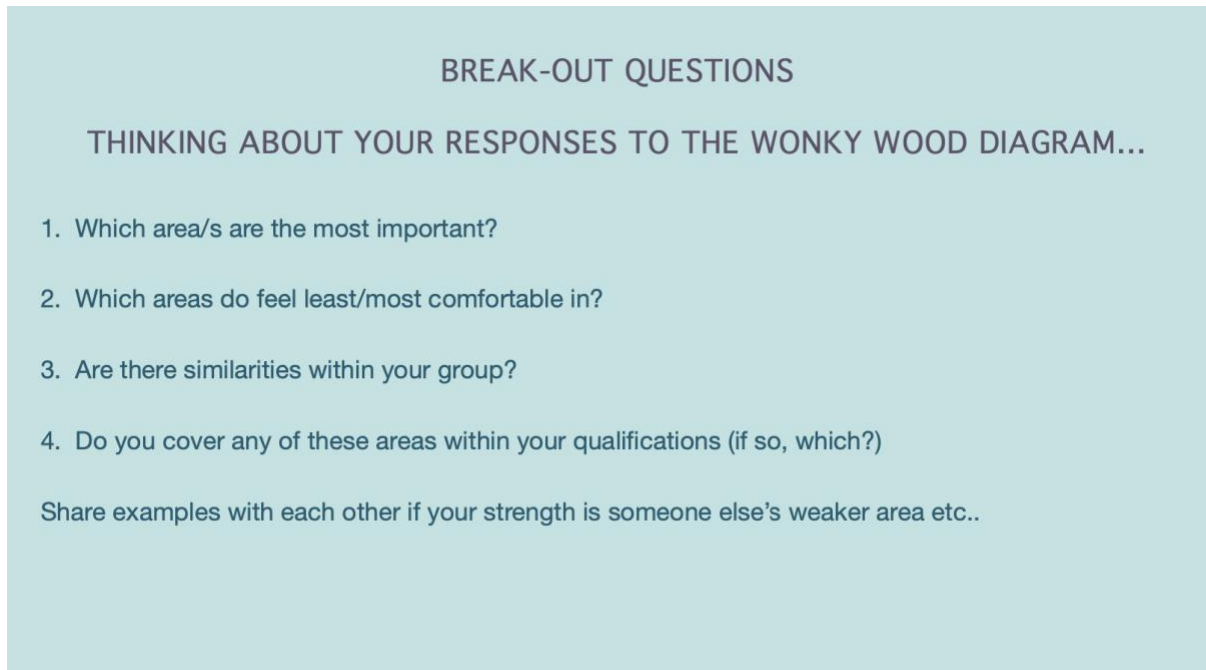


Figure 45: Presentation slide prompting discussion in breakout groups around responses to participants' wonky wood diagrams

#### 8.2.3.2 Self-reported environmental literacy

Figure 46 presents the summary wonky wood diagram, showing the average scores of all participants in iteration 3. Instructors in this iteration had the least experience of outdoor instructing (in comparison to previous iterations), with most interested in the course from a Duke of Edinburgh perspective. Self-reported environmental knowledge was consistently higher than it was for instructors in previous iterations, whereas skills and behaviours followed a similar trend indicating that knowledge does not always influence PEBs.

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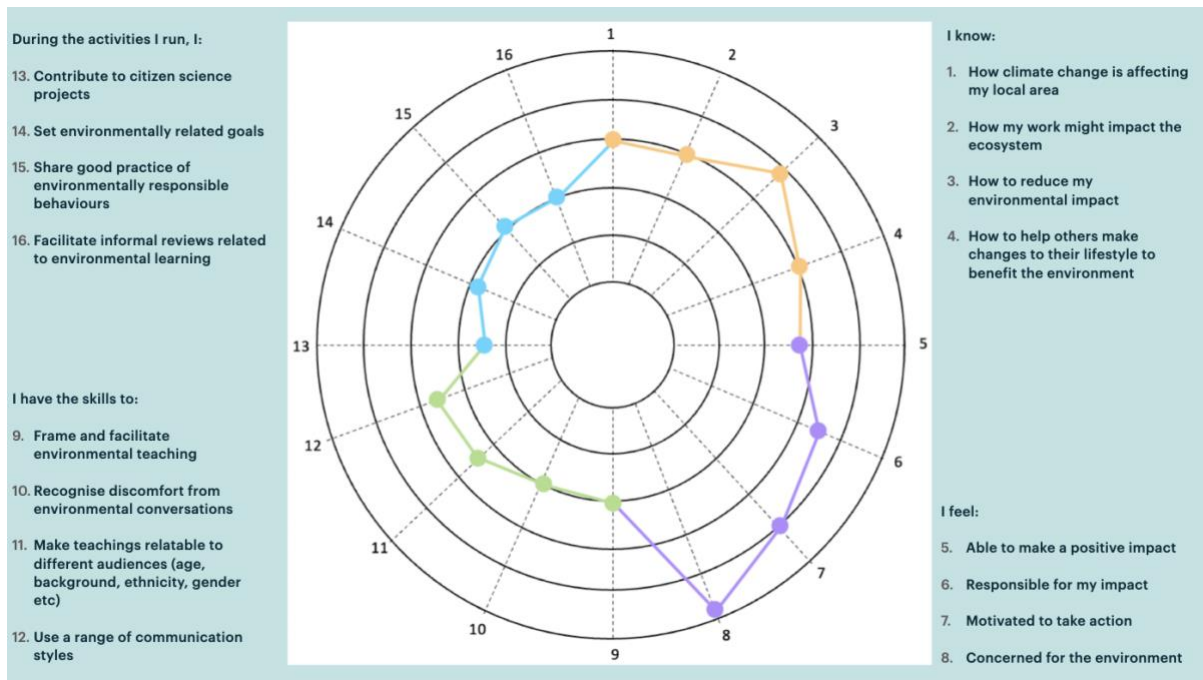


Figure 46: Summary of wonky wood diagram for course iteration 3

### 8.2.3.3 Responses to the course content and consequent changes for the next iteration

In response to instructors increased self-reported environmental knowledge, instructors were asked how they share their environmental knowledge with their clients or students. Yannis said he talked about the environment through “*knowledge sharing about flora and about geology*”, but he recognised “*I’m not sure I’m doing anything that’s going to change behaviour*”. Yannis is likely correct, as if he is targeting the knowledge component of environmental literacy, without considering the attitudes and skills element, there are unlikely to be behaviour changes. The modules on nature connection, citizen science and storytelling are intended to provide instructors with additional methods of environmental communication, to increase clients’ environmental attitudes and skills, as well as their knowledge.

Instructors in previous iterations of course trialling had not commented on the nature connectedness module as it appeared to meet the requirements of the participating instructors. For the participants in this iteration, however, not only was the concept of nature connectedness new, but the course material did not go into enough detail for the participating instructors to understand how to apply the pathways into different activities. In a response to a question asking whether anyone facilitates nature connectedness activities, Bradley responded saying “*I’m not totally sure what you mean*”, with Emma agreeing. At the end of the course, Yannis shared, “*I*

*thought the five pathways were interesting, but it would be good if you could have expanded a bit more on some of them.”*

In response to this, more information about the pathways to nature connectedness and potential activities were added to the slide pack for future iterations (see Figure 47, Figure 48, and Figure 49). Explanations of the pathways (Figure 47) were from the Nature Connection Handbook by Richardson and Butler (2022, p.12-13). Instructors were directed to this material for their personal use. As nature connectedness was discussed in the first day of the presentation, I also decided that for future iterations a homework activity would be set to encourage instructors to create or research a game to stimulate one (or more) of the nature connection pathways.

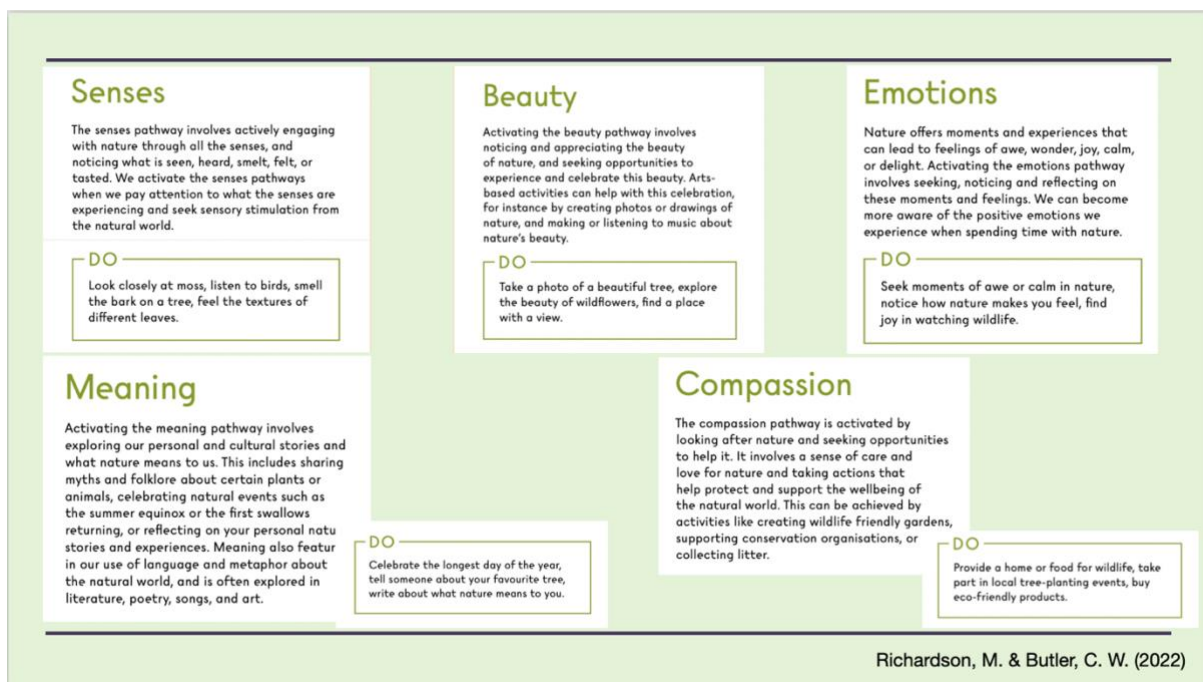


Figure 47: Slide showing pathways to nature connectedness from Richardson and Butler (2022)



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## GAMES/ACTIVITIES THAT INSPIRE NATURE CONNECTEDNESS

Name: Deer Ears

Nature Connection Pathway: Senses and Meaning

Purpose: To engage our hearing and tune in to the sounds that we are often too busy to hear. What is the difference between listening and hearing? Encourage people to listen and hear the nature around them wherever they are.

Description: Cup your hands around the back of your ears so your palms are facing forwards, your thumbs are round the back of your ears and your fingers are over the top. When everyone is quiet, listen to the sounds you can hear. Discuss why deers need such good hearing.

Audience: Any age or type of clientele (school groups, corporate, tourists etc)

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Figure 48: Slide showing activities that inspire nature connectedness: Deer Ears

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## GAMES/ACTIVITIES THAT INSPIRE NATURE CONNECTEDNESS

Name: Pure Air (Lichen Watch)

Nature Connection Pathway: Beauty / Meaning

Purpose: To increase understanding of air quality

Description: Identify lichens along a walk and notice where they are growing - on what material and and at what height. Explain how lichens are an indicator of clean air as they require clean air themselves to grow (lichens have no root system to filter what they absorb, so pollutants can accumulate and become toxic very quickly). In places with traffic lichens are generally found higher up as the most polluted air is lower down, nearer exhausts.

Audience: Any age or type of clientele (school groups, corporate, tourists etc)

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Figure 49: Slide showing activities that inspire nature connectedness: Pure Air

Another part of the course that provoked discussion, was the importance of words; the anthropocentric jargon used in the outdoor sector that unintentionally ‘others’ nature (see Section 6.3.5). The subject was introduced and explained giving examples of words such as ‘smashing’, ‘ripping’ and ‘conquering’ as words that are used as positive words in OAAs, but that



are unintentionally degrading of nature. Clive responded, “*we do use terms like ‘you smashed that!’ but that it is referring to the activity and not the ‘smashing’ of nature.*” Similarly, Yannis stated, “*I never really thought of them in a negative way. They’re all to me about the activity rather than being detrimental to nature or the environment.*” The acceptance of these terms may be in part due to the use of aggressive words in everyday language. Yannis added, “*I used to work with a lot of young people who used ‘smashed it’ for everything we did. It’s just become slang or jargon for achieving something and doing it well*”.

In contrast to previous iterations, instructors were less willing to think of alternative words that could replace the anthropocentric jargon (such as ‘journeying’, ‘riding’, ‘exploring’ or ‘playing’). While Yannis is correct in saying the type of language is used in everyday slang beyond the outdoor sector, it does not excuse instructors from taking it into consideration. The language reinforces a disconnection between humans and nature, which the outdoor sector has an ability to positively influence in changing. Rather than front-loading examples of language used, as was done in this iteration, future iterations would link the topic into instructors’ perceptions of their own nature relationship, and thus, enquire as to how they might describe success. When anthropocentric words arise, instructors will be asked about the connotations of those words, before explaining how they can be problematic.

The citizen science module generated some discussion between Yannis and Bradley, who each shared their experiences of participating in citizen science projects, though not within an OAA context. Yannis took the initiative to search for citizen science projects, saying “*while you’ve been talking and I’ve just had a look and there’s a website for a group called ‘Moors for the Future’, that are dedicated to looking after the Peak District*”. Yannis added, “*they’ve got a whole list of citizen science surveys looking at birds, butterflies, hares, bumblebees, sphagnum moss*”. Taking the opportunity to identify existing projects in their area was good as it emphasised the number of different projects that require minimal equipment, that instructors can engage their group in and contribute to. A slide was added to the presentation for future participants that would be context specific to the group, identifying some existing projects within their activity field (see Figure 50).

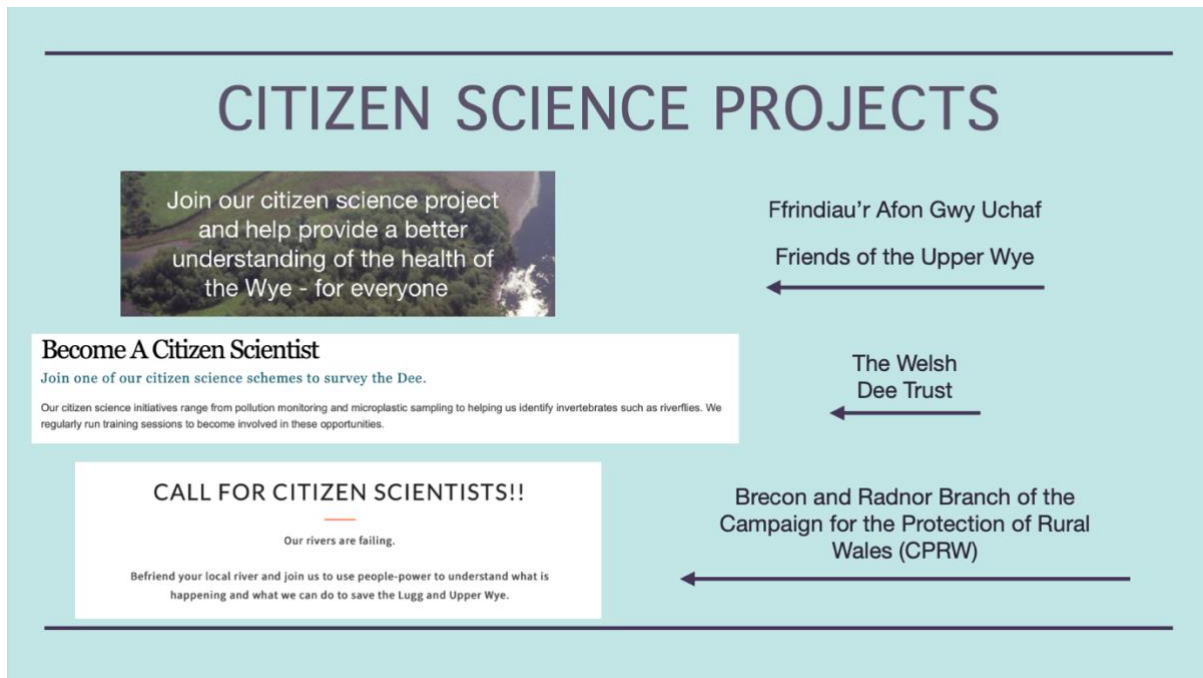


Figure 50: Presentation slide highlighting citizen science projects that exist for those working on rivers in Wales

In relation to storytelling, Bradley said he uses “a fictional story” to help facts “stick in their minds”. He uses an example of a story about the Devil’s Matchstick lichen, saying “kids just look at it and think, you know, it’s not that exciting [but after being told a story about it] you’ll then sometimes hear kids talking about it later on or some other time, and they’ll spot it again, it’s definitely something that sticks in their mind”. For other participating instructors, storytelling was less frequent. When asked if anyone tells stories during their OAA, Clive replied, “I like to try, but I’m rubbish at it”, Archie said he does, but that “I’ve made most of it up” and that “it’s for entertainment purposes only”. Zoe added “no, not really” she had told one recently, but said “that was a bit of a one off”.

After using the presentation slide to explain how to tell an ‘ACE’ story, Zoe stated, “that makes sense”, however Yannis raised that it could be “quite hard to do if you don’t know about how they fit into the ecosystem”. This goes back to the importance of environmental content knowledge for facilitation to be effective. A slide at the end of the presentation already had information about additional resources, useful links and recommendations for further reading. For future iterations however, more website links, YouTube links, and books were added with a small description to summarise what the link is for to clarify its use. In addition, future participating instructors were recommended to learn in detail three stories of non-human nature they see during their activity. This would give instructors an achievable goal, where they can choose an area that interests them. Providing a range of methods for self-directed learning (i.e. reading books or webpages,

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watching a YouTube video, or listening to a podcast), was important to enable accessibility to those with learning differences that may find reading challenging.

In response to an anecdotal story that I told to contextualise the importance of environmental literacy; Wayne commented

*I thought the anecdote was interesting because it's very easy to take young people out in that environment and for them to feel so wowed by it, but if then they go back and feel disconnected from it again, you're not really- there needs to be that immediate tie back to how it relates back to where they stay normally and what they can do to relate to the little bits of nature they do have, rather than this huge vista in front of them.*

This reinforced the power of stories for contextualisation and examples to aid learning. For a course to be influential to different people it would be beneficial to have a range of anecdotal stories that can be told if a question or suitable opportunity arises. Presentation slides were not updated for this; however, it was decided that appropriate stories should be written down and saved to remember. The same stories should not be used in every course, only when their telling will aid participant learning and understanding.

### **8.2.3.4 Personal reflection**

This course felt much harder to run than the previous two as participating instructors were reluctant to engage and share their experiences or opinions. This impacted the rapport I was able to create with the group and meant the course teaching was more directed, rather than a mixture of direction and collaboration. Given the lack of experience and the lack of willingness to share and build on ideas, the course would have benefited from more material and tasks which could have targeted active participation, as opposed to relying on voluntary engagement. It also highlighted my need for greater pedagogic and andragogic agility to respond to lack of experience or engagement by offering alternative strategies of facilitation.

### **8.2.4 Iteration 4**

The fourth iteration was run online to members of a different National Governing Body association. Due to the high dropout rate of previous courses, the maximum number of participants was increased to sixteen, on the basis that not all would attend. Fifteen instructors attended the online course (see Table 30 for a summary of participants).

Table 30: Summary of course participants for iteration 4 of course trialling

| <b>Pseudonym</b> | <b>Experience</b>                                                                                 |
|------------------|---------------------------------------------------------------------------------------------------|
| Dylan            | Paddlesport instructor and raft guide. Age bracket 25-35.                                         |
| Simon            | Paddlesport instructor. Age bracket 45-55.                                                        |
| Eddie            | Paddlesport instructor. Age bracket 35-45.                                                        |
| Ross             | Activities manager at a centre and chairperson of a local canoe club. Age bracket 45-55.          |
| Frank            | Club coach at a local kayaking club in a rural location. Age bracket 55-65.                       |
| Heather          | Sea kayak leader and coach. Age bracket 45-55.                                                    |
| Jack             | Ex surf coach (expired qualification). Age bracket 55-65.                                         |
| Owen             | Paddlesport instructor and coach. Age bracket 35-45.                                              |
| Gaz              | Course provider for training instructors. Paddlesport instructor and coach. Age bracket 35-45.    |
| Indie            | Managing director and canoe and kayak guide at an urban based activity centre. Age bracket 35-45. |
| Pete             | Instructor qualification provider, paddlesport instructor and coach. Age bracket 35-45.           |
| Martin           | Paddlesport instructor and coach. Age bracket 45-55.                                              |
| Nia              | Paddlesport and climbing instructor and mountain leader. Age bracket 35-45.                       |
| Loel             | Paddlesport coach and foundation safety and rescue trainer. Age bracket 45-55.                    |
| Ken              | Mountain leader. Age bracket 55-65.                                                               |

#### 8.2.4.1 Overall value

The course ran smoothly, however little feedback was given over the use or applicability of the course content. This was most likely due to the size of the group, whereas in previous iterations online groups were small, in this iteration there was more than double the number of instructors

present, therefore there was less open group discussion and conversation. For future courses, the preference would be no more than eight participants in an online course to enable whole group discussion.

Indie commented on the course being “*one of the slickest and most professional zoom meetings I’ve ever witnessed!*”. Furthermore, in a comment in the chat, Nia wrote

*The course was fab! I loved it and really enjoyed the company of the other participants.*

*My feedback would be:*

- 1. Your slides are really good, I ran out of time trying to write notes down from them, but I think that's because I'm slow!*
- 2. Your delivery is really good, you don't talk too fast which is great and means those who aren't first language English or slightly harder of hearing don't miss anything!*
- 3. The breakout groups were for the perfect amount of time, not enough time to go off on tangents.*

*Basically, think it's great and the delivery is fab!!*

#### **8.2.4.2 Self-reported environmental literacy**

Figure 51 presents a summary of the wonky wood diagram showing the average scores of all participants in iteration 4. The number of participants in this iteration meant the labelling was less clear than in previous iterations, therefore while the summary representation was created as accurately as possible, results should be interpreted cautiously.

The summary shows a more even distribution of knowledge, attitudes, skills and behaviours in comparison to previous iterations. This could be a result of the experience of the group, or possibly a suggestion that the governing body organisation has greater environmental expectations than others.

Similarly to previous iterations, the diagram shows a dip over statements 5 and 13 in their respective components. This indicates beliefs about making a positive impact are consistently lower than other attitudes, and that citizen science is less known about and used than sharing good practice, goal setting, and reviewing.

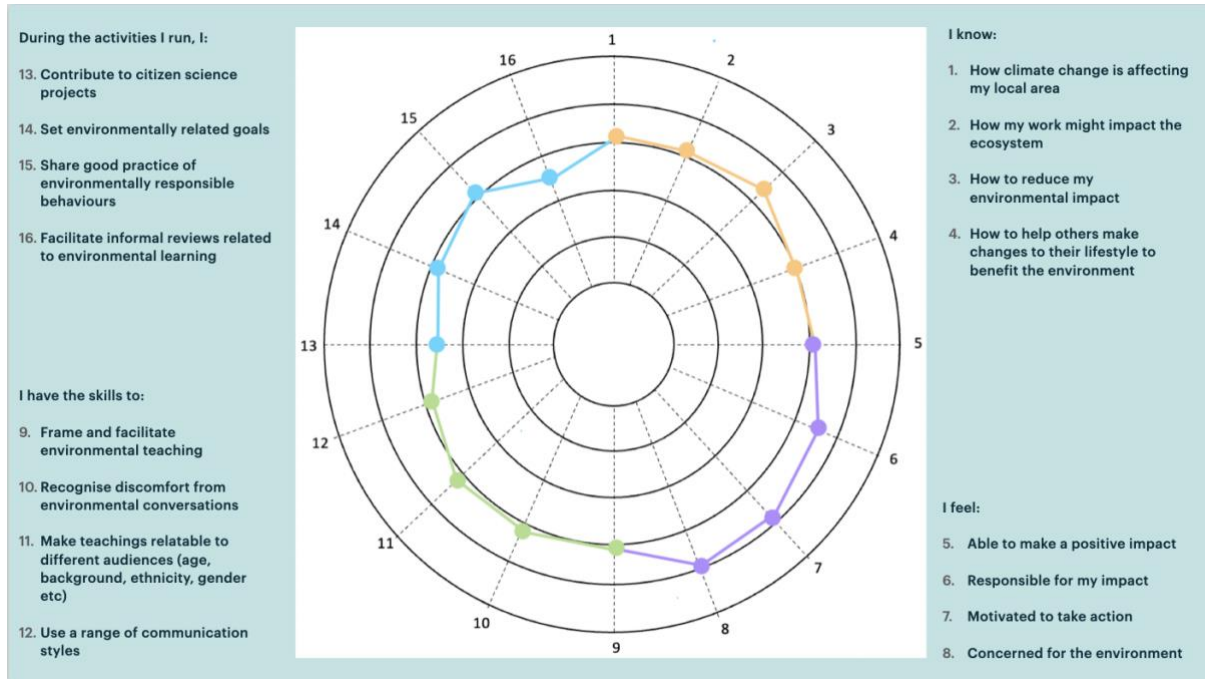


Figure 51: Summary of wonky wood diagram for course iteration 4

### 8.2.4.3 Responses to the course content and consequent changes for the next iteration

Instructors were familiar with the concept of nature connectedness, however, as discussed in the third iteration, a homework task for completion prior to the course, was introduced to encourage their application of theory. The homework piece required instructors to detail an activity that encourages a connection to nature, based on one of the five pathways. Seven participants shared their activities with the group at the beginning of the session, which were then added into the slide pack and shared among the group at the end of the course. Not everybody contributed to this exercise, however it worked well for expanding instructors' resource packs in a collaborative way, and challenged instructors to think about how the activities they are facilitating are contributing to client nature connectedness.

In relation to the importance of words, participating instructors actively contributed to the discussion, sharing anonymous suggestions onto the screen whiteboard like *"styled it"*, *"cruised it"*, *"you flowed down the rapid"*, and *"poetry in motion"*. Nia voiced that *"it's really difficult, because part of that whole 'I smashed it' is almost an expression of the energy that went into it"*. Nia went onto say *"I think some of the more gentle approaches, maybe don't capture that emotion"*. Nia agreed that *"it definitely needs addressing"*, and shared how other non-human nature is given negative connotations such as *"having a 'bug' [...] they're an agent of nature being framed in a negative way"*. Martin added, *"for the kids of today, the latest term is 'slayed it', which*

*is killing something*”, Martin felt these have connotations that “*you’re fighting against nature, it’s an enemy you have to overcome and conquer, which is possibly not the way you want to see it*”. On the other hand, Heather disagreed, saying “*nature is violent, waves ‘crash’ on the shore, they ‘pound’ the rocks, I’m not sure I agree*”. Pete added “*they haven’t ‘smashed’ the rapid, they’ve chosen their line and the thing they have smashed is their line to get down it [...] they’ve smashed their ability to do something, but not the environment itself*”. Pete went on to say, “*the language we use beforehand is more important [...] how we’re going to use the features positively that are already there*”.

This discussion evoked debate as to whether words with negative connotations really influence attitudes towards non-human nature. There was a general agreement with Nia that phrases such as ‘smashed it’ are high energy expressions of positive emotion and celebrations of success, rather than being directed at nature. Pete and Indie both felt the framing used before a high energy or challenging part of the OAA (in this case a rapid) was more important. The slide on the importance of words was updated to include a Nature Framing poster, created by a Public Interest Group (see Figure 52). The discussion of words would still happen; however, the subject was broadened to encourage instructors to consider their use of descriptive words of non-human nature throughout their OAAs.

**THE IMPORTANCE OF WORDS**

Some words can be unintentionally degrading of nature. We live, work and enjoy these environments, but by using aggressive words we continue to alienate ourselves (and others) from nature. We continue to “other” nature.

“One has only to look at the marketing verbiage—terms like “strike missions,” “peak bagging,” “shredding,” “ripping,” “sniping lines,” “smash-and-grab ascents” and “siege tactics”—a language of violence for an industry seemingly both in love and at war with the high country.”

**How to talk about nature...**

- We are part of nature**  
Try to use frames that make us part of the natural world.
- Wildlife is not biodiversity**  
Wildlife is what you have in your garden and connects better with people.
- It's not just for scientists**  
Not everyone is enthused by science, using other forms of appreciation, like art are equally important.
- Be evocative**  
Use sounds, describe sounds encourage people to get out and feel nature. Make it emotional.
- Let's talk about Nature**
- It's for everyone**  
Too often we frame nature, especially connection with nature, as for kids rather than everyone.
- Nature is not a product**  
Avoid frames that present nature as part of a transaction. People are not paying you to do conservation, they donate because they love wildlife.
- Nature is not a barrier to be overcome**  
Avoid stating that “nature is not a barrier to ... jobs / progress / transport” this just makes people think that it is.
- We love it!**  
Share in the joy of nature. Let people know how much you care about it. Don't be afraid to talk about care, beauty, compassion and meaning.

<https://publicinterest.org.uk/FramingNatureToolkit.pdf>

Taking the Long Way Home - <https://www.patagonia.com/stories/taking-the-long-way-home/story-129176.html>

Figure 52: Presentation slide prompting discussion around the importance of words

In relation to integrating citizen science projects, several of the participating instructors had either been involved in a project or were at least aware of what they were. Gaz said, “*we’ve been*

*doing loads of citizen science projects while we've been guiding people up and down the river".* Nia, although was not involved in a regular project, facilitated a day of adventure and learning for a certified B-Corporation on the beach. *"We used the Surfers Against Sewage (SAS) boxes to do sand sieving and recorded the plastics [...] the clients loved it"* (Nia). Eddie fed back from his breakout group discussion, saying they recognised *"not all of the platforms are as easy to use as we would like, which makes them a bit of a barrier"*. Eddie added another barrier to be *"our awareness of what's out there – we don't know"*. Despite showing a sample of projects related to their OAAs, it was recognised that participating instructors needed more direction to identify specific projects in their exact location. For future iterations, a task was added to the course, to prompt instructors to spend a few minutes looking for existing projects in their area that they may like to get involved with (see Figure 53). This would also provide an opportunity to share and discuss with the group how they could integrate the project into their OAA. Enabling time within the course for this kind of search would mean instructors might be more likely to engage with the task, than if left to a later date.

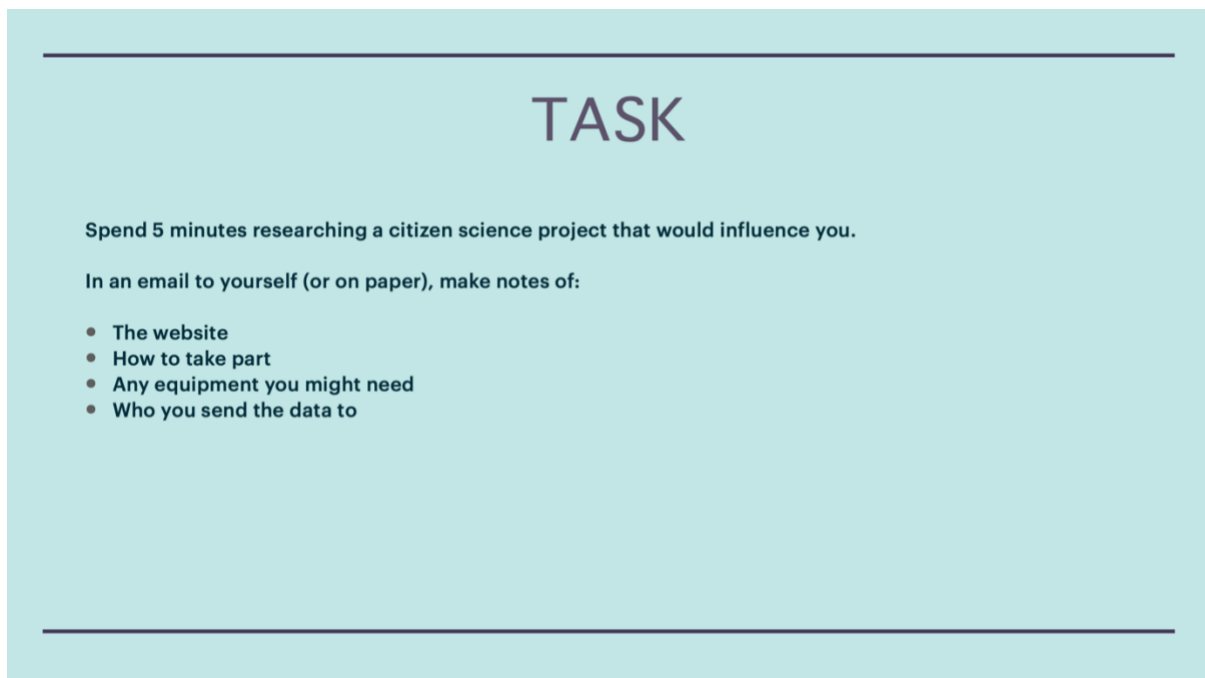


Figure 53: Presentation slide prompting a task for participants to find out about existing citizen science projects in their area

Finally, discussions around the pre-course survey INS results gave some interesting insights into how instructor nature connections are formed. Instructors alluded to their connection being in a state of flux, influenced by their surroundings and their recent activity. Nia explained her response, saying, *"at the time I was going surfing, so in my head I was off to do something that I feel quite connected doing [...] maybe if I was in a supermarket or driving somewhere I*



would have clicked a different button”. Similarly, Dylan said, “*I was sitting in the garden when I answered the survey, so that affected me; sun on my back, sitting on the grass*”. Although not relating the answer to her response, Heather commented, “*the more I can feel my best self, the more I am connected with nature*”. Heather went on to explain, “*a tree is completely a tree [...] when you are with things [non-human nature] which are totally themselves, it helps me to be totally myself*”. These views about human nature connections suggest connection is a fluid state, rather than being fixed.

Pete gave an alternative reason for his feelings of connection with nature, indicating his connection was mediated by his perceived impact. Pete answered, “*I believe we can’t be fully at one with nature because of our impact getting everywhere [...] there’s always greater strides we can do to improve what we’re doing in nature*”.

#### **8.2.4.4 Personal reflection**

The course was challenging to run given the number of people taking part which meant whole group discussion was limited. As I felt the lack of group discussion impacted the course in the previous iteration, I facilitated more tasks and structured time for discussions in break-out groups. This was positively received; however, it highlighted some opinionated characters who dominated the break-out discussions.

There was also a technical issue in the second day of this course which is commented on in the limitations (see Section 10.4). The issue stemmed from the governing body communicating the logistics of the course and resulted in not all participants receiving the link to the second day. I felt I responded to the issue as best I could but for future courses I would make every effort to ensure everyone had access to the course and that I could be responsible for communicating the logistics.

### 8.3 Interim discussion: iterations of course trialling and modification

Trialling the course with outdoor instructors gave an indication of how the course material would be received in practice, whether it met the design principles, and whether any additional design principles needed to be developed. Evaluative data from the course was collected in phase 4 of the research (Chapter 9), where the design principles are reflected on in detail. This discussion however reflects on how instructors took part in the learning experience and how that enhances knowledge about instructor learning preferences. It also reflects on the conceptual model of environmental literacy and how data about instructors self-reported environmental knowledge, attitudes, skills and behaviours contributes to understanding where instructors are in their EL-PACK journey.

#### 8.3.1 Instructor learning preferences

The discussion of expert appraisals highlighted seven assumptions about instructor learning, based on the assumptions of andragogy (Knowles, 1977) and expert beliefs (see Section 6.2.1.4.1). While these were not specifically tested within the course trialling, findings allude to three of the five assumptions being met.

Knowles' second assumption stated, "*The role of the learners' experience is a rich resource for learning*" (1977, p.211). Where instructors were less experienced (see iteration 3) experiences were not reflected upon, however, in iterations 1, 2 and 4, experienced instructors shared lessons they had learnt and used stories to reflect on how they could (or had) integrated environmental activities into their practice. Talking about experiences can be beneficial as it can give instructors a sense of agency and familiarity with the concepts that can aid their confidence and belief in ability to teach.

In some cases, however, (see the reflection on storytelling from iteration 1), instructors recounted their experiences with little active reflection for enhancing future practice. This indicates the need for directed reflection to be coupled with instructor experience and therefore suggests instructors do not have the self-determined traits of heutagogical learners (Canning, 2010; Blaschke, 2012), but rather require a certain element of guided structure. This differs from findings about post-graduate outdoor education students who showed an ability for learning through self-determined reflection (Wood, 2024). It suggests there is a variety of learning preferences among instructors depending on their existing knowledge and interest in the subject; whether learners facilitate their own research and knowledge development, or whether they

benefit from a tutor to explain and guide learning (Canning, 2010). Instructors that have re-entered the education system through a post-graduate programme are more likely to have characteristics of heutagogy as they intend to extend their field of knowledge. Instructors that are not drawn to academia, however, are more likely to have characteristics of andragogy, and therefore require a more structured learning.

Knowles (1977, p.211) third assumption states, “[instructors’] readiness to learn develops from life’s tasks and problems. The pre-course survey indicated that 85% of instructors attended the course with an understanding of the purpose of developing environmental literacy through OAAs (see statement 2 in Table 24). Findings during the course indicated instructors took value from learning about the pressures of OAAs on different ecosystems, and the opportunities instructors have in contributing to developing environmentally literate citizens. Instructors recognised the environmental challenges being faced on a local and global scale, and therefore attended the course in response to these problems, to learn about how they could make a positive impact.

Knowles (1977, p.211) fifth assumption, states, “[instructors’] motivation to learn is directed by internal incentives and curiosity”. Instructors took part in the course voluntarily and were therefore guided by their personal interest in the subject. This supports previous literature about instructor motivations, indicating instructors to be motivated to learn by internal factors as opposed to traditional career progression factors (Barnes, 1999).

### **8.3.2 Instructors’ self-reported environmental literacy**

While each participant had a unique set of responses to the wonky wood diagram the collective answers revealed participants to be most confident in their own feelings, attitudes and emotions than in their knowledge, skills and behaviours for implementing change (see Figure 54). This finding is consistent with previous research of similar nature (e.g. Langley, 2010; and Sutton, 2019).

Interestingly, instructors in the second iteration scored themselves lowest in almost all statements, despite all being from a centre with high environmental standards. The reason for modest responses could be an indication of the Dunning-Kruger effect, as supported by Fuchs (2023) in his conclusions about undergraduate students’ knowledge of environmental sustainability. The Dunning-Kruger effect explains why those with more knowledge have a more accurate understanding of the unknowns and therefore have a better judgement of their actual knowledge. As a result, they are more likely to be modest in their responses about the subject (Dunning, 2011). In contrast, Dunning (2011) explains that people with less expertise in the subject have a “*meta ignorance*” (p.251), meaning they are so unaware of the extent of which they do not know (“*unknown unknowns*”), that they believe they know a lot (Dunning, 2011, p.252).

Instructors in the fourth iteration had on average, the most experience in terms of years spent instructing. This could suggest that either they are competent in their knowledge and facilitation of environmental literacy, or they are so knowledgeable about the OAAs they do run, there is an element of belief that they know far more about environmental facilitation than they do.

The quality of results from self-reported questions about literacy is compromised due to the Dunning-Kruger effect (Mahmood, 2016), however it has indicated some trends about instructor perceptions and perceived strengths and weaknesses among individuals. The need to understand and react to instructor strengths and weaknesses emphasises design principle 6; that a course must be tailored to instructors' existing BiAtT and EL-PACK.

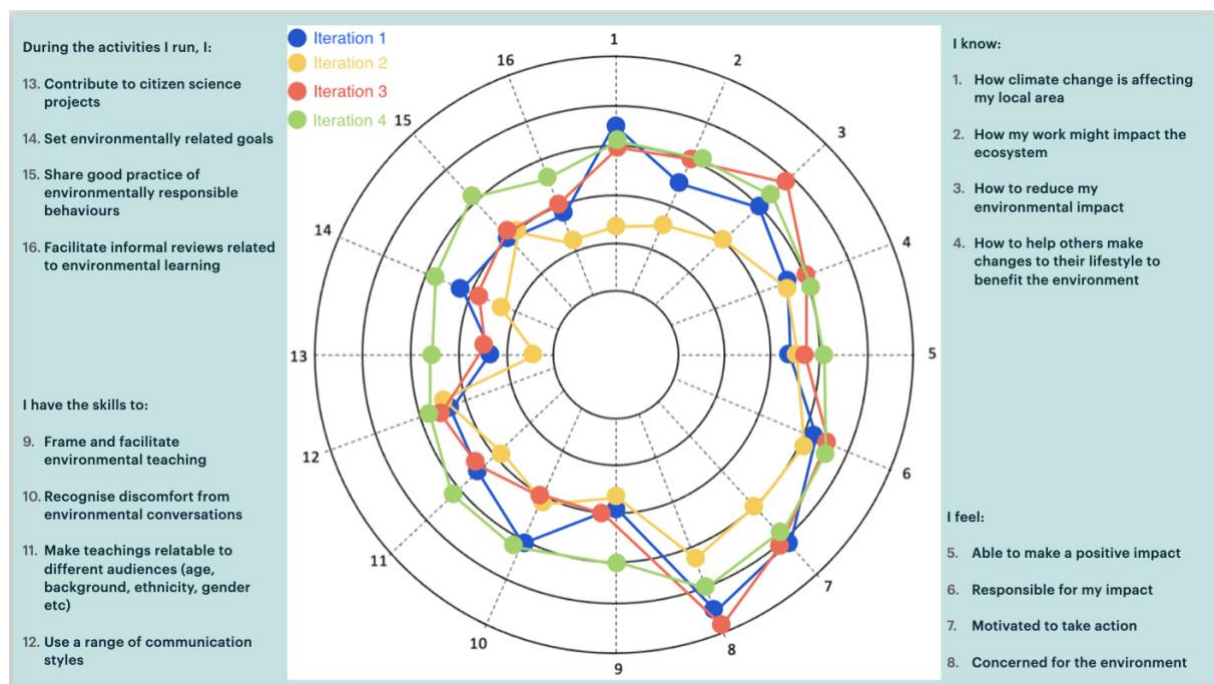


Figure 54: Summary of group responses to the wonky-wood diagrams from the four iterations of course trialling

Statement 5 in Figure 54 stating “I feel able to make a positive impact” was the lowest scoring attitude in all iterations, reinforcing the lack of belief in personal teaching efficacy, as identified in the pre-course survey. Statements 6, 7, and 8 however which were related to responsibility, motivation and concern were, on average, the highest scoring statements. Martínez and Mackenzie (2022) conclude environmental responsibility to be positively associated with feelings of nature connection. This could suggest the variance in instructor responses could be due to instructor sense of connection. However, as evidence from the course trialling (particularly iteration 4) indicated connection to be in a constant state of flux, it is unclear whether beliefs and motivation for environmental responsibility are fixed, or whether they are also context dependent.

Skills and behaviours were overall lower than perceived knowledge and attitudes, however this may have been influenced by the specific questions asked. The trend of answers around behaviours were similar for all iterations, revealing instructors to be least active in participating in citizen science projects, and most active in sharing good practice of PEBs. This supported responses from the pre-course survey.

The trend for goal setting was similar to that of reviewing, suggesting that where instructors do set environmental goals, they also facilitate reviews of environmental learning. Despite goal setting and reflection being a fundamental process of experiential learning (Kolb, 2015), as anticipated by experts in phase 2, instructors did not use them as often as expected. Self-reported results of goal setting and reviewing were relatively low (closer to the inner circle in the diagram), except for those in the final iteration, who suggested goal setting and reviewing were more common. This may reflect the group's experience in the sector and therefore, as George stated in the expert appraisals (see Section 6.2.1.4.3), they may have more headspace to be thinking about adding additional value to their OAAs. This finding also supports the understanding by Priest *et al.* (1992) (cited by Priest, no date), that recreation is predominantly action focused (see Table 2 in Section 2.1.2).

### 8.3.3 Course modifications

There was no content that was removed from the course presentation, however several modules had additional slides and information added to increase clarity. Given the varied experiences of participating instructors, their locations of work, and the activities they were involved with, having too much content was considered far better than not having enough. The additional nature connection activities added after the third iteration for example, were not all reflected on in the fourth iteration as instructors were sharing examples of their own activities. However, in another context where the group is less experienced, it would be useful to be able to share these additional examples.

As seen from the iterations of course trialling and modification, there will always be aspects of the course that can be updated and improved to suit the specific group of participating instructors. Keeping the course alive by referencing the material as living documents, can prevent the course becoming stale and instead ensure that it is updated frequently to promote best practice. This reinforces the importance of the sixth design principle, “The course must have appropriate content to enhance instructor BiAtT and EL-PACK”. To highlight the importance of tailoring the course per group, the principle was refined to state:

“The course **content must be appropriately tailored** to enhance instructor EL-PACK and BiAtT”.

## 8.4 Interim conclusion

This chapter presented the empirical research related to the second aspect of phase three, used to trial and test the feasibility of running the environmental literacy course with outdoor instructors. Of the 34 instructors that took part in the pre-course survey, 32 took part in one of the four iterations of course trialling. The DBR approach worked well, enabling the course to be trialled and improved between each iteration, based on feedback from the participating instructors. Findings contributed to understanding the learning preferences of instructors, indicating support for several of the assumptions about andragogy by Knowles (1977).

Findings about instructors' environmental literacy and EL-PACK highlighted attitudes to be the strongest component, supporting previous findings of a similar nature (Langley, 2010; Sutton, 2019). Instructors' self-reported knowledge was variable, suggesting some instructors to be more modest than others, possibly because they know how much they don't know, as well as knowing the remit of what they do know. Skills and behaviours were consistently the lowest scoring items, reinforcing findings from the pre-course survey that delivery knowledge in a subject context is the weakest area of EL-PACK.

The changes made between the iterations indicated how the course would benefit from being more specific to the audience. For example, modules on storytelling and citizen science were tailored during the iterations to be context specific for the group of instructors. This kind of modification prompted the refining of the sixth design principle to state; "The course content must be appropriately tailored to enhance instructor BiAtT and EL-PACK".

The next chapter details the final stage of empirical research which collected evaluative data about the course through a post-course survey and semi-structured interviews.

## Chapter 9 Phase 4: Post-course evaluation

The four iterations of course trialling in phase 3 (discussed in Chapter 8) collectively produced a revised course presentation. To assess whether the course altered outdoor instructor practice, a post-course evaluation survey was administered at least 3-months after participation in the course. Following this, participants were offered to take part in a follow-up interview.

This chapter presents the methodology, findings and interim discussion of the post-course survey and subsequent interviews.

### 9.1 Methodology

Phase 4 was the final stage of empirical research, conducted to evaluate instructors' engagement in the course. Figure 55 presents the methodology for phase 4 from the overarching design (see Figure 9 in Section 4.3).

The post-course survey was administered to collect data about instructors' perceptions of the course three months after participation. Results from this survey, and from the course iterations were used to influence subsequent interview questions. Interviews were carried out with some of the instructors to elaborate on responses in more detail.

Results from the post-course survey and the interviews were analysed qualitatively to influence course modification.

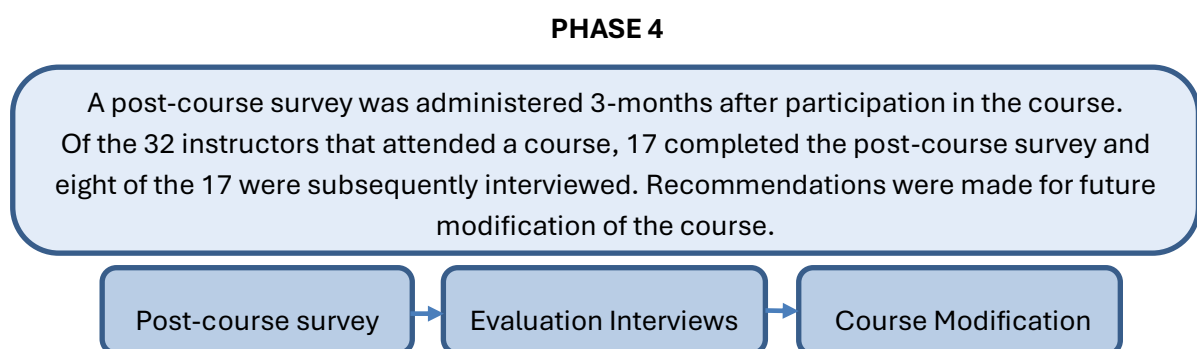


Figure 55: Methodology of phase 4 (from overarching conceptualisation of the research design)

### **9.1.1 Participants for post-course survey**

Of the 32 participants that trialled the course (see participant vignettes in Section 8.2), 17 completed the post-course survey.

### **9.1.2 Data collection for post-course survey**

The survey was hosted by Qualtrics. Emails with the survey link were sent to all course participants no less than three-months after participation in a course. To increase survey response rate, Heerwegh *et al.* (2005) recommend using email personalisation. Emails with the survey link were addressed to each participant by name, and where appropriate, referenced something they had said during the course about a suggested activity, or their job role. Participation in the survey was anonymous, unless participants left their email address for contact about an interview.

### **9.1.3 Survey development**

The post-course survey consisted of 11 questions (plus sub-questions) with a mixture of Likert-style response choices and open questions. The intention of the survey was to get feedback on what participants could remember about the course, if/what had benefitted them, and if/how it had influenced their practice. The survey was not piloted as instructors that had not participated in the course would not understand the context of the questions. The questions were however edited between me and my supervision team before they were administered.

Results from the expert appraisals indicated a course to be of value when it enhances instructors' professional development. To gauge whether the course had influenced instructor development, the first questions asked:

1. "Has participation in the environmental literacy course influenced your instructing work this summer?". Instructors were given a selection of four options to choose from: "Not at all", "Not really", "A little", and "A lot".
2. Depending on their answer to question 1, the survey automatically presented one of two open questions. Question 2a was presented to instructors who answered, "not at all" or "not really". Question 2b was presented to instructors who answered, "a little", or "a lot".
  - a. "Why do you feel the course was not influential?"
  - b. "In what way/s has the course been influential to you?"



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The pre-course survey showed most instructors talked about local environmental concepts such as flora, fauna, geology and plastic pollution, but few included environmentally orientated activities (see Section 7.2.1). Question 3 sought to understand whether the course had influenced instructors to include environmental activities in their OAAs.

3. “This summer, have you included any of the aspects below in your work delivering outdoor activities? Please tick all that apply”. Options included were “storytelling”, “citizen science”, “encouraging pro-environmental behaviours”, “goal setting (environmentally related)”, “nature connectedness activities”, “conversations about nature”, and “conversations about what environmental literacy is”.

To understand whether the barriers against including environmental activities were the same as in the pre-course survey, question 4 asked:

4. “With reference to the ones you didn’t tick (in question 3), what are the barriers that stopped you introducing these environmental concepts during your activities? Please tick all that apply”. Options included were “time”, “my knowledge”, “my ability to teach”, “it’s not what my clients want”, “I’m not interested”, and “other”.

To gauge perceived instructor value of the course, three questions were asked:

5. “How satisfied were you with the knowledge you gained from the course?” This was a Likert-style question with responses going from 1 (very dissatisfied) to 5 (very satisfied).
6. “Did the course meet your expectation?”. Instructors were given a selection of three options to choose from: “Yes”, “No”, and “Not sure”.
7. “How likely are you to recommend this course to a colleague?” 1 star = not at all likely. 10 stars = very likely.

To understand the perceived relevance of each module within the course and to explore how the course could be improved for future participants, four questions were asked:

8. “How relevant were the following modules within the course?” These were Likert-style questions with responses going from 1 (very dissatisfied) to 5 (very satisfied).
  - a. Introduction to environmental literacy
  - b. What is nature
  - c. Participant thinking
  - d. Nature connectedness
  - e. Citizen science

f. Storytelling

9. “Which aspect/s of the course were of most benefit to you?”
10. Which aspect/s of the course were least helpful to you?
11. “How could the course be improved for future participants?”

Data collected was a mixture of quantitative and qualitative. Quantitative data were based on Likert-style questions. Qualitative data were collected from open questions. The survey and responses are presented in Appendix F.1.

#### **9.1.4 Data analysis of post-course survey**

The post-course survey was first analysed exploratively to identify which areas could benefit from greater explanation through the evaluation surveys. For example, in the survey, instructors highlighted that conversations or activities about certain environmental concepts is not what their clients want, therefore, to understand perceptions of client motivations, an interview question was developed to ask, “What are your clients’ motivations for taking part in your activities?”

A second round of survey analysis coded the survey responses against the six existing design principles, as identified from the expert appraisals in Section 6.4. The design principles stated:

1. Participating in an environmental literacy course must enhance outdoor instructor value by contributing to their professional development.
2. The course should aim to initiate environmental change among adventure clients.
3. The course must challenge instructor perceptions of nature.
4. The course delivery must be relatable to outdoor instructors’ learning preferences.
5. The course must use appropriate terminology to reach the intended audience.
6. The course content must be appropriately tailored to enhance instructor BiAtT and EL-PACK.

As recognised in the analysis of the pre-course survey, the mean responses presented from the Likert-style statements do not reflect the full range of participant responses. Where clear anomalies were present I made contact with the relevant instructor (subject to them leaving their email address for future communication for the evaluation interview) and asked them to explain their answer in more depth. Triangulating the data in this way increased its dependability, however mean statements should still be interpreted as indicative rather than definitive.

## 9.2 Findings from the post-course survey (n=17)

The findings of the post-course survey are presented under the headings of the design principles.

A section on course modification is not included after the post-course survey as the course was not modified until data from the interviews were also collected and analysed.

### 9.2.1 Design principle 1: **Participating in an environmental literacy course must enhance outdoor instructor value by contributing to their professional development**

Instructors were given open questions for me to understand how the course had been influential to their practice, and which aspects they considered most beneficial. Three instructors commented on their personal development in the form of increased BiAtT and EL-PACK. Gaz (iteration 4) wrote, “[the course has] given me confidence to talk about the environment more in my sessions”. Similarly, Jack (iteration 4) wrote “[the course improved] my ability to speak to various groups about the environment”, and Oscar (iteration 1) said the course had “given more ways to talk about the environment to children”. Furthermore, Ross (iteration 4) commented specifically on the benefit of the homework task (see Section 8.2.4.3), saying, “creating an environmental activity made me reflect on how to introduce environmental activities to my practice”.

One instructor (Yannis, from iteration 3) commented on how the course had influenced his perception of his own role as a professional. Yannis wrote “[the course gave me an] overall appreciation of how outdoor professionals can play a role in educating and driving behaviour change”.

In response to the question, ‘How could the course be improved for future participants?’, four participants wrote about additional resources; “a toolbox of useful items” (anonymous, iteration 4), “quick and easy pieces of information, games or ideas” (Indie, iteration 4), “a resource of stories for different areas of the country” (Yannis, iteration 3) and “information to go away with and consolidate further” (Pheobe, iteration 2). Another anonymous respondent from iteration 4 recommended, “being more specific about things to do rather than concepts and ideas that you have you work hard to translate into actual activities”. This was interesting as additional resources, nature connection games and further reading were added to throughout the iterations of course trialling, and slides were sent to all participating instructors after the course.

### 9.2.2 Design principle 2: The course should aim to initiate change among adventure clients

Initiating change among adventure clients requires instructors to apply their knowledge of theory and knowledge of facilitation strategies into their practice. Instructors implied an intention for more active facilitation of environmental conversations and activities with their clients, however bridging the gap between intention and action was not always apparent. An anonymous responder from iteration 2 said the course *“has made me think more carefully about the opportunities to introduce environmental topics into the information given to participants throughout the courses they attend”*. Similarly, Pheobe (iteration 2) suggested she would be *“making more of an effort to inform and influence my clients view on the environment and how they impact it in day-to-day life”*, and Ross (iteration 4) added, *“[the course] made me reflect on my practice and I know I need to include more environment input to my coaching.”*

In addition, three instructors alluded to the course challenging their beliefs about how their role can have a more active part in the development of clients’ environmental literacy. Frank (iteration 4) wrote *“[The course is] highlighting the need to educate, not just ‘mention in passing’”*. Bradley (iteration 3) and Nia (iteration 4) mentioned having a different perspective for teaching; *“[the course triggered] deep thinking into the way that the environment and environmental items are taught and spoken about. How best to put that over to people in the positive light and that it should be taught”* (Bradley). Nia added, *“[the course has made me] think about delivering from a different perspective”*.

Despite positive comments reflecting how the course had informed instructors thinking about their delivery and influence on their clients, the integration of activities into OAAs remained relatively low. Figure 56 presents the working definition of environmental literacy (dark blue with rounded edges), and the activity options from question 4 of the survey; “This summer, have you included any of the below in your work delivering outdoor activities? Please tick all that apply” (pink with square edges). The numbers in the pink boxes with square edges show the instructors that included the activity in their practice (e.g., four included citizen science activities).

As seen from Figure 56, nature conversations were the most frequent method of facilitation, carried out by 16 out of 17 instructors, followed by encouraging pro-environmental behaviours. More immersive methods (citizen science, nature connectedness activities, storytelling and goal setting) were less widely adopted by instructors. Barriers that stopped instructors including

these activities were primarily time (11), followed by the belief that it is not what their clients want (10).

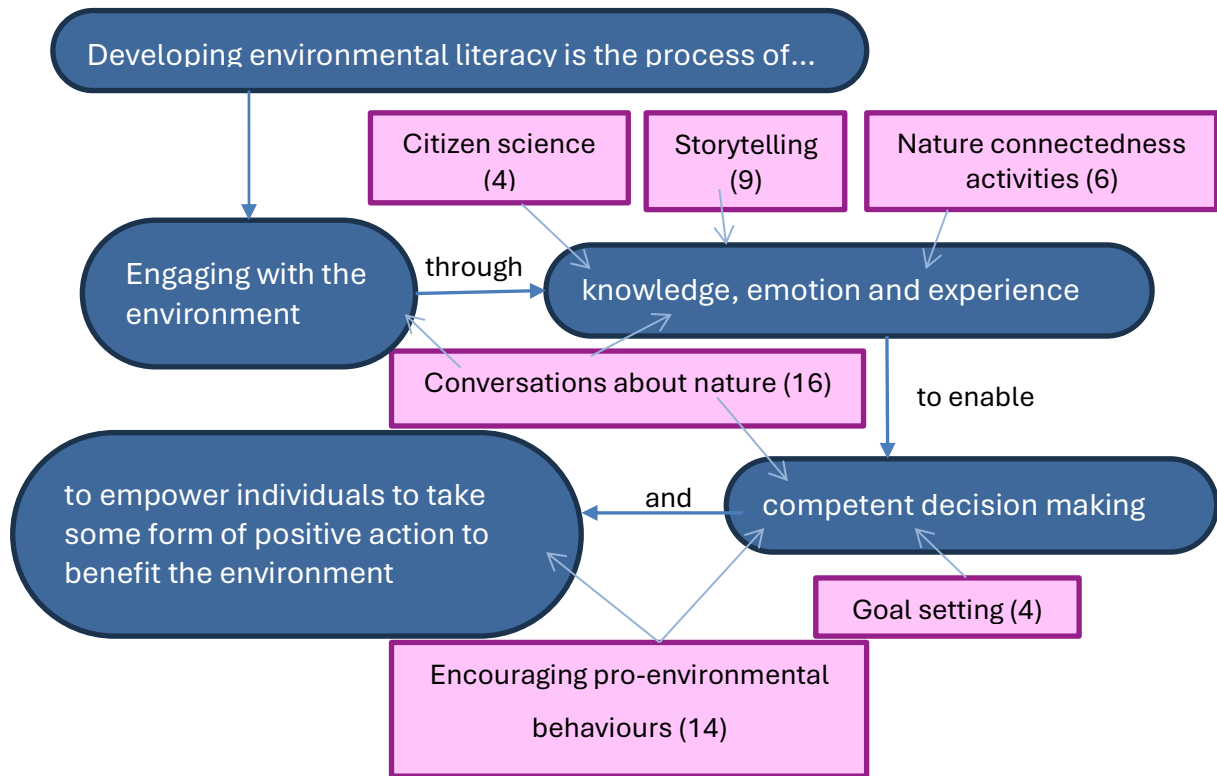


Figure 56: The number of instructors that included environmentally related activities or conversations in their OAAs since participating in the course (pink, square edged) shown against the working definition of environmental literacy (dark blue, rounded edges)

### 9.2.3 Design principle 3: The course must challenge instructor perceptions of nature

Instructor perspectives of nature were not directly assessed in the post-course survey as discussions around the INS suggested feelings of nature connectedness were influenced by recent activity, as well as long-term exposure to nature. Administering the INS again would therefore unlikely reflect participation in the environmental literacy course, given that the survey was administered at least 3-months after participation.

Responses to some of the open questions however did indicate some degree of accountability being taken following participation in the course. Instructors that were also centre managers alluded to changes they were making in their workplace. Indie (iteration 4) suggested she had

reflected on the course with the intention of having a stronger environmental focus, stating “*we’ve looked at building more information around the environment into many of our sessions*”. Similarly, Sam expressed that “*[it has influenced me to] reconsider the design of our courses to ensure we cover environmental areas effectively*”.

In addition to those in a managerial position, an anonymous responder from iteration 4 wrote “*[the course has influenced me to put] more emphasis on wildlife sensitivity [...and has reinforced] the importance of keeping environmental considerations to the fore*”. Furthermore, another instructor noted how the course had influenced his own perception of his workplace, saying “*[the course has made me] aware in depth of my surroundings*” (Jack, iteration 4).

#### **9.2.4 Design principle 4: The course delivery must be relatable to outdoor instructors’ learning preferences**

The post-course survey showed 16 (out of 17) instructors would more likely than not recommend the course to a colleague. While in the survey no instructors specified benefits of the course being held online, being able to recommend participation in the course suggests the teaching format was acceptable.

In response to question 12, ‘How could the course be improved for future participants?’, three instructors suggested an in-person course would be beneficial. Gaz (iteration 4) wrote the course could be improved by having “*more practical involvement*”. Similarly, Oscar (iteration 1) wrote “*a practical walk around*”. Jack (iteration 4) also believed, “*all participants would have ‘connected’ better and got far more out of it if it was face-to-face rather than online*” Jack added that being “*face-to-face with others in similar situations [would be useful, as there is a] big difference between Club Coaches and how they run sessions to (say) Instructors at Activity Centres*”.

For those in iteration 2 who did have some practical involvement, Sam noted, “*the walk was good and a nice opportunity to talk about things, but we didn’t cover much extra content during this time*”. Similarly, Pheobe suggested there could be “*more practical based work*”, and an anonymous responder vouched the course could be improved by “*giving more examples while actually outside*”.

**9.2.5 Design principle 5: The course must use appropriate terminology to reach the intended audience**

In previous phases of research, this design principle has focused on the terminology relating to identity. In the post-course survey however, there was no indication that the ‘instructor’ label was inappropriate. Instead, the issue of terminology related to the academic language used in the course.

In response to question 11, ‘Which aspect/s of the course were least helpful to you?’, an anonymous responder from iteration 4 stated that “*the language used e.g. citizen science and environmental literacy*”. Furthermore, in response to question 12, ‘How could the course be improved for future participants?’, Ross (iteration 4) said, “*change the name of the course as it appears a bit too nerdy!*”. In response to the same question, another anonymous responder from iteration 4 recommended “unpacking the language and being more specific about things to do rather than concepts and ideas that you have to work hard to translate into actual activities”.

**9.2.6 Design principle 6: The course content must be appropriately tailored to enhance instructor BiAtT and EL-PACK**

Participants responded positively about their knowledge acquisition from the course; 16 (out of 17) said they were ‘satisfied’ or ‘very satisfied’ with the knowledge they gained and 14 (out of 17) said their participation in the course had, to some extent, influenced their work. Table 31 shows responses from the three participants who felt the course had not influenced their work.

Table 31: Explanations from the three instructors who stated their participation in the course had not influenced their work. After stating their participation in the course had not influenced their work, the three instructors were asked, ‘Why do you feel participation in the environmental literacy course was not influential?’

| Participating instructor | Reasons as to why their participation in the environmental literacy course was not influential                                                                                           |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Anonymous<br>Iteration 4 | <i>“I have a BEd Hons in Outdoor Education and work with all ages in the outdoors daily, so I am constantly moving up and down the continuum to be able to communicate clearly.”</i>     |
| Pete<br>Iteration 4      | <i>“I was already doing a lot of this, I also missed part of the course due to not having a link sent through along with other candidates so I can't comment on 1/4 of the content.”</i> |
| Yannis<br>Iteration 3    | <i>“I've not had a great deal of opportunity over the summer. Most of my work has been with DoFE groups and I struggle to get them interested in the environment.”</i>                   |

The responses indicate both instructors from iteration 4 to have self-reported EL-PACK and BiAtT about the environment prior to attending the course, therefore the course was not in depth enough to enhance their development. Pete’s comment about missing part of the course is noted in limitation 2.2 in Section 10.4. Yannis from iteration 3 indicated his lack of inclusion of course content in his OAAs to be due to lack of opportunity, rather than due to the course. However, it could have been expected that he may have been able to use different methods of facilitation to engage his DoFE students.

The open questions at the end of the survey (questions 10, 11 and 12) asked which aspects of the course were of most and least benefit, and how it could be improved for future participants. The responses indicated diversity among the participants, and how different aspects of the course suited some instructors more than others. For example, two participants wrote “*story telling*” as the most beneficial module (one participant from the first iteration, and one from the fourth iteration) and another two wrote “*story telling*” as the least helpful module (one participant from the second iteration, and one from the fourth iteration).

A summary of module relevance is presented below in Table 32. Averages were calculated from the Likert-style questions where 1 = extremely irrelevant and 5 = extremely relevant. The highest score for the averages is therefore 5. Responses of ‘can’t remember’ were removed from the calculation of averages.



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The most relevant module varied per iteration; for iteration one, modules on ‘what is nature’, ‘participant thinking’, and ‘citizen science’ were rated highest. For iteration two, it was ‘participant thinking’, iteration three was ‘storytelling’, and iteration four ‘introduction to environmental literacy’. The highest rated overall were ‘storytelling’ and ‘participant thinking’.

All modules were relevant for all iterations, indicating the course was appropriately tailored to suit the majority of instructor needs. The lowest ratings came from those in iteration 4, who were the more experienced instructors. On average however, all modules scored over four out of five for relevance.

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Table 32: Post-course survey results showing a summary of module relevance by iteration

|                    | Introduction to EL   | What is Nature       | Nature Connectedness | Participant Thinking | Citizen Science      | Storytelling         |
|--------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| <b>Iteration 1</b> | <b>Average = 4.0</b> | <b>Average = 5.0</b> | <b>Average = 4.5</b> | <b>Average = 5.0</b> | <b>Average = 5.0</b> | <b>Average = 4.5</b> |
| Oscar              | 3                    | 5                    | 4                    | 5                    | 5                    | 4                    |
| Anonymous          | 5                    | 5                    | 5                    | 5                    | 5                    | 5                    |
| <b>Iteration 2</b> | <b>Average = 4.0</b> | <b>Average = 4.0</b> | <b>Average = 3.7</b> | <b>Average = 4.7</b> | <b>Average = 4.0</b> | <b>Average = 4.5</b> |
| Anonymous          | 4                    | 5                    | 4                    | 5                    | 4                    | Can't remember       |
| Sam                | 5                    | 4                    | 4                    | 5                    | 4                    | 5                    |
| Pheobe             | 3                    | 3                    | 3                    | 4                    | 4                    | 4                    |
| <b>Iteration 3</b> | <b>Average = 4.0</b> | <b>Average = 4.5</b> | <b>Average = 4.5</b> | <b>Average = 4.0</b> | <b>Average = 4.0</b> | <b>Average = 5.0</b> |
| Yannis             | 3                    | 4                    | 4                    | Can't remember       | 4                    | 5                    |
| Bradley            | 5                    | 5                    | 5                    | 4                    | 4                    | 5                    |
| <b>Iteration 4</b> | <b>Average = 4.2</b> | <b>Average = 3.6</b> | <b>Average = 4.0</b> | <b>Average = 3.9</b> | <b>Average = 3.9</b> | <b>Average = 3.6</b> |
| Gaz                | 4                    | 5                    | 5                    | 5                    | 4                    | 5                    |
| Anonymous          | 3                    | 4                    | 4                    | 3                    | 4                    | 2                    |
| Pete               | 3                    | 3                    | 5                    | 4                    | Can't remember       | 4                    |
| Ross               | 5                    | 1                    | 1                    | 2                    | 2                    | 1                    |
| Anonymous          | 4                    | 4                    | 4                    | Can't remember       | Can't remember       | 3                    |

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|              | Introduction to EL | What is Nature | Nature Connectedness | Participant Thinking | Citizen Science | Storytelling |
|--------------|--------------------|----------------|----------------------|----------------------|-----------------|--------------|
| Jack         | 3                  | 2              | 2                    | 2                    | 3               | 2            |
| Nia          | 5                  | 5              | 5                    | 5                    | 5               | 5            |
| Ken          | 5                  | 5              | 5                    | 5                    | 5               | 5            |
| Frank        | 5                  | 3              | 4                    | 4                    | 3               | 5            |
| Indie        | 5                  | 4              | 5                    | 5                    | 5               | 4            |
| <b>Total</b> | <b>4.1</b>         | <b>4.3</b>     | <b>4.2</b>           | <b>4.4</b>           | <b>4.2</b>      | <b>4.4</b>   |

## **9.3 Evaluation interviews**

### **9.3.1 Participants for evaluation interviews**

Thirteen instructors left their email in the post-course survey to be contacted for an interview. Of the 13 that were emailed, eight took part in the follow-up interview: one from the first iteration, two from the second, none from the third, and five from the fourth. The five that did not take part did not respond to the email.

Table 33 shares short vignettes about the participants.

Table 33: Vignettes of instructors who took part in post-course follow-up interviews

| <b>Participating instructor</b> | <b>Experience</b>                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oscar<br>Iteration 1            | A senior instructor and tutor at a semi-rural outdoor centre. The centre offers day and half-day adventures, as well as multi-day residential trips for schools, families, and corporate groups. Age bracket 25-35.                                                      |
| Frank<br>Iteration 4            | A club coach at a local kayaking club in a rural location. Age bracket 55-65.                                                                                                                                                                                            |
| Phoebe<br>Iteration 3           | A climbing instructor and coach at a rural outdoor centre. The centre offers mainly skills-based courses to equip people to take part in the activities themselves, without an instructor. Age bracket 25-35.                                                            |
| Sam<br>Iteration 3              | A centre manager, instructor, and coach. Working less on the activity side, Sam runs the centre, designs the courses, and works to maintain their B-corporation status. The rurally based centre mainly offers skills-based courses. Age range 35-45.                    |
| Indie<br>Iteration 4            | Managing director and canoe and kayak guide at an urban based activity centre. Indie runs half full day sessions as well as weekly litter-pick activities and uses citizen science projects to monitor water quality and non-native invasive species. Age bracket 35-45. |
| Jack<br>Iteration 4             | Formally a HGV driver, transporting chemicals. Now a surf-lifesaving coach and, although the qualification has lapsed, was a canoe and kayaking instructor. Jack lives and works in an urban location with a high industrial presence. Age bracket 65-75.                |
| Ken<br>Iteration 4              | A mountain leader and mountaineering instructor. Ken facilitates courses in the hills to help people learn about the place they are in. Ken uses stories, particularly of flora, fauna, and land change to engage and teach his clients. Age bracket 55-65.              |
| Ross<br>Iteration 4             | An activities manager at a centre and chairperson of local canoe club in a semi-rural location. The centre offers trauma-based care and outdoor therapy as well as school groups. Age bracket 45-55.                                                                     |

### **9.3.2 Data collection for evaluation interviews**

Personalised emails were sent to 13 instructors who completed the survey and gave permission to be contacted regarding an interview. Interviews were all held online using Microsoft Teams, at a day and time chosen by the participant within January and February 2024.

Semi-structured interviews were used to explore feedback on participation in the course and to explain some of the findings from the post-course survey. Semi-structured interviews were chosen over structured or open interviews to enable flexibility and freedom while maintaining consistency with topics of questions (see Bryman, 2012). As in phase 2 for the expert appraisals, a dyadic or focus approach was considered to reduce the perception of power difference between the interviewer (me) and the interviewees. This consideration was dismissed however as the research sought individual feedback, rather than group discussion.

### **9.3.3 Interview questions**

The semi-structured interviews consisted of seven questions. Some of the questions were asked in response to design principles, while others were asked based on client responses to the course surveys. The questions were asked when the time was right within the interview, rather than necessarily being asked in the same order.

Results from the post-course survey suggested the course had contributed to instructors' professional development (design principle 1) by enhancing confidence, content knowledge and pedagogical and andragogical knowledge. It was unclear however whether these factors were considered suitably valuable outcomes.

Two questions were asked in the interviews to gain a deeper understanding of what instructors perceive as 'value', as per design principle 1.

1. "What was the most valuable part of the course for you (and why)?"
2. "What makes general CPD/training courses valuable to you (and why)?"

The pre- and post- course surveys both found that a barrier stopping instructors talking about environmental concepts is the belief that it is not what their clients want. To understand more about perceived client motivations, an interview question asked:

3. "What are your clients' motivations for taking part in your activities?"

The pre-course survey highlighted that most instructors believed the activities they lead change the way their clients value nature (see statement 3 in Table 24 in Section 7.2.5.2). To understand what instructors feel they do to influence these values, and whether these are believed to influence behaviour, an interview question asked:

4. “In what ways do you think the activities you lead change the way your clients value nature?”

Both the pre- and post- course surveys, and the qualitative data from the course trialling alluded to instructors finding it easier to talk about local environmental concepts, rather than global. Two questions were asked to understand more about instructors’ EL-PACK and BiAtT about local and global concepts in the form of natural features and human impacts.

5. “How competent/confident are you talking about nature during your activities?”
6. “How competent/confident are you talking about human impact on the natural environment during your activities?”

Several instructors alluded to making changes in their practice having attended the course. To understand whether certain modules were more easily applied than others, and what barriers prevented their application, the interview included the question:

7. “Have you used any aspects of the course in your job role?”

### 9.3.4 Data analysis of evaluation interviews

Interviews were automatically transcribed on Microsoft Teams. Transcripts were imported to NVivo where I carried out two rounds of coding. The first round of coding was inductive; I generated themes from the data based on participant responses to the interview questions. The second round of coding was deductive; I used the themes found during the first round of coding to see where themes existed across the different interview questions. See Appendix F.2 for examples of coded transcript.

Figure 57 presents the seven interview questions (shown in boxes along the top). Under each question are themes generated from participant responses. The thickness of the outline indicates the prevalence of the response among the participants (i.e. a thicker outline indicates multiple people reiterating the same point). The boxes are also coloured to indicate themes that arose across multiple codes. Boxes outlined in grey are not related to each other. All other

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colours relate to cross-code themes (e.g. all boxes outlined blue relate to references of personal development).

The findings from these interviews are presented under the five themes which emerged in response to more than one question: personal development, relating to learning through seeing, the experience, barriers, and resources. Extracts from the interviews are used to present the voices of the participants. Findings are presented under the cross-question themes as opposed to the interview questions as they indicate recurring importance.



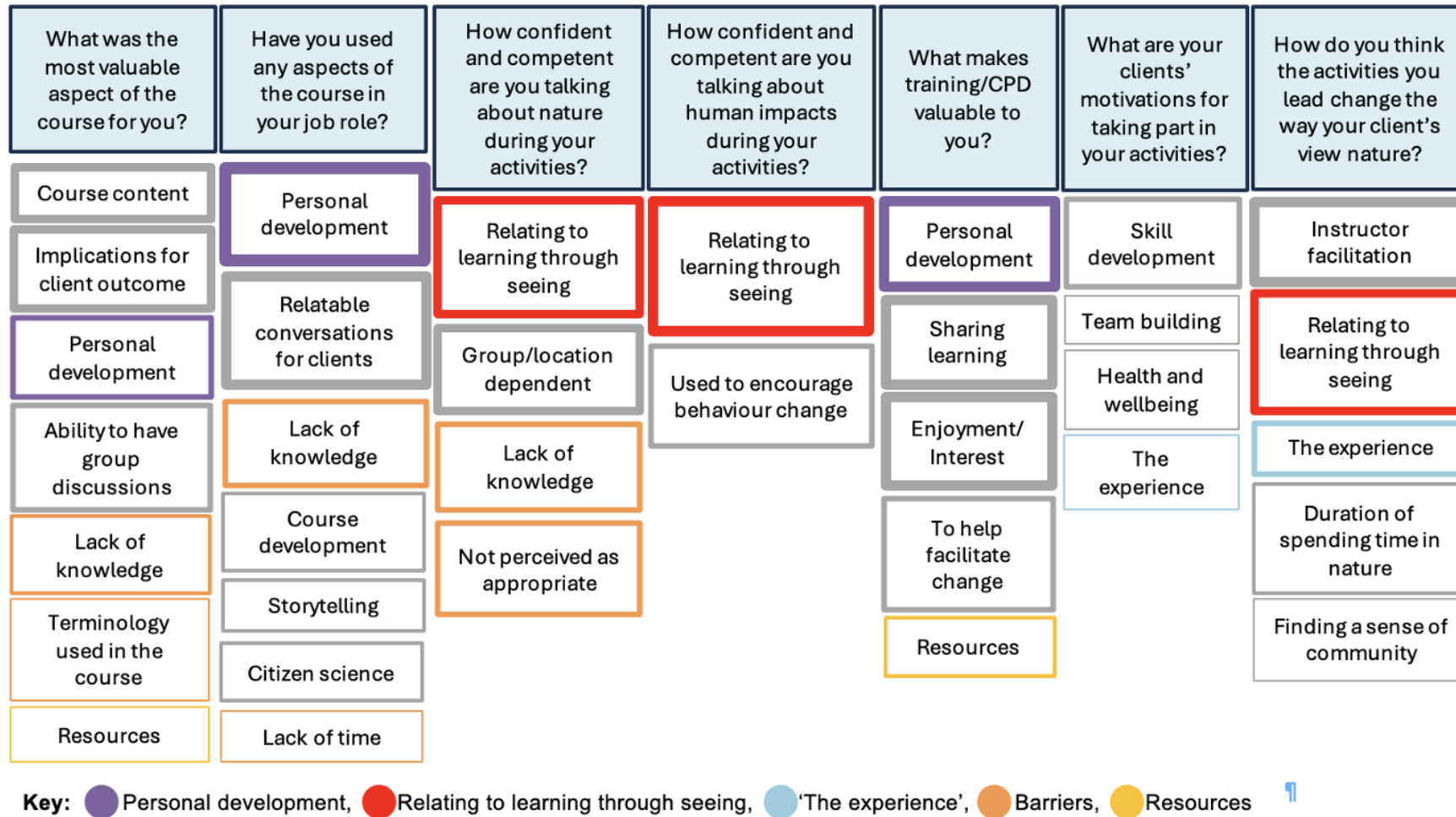


Figure 57: The seven interview questions with their corresponding themes generated inductively from the participant responses. The thickness of the outline indicates the prevalence of the theme (a thicker line shows it was mentioned by multiple participants). colours (apart from grey) indicate where a theme occurs in response to more than one question

## 9.4 Findings from the evaluation interviews (n=8)

### 9.4.1 Theme 1: Personal development

In contrast to value being perceived through professional development (as per the expert appraisals), instructors responded to questions about course value and course impact ('What was the most valuable aspect of the course for you?', 'What makes training/CPD valuable to you?' and 'Have you used any aspects of the course in your job role?') with references to personal development (see Figure 57).

Instructors explained they attended CPD courses to "*look for more information*" (Jack, iteration 4), to "*increase knowledge*" (Frank, iteration 4), and "*improve coaching*" (Oscar, iteration 1). Sam (iteration 2) highlighted the importance of knowledge gained from CPD leading to change, stating; "*If I spend time on something and don't really end up changing anything as a result of it, then that's not as valuable*".

In addition, Indie (iteration 4) commented on personal development being a way of meeting a standard and dealing with "*imposter syndrome*". Indie stated, "*If you've done that training, that gives you a little bit of confidence that you have been taught stuff and you do know what to do [...] I feel a little bit more confident that at least one other person has deemed that I am in fact competent*".

In terms of specific personal development gained from taking part in the environmental literacy course, Pheobe (iteration 2) stated the course gave her "*more awareness of how to approach people and get people involved with the environment*". Furthermore, Oscar (iteration 1) stated that attending the environmental literacy course, "*built up my confidence talking about it [and] made me realise that actually you can have a bigger impact*". Similarly, Indie (iteration 4) said it gave her "*a much better understanding of the breadth of what could be included [and] more confidence to talk about those things more openly*".

### 9.4.2 Theme 2: Relating to learning through seeing

Relating to learning through seeing was raised when participants were asked about their confidence and competence in talking about nature and human impacts during their activities. The concept expressed a view that it is easier to talk about environmental concepts (nature or human impact) when the subject can be pointed out and shown to clients. This theme also arose

when instructors were describing how they believe the experiences they lead change the way their clients value nature.

Ken (iteration 4) explained how connections are made between something you have seen, or somewhere you have been and future engagement; *“If you’ve been on holiday to a country and it’s in the news, your eyebrows raise don’t they? You say, “I’ve been there, what’s going on?” And it’s the same with nature”*. Several instructors commented on how they used locally visible subjects to engage clients about bigger challenges which they (the clients) might think about elsewhere. Oscar (iteration 1) explained how he introduced the subject of light pollution with his clients from the top of a hill on an evening walk. Oscar said, *“you can quite clearly see the rural and urban sides [...] you can see stars and one side of hill, but you can’t see the stars on the other side of the hill”*.

Similarly, Jack (iteration 4) spoke about the local area he works in, explaining that *“you’ve got the steelworks, and you can see what it’s pumping out into the air. The next thing, you can see all the plastic and everything becoming washed up on the beach”*. Jack went on to add *“it makes most sense to teach children about that type of an environment, because they can see it with their own eyes”*. In terms of this kind of environmental engagement influencing behaviour change, Jack added, *“when they can see it in front of their eyes, they can take it away with them and think, you know, what can we do to stop it?”*.

In less industrial areas, Frank (iteration 4) explained how *“you can’t always see human impacts but then look for the layers and look for the small impacts that are hiding the big impacts”*. In terms of engaging clients in conversations about non-human nature, however Frank believed, *“I don’t think you need to specifically discuss the vegetation, or the bits of the environment. I think you just need to make it accessible and let them see. Let them just open their eyes”*.

In addition to the impact of clients seeing a different perspective of nature, or seeing and recognising human impacts, Indie (iteration 4) highlighted how the impact of seeing can extend to a wider community. Referring to paddling on an urban river with a client group and litter picking along the way, Indie says,

*When other people and passers-by see groups of people litter picking, and see the environment actively being looked after, sometimes they ask about that and are obviously interested [...] when we don’t have a good sense of community and we don’t necessarily have a sense of pride in some of these urban environments, I think even a little bit of that happening is probably positive.*

Despite instructors commenting on the influence of ‘seeing’ damage or change, only one instructor commented on their direct impact they observed from their role in the outdoor sector. Pheobe (iteration 2) explained,

*“As a climbing instructor, people have paid for a course, and they want to climb regardless of the weather. But I really don't like people climbing on grit when it's wet, 'cause it removes that outer layer of the gritstone. It's basically a hard sandstone and once that's gone, then it doesn't really recover from that. So, we as instructors kind of have sacrificial areas [that we choose to use], but I'd rather it didn't have to be that way at all”.*

Pheobe is alluding to the challenge in balancing consumer and environmental demands. Her view of her impact demonstrates her consideration for an ethical dilemma and the ways in which she mitigates a broader impact. Pheobe used the impact of seeing to encourage future best practice saying, *“I try to explain [the problem] as much as I can to the clients”.*

#### **9.4.3 Theme 3: ‘The experience’**

‘The experience’ describes the action of taking part in an OAA. It includes all aspects of involvement; practical, sensual, and skilled. The theme arose through questions about client motivations for taking part in the activity and instructors’ beliefs about the activities they lead changing the way their clients value nature.

The perception of client motivations varied, with little reference to environmental learning or awareness. Perceived motivations for taking part included *“team building”* (Oscar, iteration 1), *“skills development”* (Sam and Phoebe, iteration 2), *“personal wellbeing”* (Ross, iteration 3) and *“for the experience”* (Ross, iteration 3).

Oscar (iteration 1) stated, *“I'd say the environment stuff is kind of second for them [the clients], but for me and especially a few of the instructors, we try and push that environmental stuff a bit further up the agenda”.* Where clients are only interested in taking part for ‘the experience’ however, Ken (iteration 4) suggested environmental learning may be lost; *“sometimes when you talk to the general public about things, they're very polite and they listen, but they're not interested. That's not why they go”.*

Further to participating in ‘the experience’, Ross (iteration 4) commented on some clients *“just wanting to pay for experiences to get the Instagram shot, they want to say they've done it and then they want to walk away”.* Ross recognised however, that this is not the incentive of all clients,

and that some do *“just enjoy being in the outdoors in nature, in the green and blue spaces”*. Ross added *“it’s that feeling of going out walking around the park or walking round the lake, it just feels nice, doesn’t it?”*

Instructors alluded to ways they believe the experiences they lead change the way clients value nature. Some of these were credited to ‘the experience’, while others were more actively taught or facilitated. Frank (iteration 4) felt it was *“the whole package”* that influenced client values of nature, explaining *“it’s just the experience of getting on the water for a lot of people”*. Frank went on to talk about an interaction between a group of boys and a shoal of fish nibbling their toes in a river; Frank described the situation as *“organic”*, saying, *“the way it happened, I didn’t really initiate it to be honest, I just helped it along”*.

Later in the interview Frank reinforced his beliefs about the experience itself having a greater influence than anything instructor facilitated. Frank said

*“It’s not always about what you say, or the stories you’re telling or anything like that, sometimes it’s just exposure. Sometimes it’s just about putting them into an environment where they feel safe and comfortable doing what they’re doing and they’re there and they’re experiencing it”*.

While Frank showed the most extreme case of letting the experience speak for itself, Sam (iteration 2) and Ross (iteration 4) also suggested the experience as being the main factor for raising awareness and inspiring behaviour change, but that it is supplemented by the instructor. Sam stated, *“we’re making people aware these things exist and then they actually have a such fantastic time that in the future they will just naturally end up wanting to look after it or enjoy it or share that with other people in the same way”*. Similarly, Ross alluded to how experiences can shape how clients value nature, but also referenced how unplanned moments during the activity can be used to engage in environmental conversations and his ability to react to client questions. Ross explained, *“it does change the way young people think because [...] there’s lots of things that they will say, wow, what’s that? And it just gives you great opportunities to try and explain and fit into the natural world”*.

#### **9.4.4 Theme 4: Barriers – ability, motivation, opportunity**

Time and the ‘belief that it is not what my clients want’ were listed in the post-course survey as the two most prominent reasons why instructors’ did not include certain environmental literacy activities in their practice (see Section 9.2.2). In the interviews, lack of knowledge was talked

about most often, though lack of time and perceived appropriateness were also mentioned. These were brought up with reference to the limitations of course value, reasons as to why aspects of the course had not been applied in instructors job roles, and reasons why instructors did not feel they were confident or competent to talk about nature during their activities.

Several participants referred to not having up-to-date or correct knowledge about local and global environmental issues and possible solutions. Frank (iteration 4) felt that *“to do more than what I'm doing, [...] I need a bit more knowledge, I like to be correct about what I'm doing”*. Similarly, Indie (iteration 4) stated that,

*“I still have a problem with knowing what's best sometimes because you don't want to talk about using biodegradable cups over reusable cups over paper cups unless you actually know which one has the best footprint. I'm still missing a little bit of a resource in terms of what's the consensus amongst the scientific community [...] I'm still a bit apprehensive of being an advocate for best practice on some of those things. Just 'cause I don't know what the right thing is”*.

The impact of the course was reduced where instructors felt they had insufficient time to implement change into their workplace. Two participants referenced feelings of guilt for not doing more, while commenting on the fast-paced nature of their jobs and their multiple priorities.

Sam (iteration 2) explained,

*“When you're busy, you'll do a course like that and then you have lots of good ideas, but you don't necessarily put the time aside to actually action it. I guess we're probably guilty of that because we're trying to prioritise lots of things”*.

Similarly, Ross (iteration 4) admitted,

*“I'm feeling a little bit guilty that I haven't thought about it as much as I should have done. I guess in a busy working environment it's not on the forefront of what we do. I construct on safety a lot. So, safety comes at number one. But I totally believe that the environment is second to that. It's prioritising”*.

While not mentioning feelings of guilt, Indie (iteration 4) also vouched for not yet implementing as much as she would like to, saying;

*“I think we haven't yet had the opportunity to kind of integrate that into what we're offering customers. What is on the website and all that is stuff I need to really think*

*about in the next couple of months [...] in terms of timing for us, adding anything new has to happen over the winter”.*

Interestingly, Sam, Ross and Indie are all managers within their respective organisations. As they have responsibilities that lie beyond the instructor role, implementing change for them represents something beyond their activity facilitation and more towards changing course material. Sam went on to mention,

*“I’m gonna write a lot of delivery of things myself, but we have since built this thing called our ‘Environmental Risk Benefit Analysis’. We’re trying to just get each course and go- ‘how can we improve how we deliver?’, you know, make people aware that we’ve really considered this a little bit more in terms of how we deliver it and the methodology”.*

Instructors showed an element of wariness about ‘pushing’ environmental information or conversation on to those who are potentially not interested. Oscar (iteration 1) stated, *“I’m definitely much happier talking to them about it, but it also depends on what type of group I have and how they interact with it to how much I push talking about nature”*. Ken (iteration 4) concluded *“it’s about sparking that interest, but it’s different with different groups”*. Further to clients’ reception of environmental conversations and activities, Ross (iteration 4) indicated that success also requires passionate instructors; *“If you’re planning on enforcing it, it might seem unnatural. You can only really talk about things you’re passionate about and that mean something to you. That passion then will rub off and possibly inspire others”*.

A final barrier which was also mentioned in the post-course survey was that of language or terminology. Ross commented on the title of the course potentially putting people off:

*“When I was trying to explain what I’d done to other people, if you bear in mind that I deal with a lot of people that aren’t particularly high-level academic people, they said, ‘What?! What the hell is that?!’ It sounds a bit nerdy. So as a name environmental literacy, I think it just sounds very highbrow. I think if it had a snappier, easier to understand name, then it would be more accessible”*

#### **9.4.5 Theme 5: Resources**

Having the course slides sent to instructors was noted as a useful resource to refer to, to prompt recollection of course discussion. There were also however, requests for additional resources to aid implementation.

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Ross (iteration 4) specifically asked, “will there *be some resources for individuals and volunteers that would help us to train our staff and train our volunteers?*”. Oscar (iteration 1) also pointed to the benefits that resources could bring, stating that “*having a poster or a leaflet or little fact sheet or something about different aspects that I can pull up and go, ‘there you go’, and pass it on.*”

Several instructors appreciated the value in sharing resources to make it “*easier to teach*” (Jack, iteration 4), and so save instructors’ or businesses having to create their own ideas.

Sam (iteration 2) mentioned,

*“What could be quite nice is if there was a support group or a Facebook group or just a monthly mailer about some ideas and what other people are doing. It’s that- ‘oh that’s a nice idea, let’s copy them’, you know, it’s a great thing to do is copying”.*

Likewise, Indie (iteration 4) said,

*“I haven’t implemented any of these plans yet, so if anyone else has and there’s easy hacks or tricks or worksheets, please point me in that direction. [...] Having some kind of forum or page or group or- somewhere we could share some of the ideas or briefings or lessons that worked really well [...] somewhere that, that stuff exists together would be a useful resource”.*

The desire for easily accessible resources, and the idea of copying highlights a point made by Ken (iteration 4), that “*people want the solutions, they want answers. They want to know what to do. They want to know how to do it*”.



## 9.5 Interim discussion

Findings from the post-course survey contributed to understanding the importance of the design principles, and whether the environmental literacy course had been successfully designed to meet the principles. The evaluation interviews gave deeper explanations of some of the responses that arose from the pre-course survey, the course trialling and the post-course survey. They highlighted themes which:

- 1) Increase our understanding of what instructors seek to gain from attending training courses
  - a) Personal development (theme 1, design principle 1)
  - b) Additional resources (theme 5, informed the development of a new design principle 7)
- 2) Increase our understanding of instructor beliefs about environmental literacy development through outdoor adventure activities (OAAs)
  - a) Instructors believe the experience of immersing oneself in nature is the foundation for building environmental connections for clients (theme 3, underpins the importance of design principles 2 and 3)
  - b) Instructors believe components of environmental literacy (knowledge, attitudes and skills) are most effectively developed when clients can physically see the subject that is being talked about. E.g., talking about the importance of taking litter home and recycling appropriately is more relatable for clients when they can see plastic pollution during their activity and contribute to its clearing (theme 2, design principle 2)
- 3) Increase our understanding of instructor ability, motivation and perceived opportunities for integrating environmental conversations or activities into their job role.
  - a) Lack of environmental content knowledge (theme 4)
  - b) The belief that it is not what clients want (theme 4)
  - c) Time is prioritised in other ways so that managers lack time to make course changes, and instructors lack time during the activity to pause for environmental conversations or activities (theme 4)

These themes have contributed to understanding the characteristics of an effective environmental literacy course. This interim discussion presents how the findings have influenced the understanding and refining of the design principles, and how they have influenced course modification.

**9.5.1 Design principle 1: Participating in an environmental literacy course must enhance outdoor instructor value by contributing to their professional development.**

For experts interviewed in the appraisals (phase 2), instructor value was about *professional* development; making instructors more employable and enhancing their practice in a way that benefits the OAA and their clients. The post-course survey responses and interview findings however, indicated *personal* motivators to be the main incentive for instructor learning. This reinforces previous findings by Barnes (1999) who identified instructors to be motivated by internal factors rather than traditional career progression.

The role of training through voluntary or paid courses is a recognised means for keeping up to date with practice and advancing one's knowledge. Friedman and Phillips (2004) however, recognise the differing views about the value of training courses from professional associations versus professionals. In contrast to the findings of this study, Friedman and Phillips (2004) found professionals viewed training courses as a means of keeping up-to-date and building one's career. These outcomes lean towards a more professional development focus than indicated by instructors. Professional associations on the other hand valued training courses in a more holistic light; commenting on professional development outcomes (such as gaining career security and verifying competence) as well as adding a means for personal development and lifelong learning (Friedman and Phillips, 2004)

The distinction between what constitutes personal development and what constitutes professional development is unclear. Instructors motivations are largely influenced by internal factors such as personal skill and knowledge acquisition, experiencing nature and achieving self-directed goals (Lewis and Kimiecik, 2018), as opposed to external factors such as career progression (Barnes, 1999). In recent years however, there has been growing support for the outdoor sector being viewed as a profession rather than as a hobby (Cox, 2022), therefore value could be expected to constitute a greater professional development, as well as in a personal capacity.

Many outdoor instructors begin their work in the sector because of their enjoyment of OAAs (Stott *et al.*, 2014; Wagstaff, 2016; Lewis and Kimiecik, 2018). As a result, instructors have struggled with the concept of developing a 'professional identity' (White and Groves, 2023) as the boundaries between personal and professional, leisure and work are so merged (Filho, 2010). The instructor uses their positive personal characteristics and physical skill, developed primarily

through leisure experiences, to facilitate high quality, professional OAAs. However, instructors often represent their profession in their leisure time too by wearing company clothing (Filho, 2010). The distinction between personal and professional characteristics for instructors is therefore interlinked. For training purposes, a course should consider both the individuals in their personal capacity and the instructors in their professional capacity. As stated by Allin and Humberstone (2006, p.135) “*professional development in outdoor education cannot be understood as divorced from the individual outdoor educators themselves*”. Although written for outdoor educators, Allin and Humberstone (2006) write in response to the connections between work and leisure and therefore the same principle about professional development could be stated for outdoor instructors.

A modification to the design principle was made to account for value being perceived as improving both personal and professional development. The new principle states:

‘Participating in an environmental literacy course must enhance outdoor instructor value by contributing to their **personal and** professional development’.

### **9.5.2 Design principle 2: The course should enable environmental change among adventure clients**

The environmental contradiction explored in the literature review highlighted the rhetoric-reality gap between environmental outcome expectancy and the potential for actual environmental outcomes (see Section 2.1.3). Several instructors indicated that participating in the course had encouraged them to build on the OAA experience by facilitating conversations and activities that would develop clients’ knowledge and skill (see Section 9.2.2). However, just as one of the experts believed such facilitation could be inappropriate for OAAs in the tourism market (see expert Connor’s comment in Section 6.2.1.2), one instructor also felt there could be too much environmental focus in OAAs, where clients want skill-based learning (see Pheobe’s comment in Section 8.2.2.2).

In terms of instructor perceptions about client expectations, in the pre-course survey 12 of 34 instructors believed introducing concepts such as pollution, global warming, citizen science and nature connectedness were not what clients wanted during participation in an OAA. In the post-course survey, the question was tailored to reflect the learning modules of the course, rather than global concepts, however nevertheless, 10 of the 17 responses indicated goal setting, citizen science and nature connectedness activities were still not what their clients would want. These findings support the assumption by expert Connor, that clients of OAAs in the tourism

market have different drivers to those evidenced in outdoor education (see Section 6.2.1.2). However the finding contrasts existing literature which indicates clients want to connect with nature (Giddy and Webb, 2018; Ponte *et al.*, 2021; Miller *et al.*, 2023) and minimise their contribution to environmental decline (Novotná *et al.*, 2024). It could be questioned in this regard whether clients want to connect with nature passively (i.e. by being present and engaged in the activity) or intentionally, through acquiring knowledge and skills and actively engaging one's senses. This contradiction around client expectations and preferences would benefit from further research.

For expert Connor, active facilitation of environmental content was not only perceived as potentially inappropriate for the tourist market, but also unnecessary, as he believed the power of the experience was sufficient for instigating change (see Section 6.2.1.2). The power of the experience was also credited by instructors in the pre-course survey (see statement 14 in Table 23) and explained in the evaluation interviews (see Section 9.4.3). One reason for instructors having this belief may be due to their own experiences of awe in nature which for some, may have been the catalyst for pursuing instructing as a lifestyle profession (Lewis and Kimiecik, 2018).

The belief about the power of the experience being sufficient to inspire change supports existing literature which has shown time in nature can increase psychological nature connections (Mayer and Frantz, 2004; Mayer *et al.*, 2009) and inspire pro-environmental behaviours (Mayer and Frantz, 2004). Achieving some element of nature connection boost from participating in OAAs is uncontested (see examples from the likes of Hanna *et al.*, 2019; Mullenbach *et al.*, 2019; Houge Mackenzie *et al.*, 2023; Pomfret *et al.*, 2023; and Puhakka, 2023). The close relationship between a psychological nature connection and personal well-being means that as engaging in physical activity boosts endorphins (Alam *et al.*, 2023), and being in fresh, clean air increases oxygen supply to the brain and therefore increases levels of serotonin (Rogers, 2022), short-term natural highs are probable outcomes (Pomfret *et al.*, 2023). Coupled with the exposure to beautiful and ecologically diverse places, which many (but not all) OAAs take place in, experiences in nature can elicit feelings of happiness and a reduction of stress, which, given the surroundings, enhance nature appreciation and gratitude and therefore sense of connectedness (Capaldi *et al.*, 2014; Capaldi *et al.*, 2015). The famous phrase of “letting the mountains (or ‘experiences’) speak for themselves”, promotes the concept of talking less and allowing those awe-inspiring moments and nature appreciation to happen. However, as evidenced in the introduction of this study (see Chapter 1), the potential of the OAAs could be far greater, if the experiences are supplemented by a knowledgeable instructor.

The emphasis on ‘the experience’ as the driver for environmental developments reinforces the rhetoric reality gap as explained in the introduction of this thesis; OAAs are credited as a vehicle for enhancing environmental values, however the extent of these developments, and how long they last for are unknown. In a similar way that children can strengthen their experiential understanding about nature connections through regular exposure to big nature (Kahn and Weiss, 2017), instructors are likely to enhance their personal environmental literacy through their extended time spent immersed in OAAs (Mullins, 2014). However, as clients may not have access to regular exposure to big nature (Ponte *et al.*, 2021), this luxury of ‘topping up’ ones psychological and/or cognitive nature connection cannot be assumed to have the same benefits. Instead, increasing the potential of OAAs for influencing clients’ sustainable environmental literacy requires the instructors’ facilitation of activities (Hadzigeorgiou and Judson, 2017), actively noticing nature (Richardson *et al.*, 2021), thought-provoking conversations and building awareness (Hutson *et al.*, 2024), and time for goal setting and reflection.

To emphasise the importance of the role of the instructor as well as the role of the experience for future courses, two slides were added to the presentation pack. Figure 58 shows three graphs loosely based on findings from existing literature, illustrating how feelings of nature connectedness can be heightened through time spent in nature (and through OAAs) and how nature connectedness can increase pro-environmental behaviours.

Graph A in Figure 58 is based on the work of Mayer *et al.* (2009) who conducted an empirical study with three groups, concluding that in all cases exposure to nature increased feelings of nature connectedness. Graph B in Figure 58 illustrates the expectation for increased nature connectedness through participating in an OAA. The graph is based on the work of Hanna *et al.* (2019) and Barton *et al.* (2016) who conclude OAA experiences can enhance feelings of nature connection for adults and adolescents (respectively). Although both studies comment on outcomes over a prolonged time spent doing the OAAs, as opposed to one-off participation, Barton *et al.* (2016) found no statistical differences in increase in nature connection between the different in lengths of expedition. Barton *et al.* (2016) collected survey data from pre- and post-participation in a wilderness expedition. One-hundred and thirty adolescents took part in one of sixteen interventions ranging between five and eleven days. Outcomes from their study found all expeditions to increase feelings of students’ nature connectedness, however, it should be noted that re-kindling connections was a specified aim of the expeditions. Activities such as journaling, solo experiences, foraging and encouraging the Leave No Trace principles (see Table 5) featured in all expeditions (Barton *et al.*, 2016, p.62). Hanna *et al.* (2019) on the other hand, conducted

semi-structured interviews with 21 participants who had varied experience with OAAs ranging from once-a-year as part of a holiday, to having over 20-years of experience.

Finally, graph C in Figure 58 is influenced by the findings from Pereira and Forster (2015) and Martin *et al.* (2020). Pereira and Forster (2015) collected survey data from 76 undergraduate students using different validated instruments to assess the relationships between nature connections, environmental values, and environmentally responsible behaviours. They concluded connectedness to nature to be positively correlated with environmentally responsible behaviours. Martin *et al.* (2020) collected data from 4960 adults over a 3-year period to assess nature contact, nature connectedness and associations with health, wellbeing and pro-environmental behaviours. Findings concluded nature connectedness positively influenced household pro-environmental behaviours (PEBs) as well as nature conservation behaviours (Martin *et al.*, 2020) .

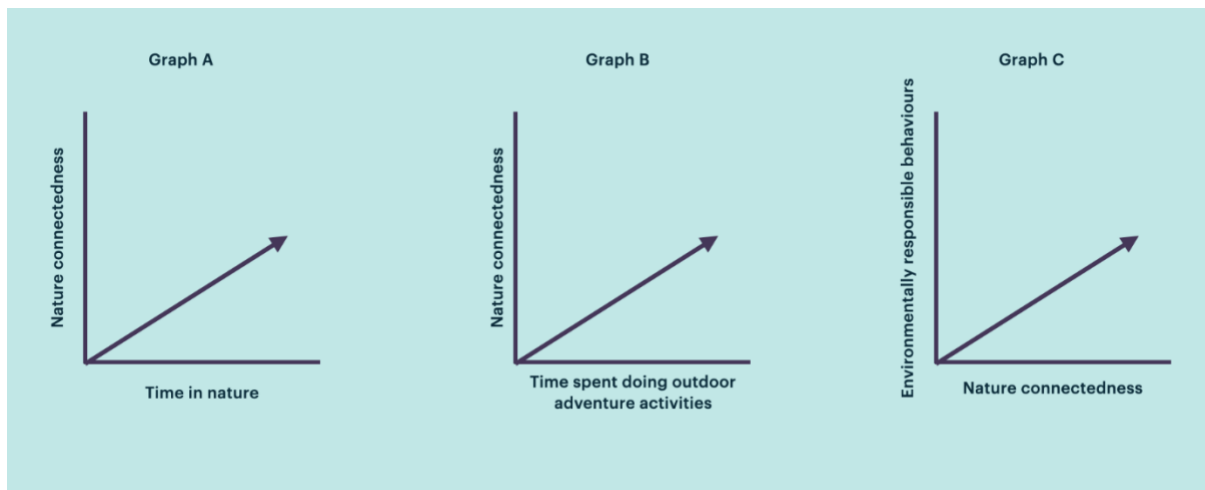


Figure 58: Presentation slide added to the course material to show what literature states about the relationships between nature connectedness and time in nature, outdoor adventure activities and environmentally responsible behaviours

Instructors in this study appeared to support the likes of Mayer *et al.* (2009), believing in the power of exposure to nature for heightened feelings of nature connectedness. However, there is a lack of available literature regarding the outcomes of OAAs when nature-based pedagogies are not applied (see Section 2.2.1). Given the available literature, I support the conclusion of Rokenes *et al.* (2015), who conclude the environmental dimension of OAAs can be of greater influence if given more attention by instructors. Furthermore, I argue the potential of OAAs can be met when either (a) clients are regularly exposed to big nature (Kahn and Weiss, 2017) and OAAs in a leisure capacity themselves (like participants in the study by Hanna *et al.*, 2019), or (b) instructors use some method of active facilitation to guide learning (as in the study by Barton *et al.*, 2016).

An additional feature for consideration is the lasting impacts of such connections. Peaks in nature connection have primarily been recorded a short time after participation in OAAs, therefore it cannot be assumed that nature connection, and therefore PEBs, become sustained or habitual.

Figure 59 illustrates the unknown about client nature connection following participation in an OAA. It shows a spike in nature connectedness during participation in OAAs, which is assumed to be a result of the immersion in nature and the natural release of drugs that instigate a natural high (Pomfret *et al.*, 2023). However, the dashed lines following participation are to promote discussion with instructors about how and why they believe such feelings can be sustained.

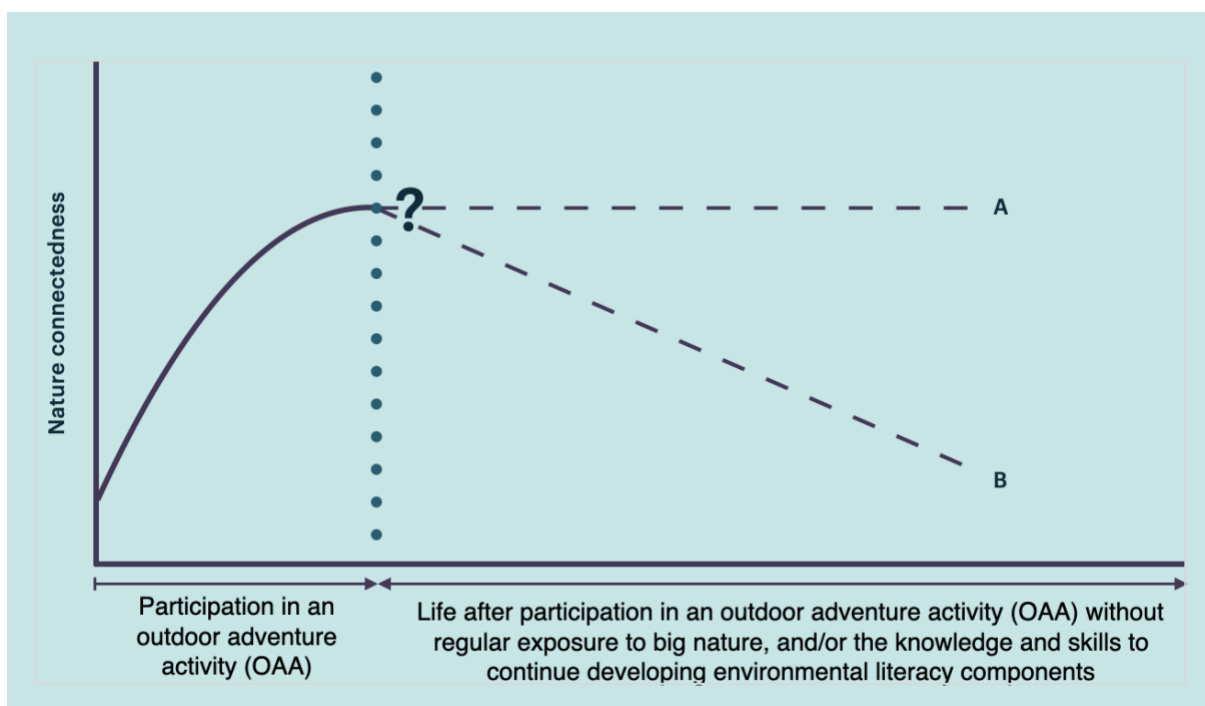


Figure 59: Presentation slide added to the course material to show how participation in an OAA can increase nature connectedness, but that such connections are not necessarily sustained

How long environmental outcomes last for post participation in OAAs are unclear. Findings from the likes of Prince (2021) however (see Section 7.3.6 for study description), suggest that environmental outcomes should not be an assumed sustainable outcome of OAAs. Furthermore, the state of flux among instructors' self-reported nature connection (shown in Section 8.3.2), suggests that nature connection is not a sustained emotion, value or feeling, but is an expression that is constantly influenced and changing according to one's surroundings.

The lines labelled A and B on Figure 59 are intended as discussion points for outdoor instructors to consider the potential lasting environmental outcomes following participation in an OAA. It is anticipated that line A could broadly represent instructor connection (without the day-to-day flux), given their repeated exposure to big nature. Option B however may be more accurate for holiday tourists who, after participation in their one-off OAA may return home to an urbanised town with limited access to big nature, without the knowledge or skills to boost connections through interactions with small nature (Kahn and Weiss, 2017).

To reflect on the four purposes of adventure programmes by Priest et al. (1992), (cited by Priest, no date) (see Table 2 in Section 2.1.2), this supports the theory that for development to occur, there must be access to some element of ‘booster’, to reinstate values, knowledge and behaviours.

Conceptualising the power (and limitations) of the OAA experience was highlighted as an area where the course could have greater influence. Having said this, results from the post-course survey and evaluation interviews indicated greater consideration was being taken over what instructors would say to their clients, and how they could facilitate environmental conversations, therefore increasing the likelihood of their OAAs having environmental outcomes.

Where instructors did engage clients in environmental conversations and/or activities, instructors indicated they were of most benefit and most suitable when they could physically point out to clients what they were talking about. This supports the belief of Louv (2008, p.104), that *“we cannot protect something we do not love, we cannot love what we do not know and we cannot know what we do not see”*. During the course trialling, instructors commented on the process of introducing something local to clients and then scoping out to understand its wider impact (e.g. see Vince’s comment from in iteration 2 in Section 8.2.2.3). This supports the importance of using place-based pedagogies to make local and global connections, as mentioned in Section 2.2.2.1.

Using place-based pedagogies to establish cognitive and psychological environmental connections have been used in formal education settings to increase understandings of global environmental challenges (Thomashow, 2001; Renshaw and Tooth, 2018). However, once again the process is reliant on instructors being knowledgeable about connections between local and global challenges (or successes). Not all instructors felt they had sufficient scientific knowledge to be able to relate local challenges to wider contexts (see Section 9.4.4). Moreover, experts in the appraisals warned about the risks of instructors getting caught out talking about global



challenges and ‘wicked problems’ (see Section 6.2.1.2). Instructors believed having a good understanding of global environmental concepts and facts to be important for delivering environmental conversations. As alluded to by Jasanoff (2010) however, scientific facts are not necessarily a requirement for understanding such connections. In contrast, fact sharing has shown to have insignificant impact on psychological or cognitive environmental outcomes (Lumber *et al.*, 2017) and can remove emotional understanding of the subject (Jasanoff, 2010). To effectively understand the connections, Jasanoff (2010) highlights the role of knowledge gained through embedded experiences to stimulate understanding of locality and to provoke consideration for global connections.

Place-based pedagogies have been influential for school students taking part in an extended interventions for environmental outcomes (Gregory, 2011; Häggström and Schmidt, 2020). However, I found no research relating to placed-based attachments following a half-day OAA. The formation of place-based attachments have been reported to be a result of aesthetic and recreational values (Jayakody *et al.*, 2024), therefore suggesting a place-attachment through OAA is plausible. However, as with much of the research on place-attachments, Jayakody *et al.* (2024) focus on slow formed attachments developed over a prolonged period of time spent in the place. Raymond *et al.* (2017) call for more research on the development of ‘fast’ place-attachments and their influence on sustained attachments.

To bridge the gap between locality of OAA, and the global context, I recommend there should be a third layer of connection related to the clients’ home localities or placed-based attachments. For establishing connections between local and global environmental concepts, the instructor should discuss with clients’ concepts that are (1) local to the OAA, (2) local to the clients’ homes or local place-attachments, and (3) global. In doing so, instructors are encouraging clients to make connections between different environments which can aid clients to build connections through both (potentially) ‘small’ and ‘big’ nature.

In terms of creating memorable experiences, as is expected of the ideal OAA (Ponte *et al.*, 2021), experts from the appraisals talked about the importance of subtle repetition to make learning ‘stick’ (see Section 6.2.1.2). In addition, both experts and some instructors in the evaluation phase mentioned the influence of ‘nudging’ for subtly advancing the clients experience without needing to actively facilitate it. The influence and limitations of nudge theory were discussed in Section 6.4.2, concluding that for clients on a one-off OAA, the impact of nudging for PEBs would likely be limited.

Design principle 2 was refined to be made more specific to the environmental change intended of the course. The updated principle states:

‘The course should **enable instructors to facilitate OAAs that enhance clients cognitive and psychological connections to nature to promote sustained environmental outcomes**’.

### **9.5.3 Design principle 3: The course must challenge instructor perceptions of nature**

The findings from the course trialling suggest instructors’ perceptions of nature are in a constant state of flux (see Section 8.3.2). This supports previous research around situational values and priorities of worth (see Boltanski and Thévenot, 2006; Carnoye, 2020; and Lehtimäki and Virtanen, 2023). Instructors are thought to possess varied ecocentric values and feelings of psychological connection to nature which are influenced by their regular immersive time spent engaging themselves (and clients) in big nature (Martínez and Mackenzie, 2022). However, findings from Martínez and Mackenzie (2022) also indicated not all outdoor experiences positively influence instructors’ connection. This was reinforced by one instructor in this research (Nia, from iteration 4) who elaborated on her INS result, indicating she had answered the survey just before going surfing and therefore felt more connected to nature than she might have done if she’d been in a different situation (see Section 8.2.4.3). In addition, findings supported previous literature which indicated how ecocentric values can be superseded by the anthropocentric norms of OAAs, creating an ethical dilemma for some instructors (Beames *et al.*, 2019; Martínez and Mackenzie, 2022).

One anthropocentric norm of OAAs is the repeated disturbance to- and exposure of ecologically delicate environments for the activity to take place in (Beames *et al.*, 2022; Martínez and Mackenzie, 2022). In the expert appraisals, Ben alluded to this dilemma, explaining nature as being seen as a resource in the eyes of the outdoor sector, often being used to meet the intended outcomes of the company and clients, but with little consideration or ownership of their environmental impacts. Similarly, expert George explained how OAAs are making environmental problems worse by contributing to the exploitation of rural and delicate ecosystems, without providing the necessary education to their staff or clients (see Section 6.2.1.2). Not only can accumulated disturbance impact species success (see Tyler-Walters, 2005; Sutton, 2020; Evju *et al.*, 2021; Pickering, 2022; and Pastor *et al.*, no date), without acknowledging past and present impact, instructors derive their own baseline of what is ‘normal’ and the magnitude of erosion or species decline over time gets lost. Kahn and Weiss (2017) describe the problem of generational

amnesia, explaining that the baseline for what constitutes ‘healthy nature’ is lowering as generations are being born and growing up with what they perceive ‘normal’ to look like. The same theory exists in the outdoor sector with the locations outdoor businesses choose to use; while one generation of instructors may believe the decline to be acceptable (or unnoticeable), the next generation of instructors start with a new baseline of what is ‘normal’, and the cycle starts again.

Despite references to ecocentric values and the norms of OAAs causing ethical dilemmas among instructors (Martínez and Mackenzie, 2022), the instructors in this research appeared less prepared to admit to their negative contribution, or the anthropocentric nature of elements of OAAs. Only one instructor reflected on her negative impact, using the term “sacrificial spots” (see Pheobe’s comments in Section 9.4.2), to describe areas which succumb to overuse. This indicates an acknowledgement of the impact of OAAs; however, it reinforces a perception of human-power or dominion over nature. The idea that outdoor businesses benefit commercially from ‘sacrificing’ particular areas; devaluing nature while simultaneously increasing their business value, emphasises an ethical dilemma instructors’ face in their job role. Especially when you add the importance of 262 OAAs inspiring lifelong connections and PEBs.

Pheobe admitted the difficulties in satisfying the consumer demand while balancing the impact of OAAs (see Section 9.4.2), particularly when conditions such as weather can influence the environmental impact of the OAA but do not constitute reason enough to cancel. This dilemma highlights the impact of commercialisation on environmental goals and ecocentric values and how the challenge of balancing business, finance and growth, can distort perceptions of acceptable environmental impact. Where the expected actions of the instructor to do their job misalign with ecocentric values, it seems environmental considerations are often (consciously or negligently) ignored.

The importance of challenging instructors’ perceptions of nature was to emphasise ecocentric values and the priority that non-human nature should have in the consideration of OAAs. The findings from the evaluation phase of research, however, conclude there to still be a widespread acceptance among those working in the sector that OAAs are only doing good; they believe that time spent immersed in natural environments has positive psychological effects and, as found by instructors themselves, increases feelings of connection to nature, even if those feelings are short-lived. To highlight to instructors how their (and their clients) values may be influenced, a slide was added to the presentation pack (see Figure 60) illustrating the compatibility of different intrinsic and extrinsic values (from Blackmore *et al.*, 2013). Blackmore *et al.* (2013, p.23) explain

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how values that are close to each other are complementary of one another (for example, universalism, benevolence, and self-direction are values that complement each other). On the other hand, values that are further away, or opposite from each other are difficult to balance. This explains why ecocentric values (universalism) are difficult to balance with commercial drivers of wealth (power) and security. Making instructors aware of the drivers behind their values may encourage them to have more consideration over their priorities and whether they are prepared to commit to valuing nature (universalism) as a priority.

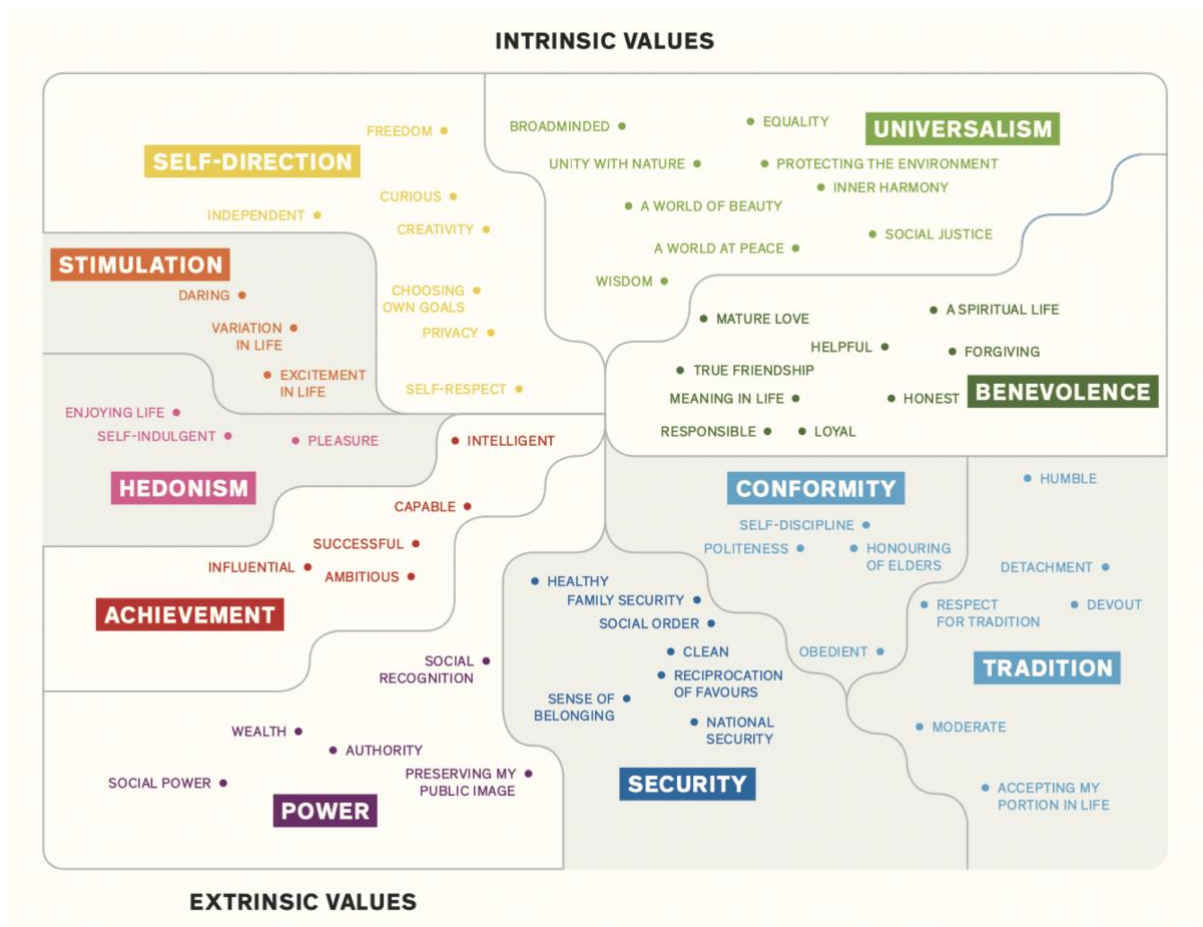


Figure 60: Map of intrinsic and extrinsic values from Blackmore et al. (2013)

The design principle was made more specific to highlight the importance of instructors valuing nature from an ecocentric perception. Furthermore, future courses will introduce conversations around the balancing of values and generational amnesia, to emphasise the importance of accountability and recognition for the environmental impacts of OAAs, as well as their benefits. The updated principle states:

‘The course must challenge instructor **perceptions about the value** of nature.’

#### **9.5.4 Design principle 5: The course delivery must be relatable to outdoor instructors' learning preferences.**

My initial assumptions about outdoor instructors' learning preferences and appropriate methods of course delivery were influenced by Knowles (1977), Brandt (2016) and Wood (2024), as well as my personal experience as an outdoor instructor and undergraduate student on an outdoor degree programme. Experts in the appraisals reinforced my expectation and that from White and Groves (2023) about many instructors having SpLDs and a generic preference for practical, experiential learning (see Section 6.2.1.4.1). There was no mention of instructors experiencing difficulties with the course due to SpLDs, however the reification of having 'a practical walk around', and task-based activities is indicative of an audience that needs to actively participate to maintain concentration and maximise learning.

The advantages and limitations of online learning was discussed in Section 6.4.4 following expert George's comment that more experienced instructors would likely have greater capacity for learning and applying than novice instructors. As most participating instructors were thought to be in stages three to five of their outdoor career development (see Section 7.3.4) and most were qualified to lead at least one OAA, I anticipated the application of knowledge to be higher. In the post-course survey, five instructors commented on the benefits of an in-person course over an online course (see Section 9.2.4). However, in the evaluation interviews there was some support for the online facilitation enabling people to share different experiences. Instructors that commented on wanting a more practical delivery represented a small portion of the participants. Furthermore, the five instructors that stated this all had over 10-years of experience working in the outdoor sector, whereas those with less than 5-years of experience did not mention online learning being a barrier. While this contradicts the expectation by expert George, it may reflect the adaptability of new instructors to alternative methods of learning. Despite being novice to outdoor instructing, new instructors are more likely to be accustomed to remote learning due to the increase in courses being delivered online (Smith *et al.*, 2016). For experienced instructors however, as they will have primarily learnt through in-person courses, adapting to learn through a remote, online course may be of greater challenge.

Findings from the course trialling (phase 3) concluded three assumptions about adult learners' (by Knowles, 1977, p.211) to be evident in instructors' learning: assumption 2; "*the role of learners' experience is a rich resource for learning*", assumption 3; "*readiness to learn develops from life's tasks and problems*", and assumption 5; "*motivation to learn is directed by internal incentives and curiosity*".

One finding that appeared to contrast Knowles' first assumption, was that instructors did not appear to be self-directed learners. Knowles (1975) described self-directed learning as "*a process in which individuals take the initiative without the help of others in diagnosing their learning needs, formulating goals, identifying human and material resources, and evaluating learning outcomes*". From this assumption, it was anticipated that instructors would take initiative in researching about their local flora and fauna, history, geology and geography to have the appropriate content knowledge to apply to the course. In contrast however, instructors in the present study indicated they wanted additional resources, knowledge and methods given to them to make implementation as easy as possible, as opposed to applying their EL-PACK to create original activities and location-specific stories or conversations. This finding influenced the development of a new design principle (design principle 7 in this chapter), which states, "The course should provide additional material and where possible share regular updates about good practice". Design principle 7 is discussed in more detail in Section 9.5.7.

In terms of instructors' preferred learning orientation, findings from the course evaluation supported Knowles' fourth assumption, that adult learners prefer task or problem centred learning. The homework task introduced for iteration 4 was positively reflected on in the post-course survey and in the interviews, as were the interactive tasks that required instructors to write on the screen and discuss responses. Due to time restrictions, tasks were originally kept to a minimum. However, throughout the iterations they became more prominent.

In addition to favouring task-based learning, several instructors, noted the course could have been more valuable if it had been held in person, with some degree of practical delivery. As in-person courses have greater time and financial implications (hence why more of the course iterations were not trialled in-person), sections of the online course were modified to include more practical task-centred engagement.

Additional tasks were added for future iterations (see Figure 61 and Figure 62) to prompt instructors to apply the theory of ACE storytelling, and to engage instructors in some self-directed research. Furthermore, as these tasks could be made specific to the instructor it could provide a way to ensure instructors give dedicated time to practise the principles of EL-PACK, specifically those of subject knowledge in a delivery context, and delivery knowledge in a subject context. Incorporating these tasks within the course gives a higher likelihood that instructors might take ownership of the task and set themselves goals for implementing it into their OAs.

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# TASK

With a partner, find some space in the room (or a breakout room) and one person tell an ACE story about a subject within your chosen activity environment.

Things to think about:

- Action (Narrative): What is the purpose or intention of telling the story? What's the challenge, the cause and methods of solution?
- Colour (Connections): How is this connected to a local and global ecosystem? How it is connected on a personal level?
- Emotion: What makes you passionate about this? How will you evoke wonder?

Listeners role:

Find 3 objects and label them Action, Colour and Emotion. As your partner is telling their story, lift the relevant objects when you want to hear more narrative, more about the connections, or more emotion.

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Figure 61: Presentation slide directing a storytelling task. The slide is written as an example for an in-person course or online course

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# TASK

Spend 5 minutes researching a citizen science project that would influence you.

In an email to yourself (or on paper), make notes of:

- The website
- How to take part
- Any equipment you might need
- Who you send the data to

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Figure 62: Presentation slide showing a task for instructors to complete to increase their awareness of citizen science projects in their area

Design principle 4 remained unaltered, however based on the literature, expert appraisals, course trialling and evaluation, the research presents assumptions about instructor learning

preferences which guides the application of the principle. While the subject would benefit from greater attention, this research has contributed a foundational understanding of how instructors prefer to learn. A preliminary set of seven assumptions (based on the andragogical assumptions by Knowles, 1977) about outdoor instructors' approach to learning is summarised as:

1. The instructor favours directed learning for understanding theories.
2. The role of the instructors' experience is a rich resource for learning.
3. The preferred orientation to learning practice is task or problem centred.
4. Instructors' readiness to learn develops from life's tasks and problems.
5. Instructors' motivation to learn is directed by internal incentives and curiosity.
6. The instructor favours practical learning for understanding practice.
7. Many instructors have specific learning differences (SpLDs) (i.e. dyslexia and AD(H)D).

### **9.5.5 Design principle 5: The course must use appropriate terminology to reach the intended audience**

This design principle was initially developed with reference to terminology being a matter for instructor identity (see Section 6.4.5). Experts warned the course may not reach its desired audience if limited to using 'instructor' as opposed to 'leader', 'coach', or 'guide', etc (see Section 6.2.1.4.2). The challenge of a unified identity in the outdoor sector has been addressed by other theorists (see Cox, 2022; and White and Groves, 2023) and has been discussed in Sections 6.4.5 and 7.3.5. Findings from the pre-course survey supported previous research by Cox (2022), affirming instructors affiliated with several identity labels which are likely to be influenced (at least to some extent) by their outdoor qualifications.

The principle evolved to focus on the language of the course. The title of the course was first introduced in the expert appraisals, who gave mixed opinions about whether the concept 'environmental literacy' would intrigue instructors or put them off (see Section 6.2.1.1). The issue was not mentioned in the pre-course survey or during the course trialling, however it was brought up by two people in the post-course survey, and again in the interview. The title was critiqued for sounding 'nerdy' and while I attempted to transfer knowledge from theory into an interesting and task-orientated presentation, some instructors felt the style of the course was still too academic (see Section 9.2.5).

The use of academic language in the classroom has been noted by theorists for the challenges it poses for those with literacy difficulties (Snow and Uccelli, 2009; Indrarathne, 2019). Gallardo et



*al.* (2015) warns that adults with SpLDs may have experienced frustration with previous academic learning tasks, therefore engaging in additional learning may be daunting. To minimize risks of instructors feeling underqualified for attending the environmental literacy course, several experts recommended pre-reading to establish a shared level of knowledge prior to attending the course (see Section 6.2.1.4.3). This was not introduced for the research process as I did not want to put instructors off by giving them too much work, given that they already had to fill in the pre-course survey. However, the success of instructors completing the pre-course survey could suggest they would be willing to engage in pre-course reading another time.

To avoid the use of the term ‘environmental literacy’ for future iterations, an alternative theory was added into the presentation. Head, Hand, Heart theory (see Figure 63) was designed by Orr (1992) and although does not have roots in environmental literacy, it has been used in other areas of environmental education as a method to increase sustainability values (see Sipos *et al.*, 2008; and Singleton, 2015). In addition, the theory has been referenced by Shulman and Wilson (2004) as the ‘three apprenticeships’ and recommended for use in not only training teacher professionals, but also for applying the ‘knowing, doing and believing’ theory (Rouse, 2008).

In an environmental context, the theory provides an alternative way of thinking about the components of environmental literacy; knowledge is the cognitive connection formed in the ‘head’, attitudes and emotions are the psychological connection formed in the ‘heart’, and skills for behaviour change are the physical actions practised through the ‘hand’. While the principle of environmental literacy still stands for the course, explaining the concept through Head Hand and Heart theory may provide instructors with an alternative means for relaying information and relating it to their clients.

For example, if an instructor were to engage clients in a conversation about barnacles during a coasteering activity, they might first share a story of the barnacles belonging in the ecosystem (to facilitate knowledge). Following this they could facilitate an imagery activity to encourage clients to engage their emotions and feel empathy for non-human nature. Finally, they could collaboratively share ideas of what they could do to minimise their impact on barnacles during their activity, and how these skills could be transferred into other areas of their lives.

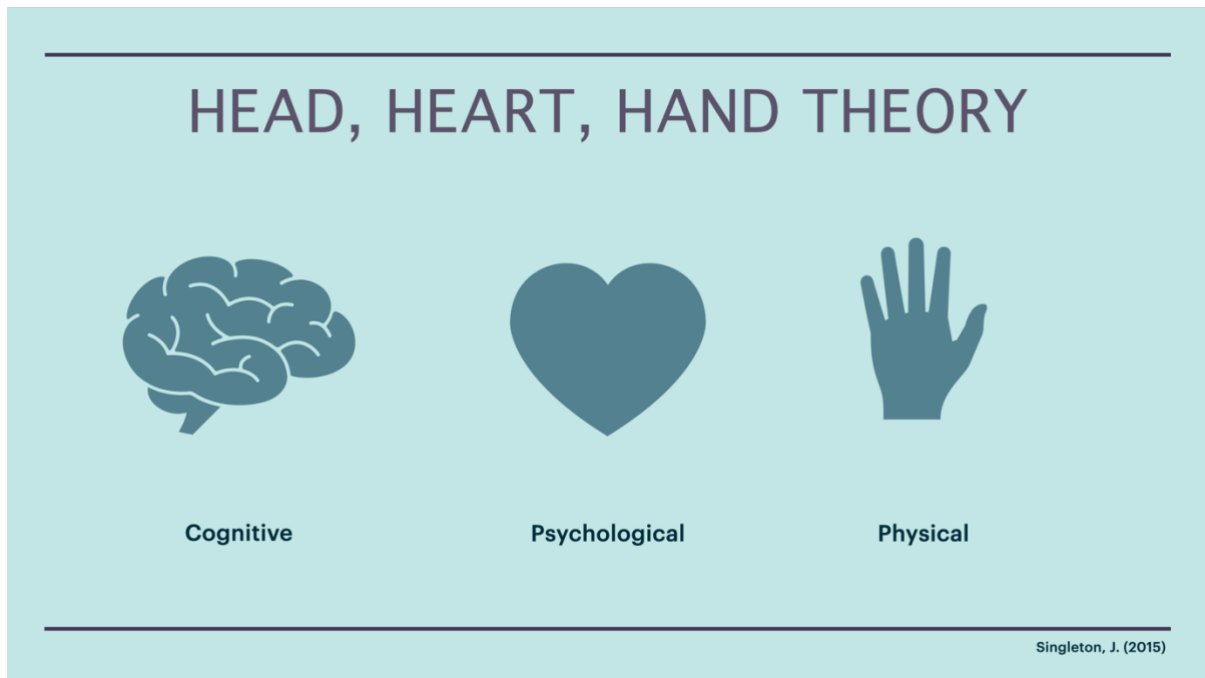


Figure 63: Presentation slide introducing Head Hand and Heart theory, as an alternative way to introduce components of environmental literacy

The design principle was refined to include the importance of language as well as terminology:

‘The course must use appropriate terminology **and language** to reach the intended audience’.

#### 9.5.6 Design principle 6: The course content must be appropriately tailored to enhance instructor BiAtT and EL-PACK

Sections 7.2 and 8.2 revealed instructors in this study had a greater knowledge of local environmental concepts than of global concepts. The level of knowledge was variable, supporting previous findings about instructors knowledge of conservation (Langley, 2010) and of marine pollution (Sutton, 2019). Findings also indicated evidence for the Dunning-Kruger effect as instructors with experience working in an outdoor centre with high environmental credentials reported a modest level knowledge in comparison to other instructors (see Section 8.3.2). It is suspected that experienced instructors may also over-estimate their beliefs about what they do to contribute to environmental literacy development. Despite a characteristic of experienced instructors being “*a desire to effect change*” (Wagstaff, 2016, p.90), findings from this research suggest the action to achieve environmental change is limited by instructors’ time and motivation to apply self-directed learning to theory, and time and motivation for creating (or using) resources.

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As instructors showed a lack of self-directed learning to broaden their knowledge of local and global environmental concepts, I introduced an additional three slides to the course material, to broadly cover the subject of climate change (see Figure 64, Figure 65, and Figure 66). Data for the information on the slides are from Berners-Lee (2020). Slides about local concepts were not added as 'local' will change depending on where the course is being run.

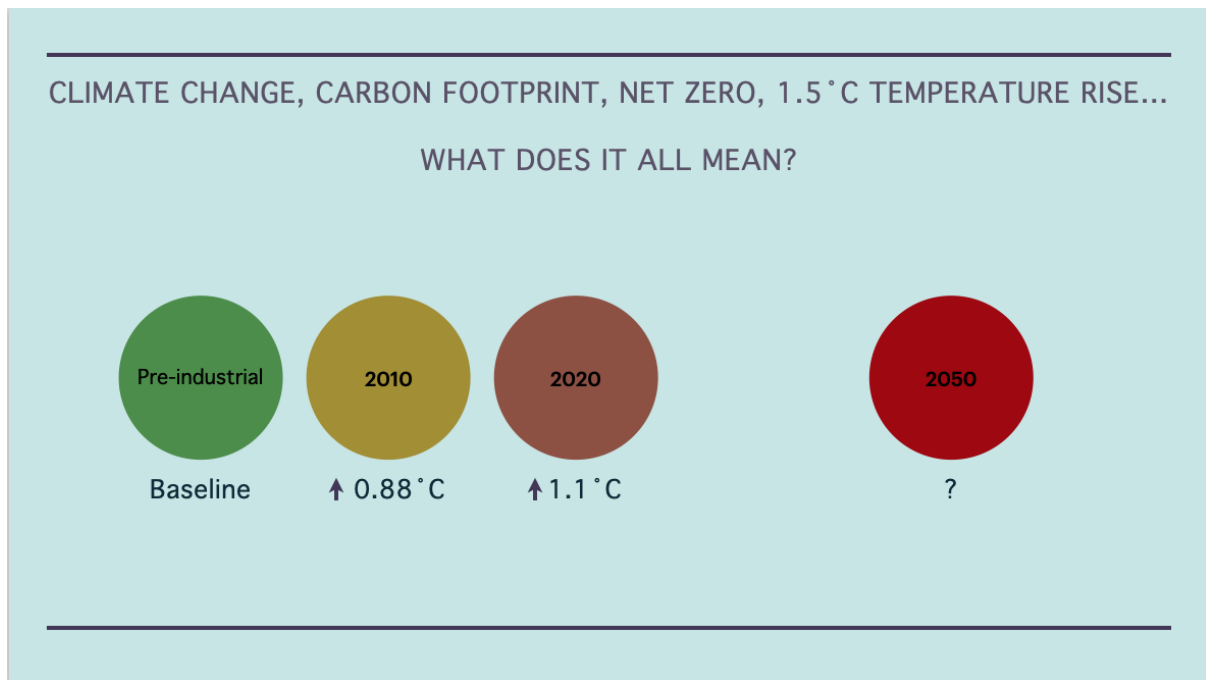


Figure 64: Presentation slide for understanding climate change and global warming

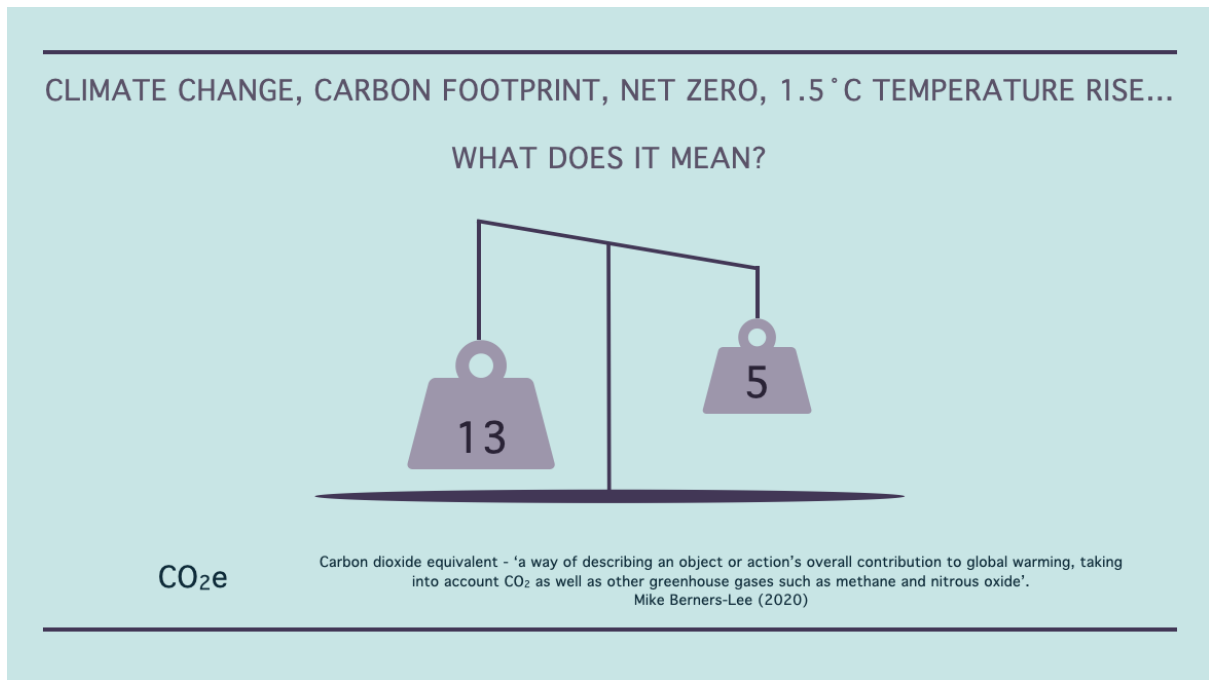


Figure 65: Presentation slide for understanding carbon accounting. The slide introduces the challenge of a '5-tonne lifestyle' (each person emitting 5-tonnes of carbon dioxide equivalent per year) as opposed to the UK average of 13-tonnes. Data for the information on the slide is from Berners-Lee (2020)

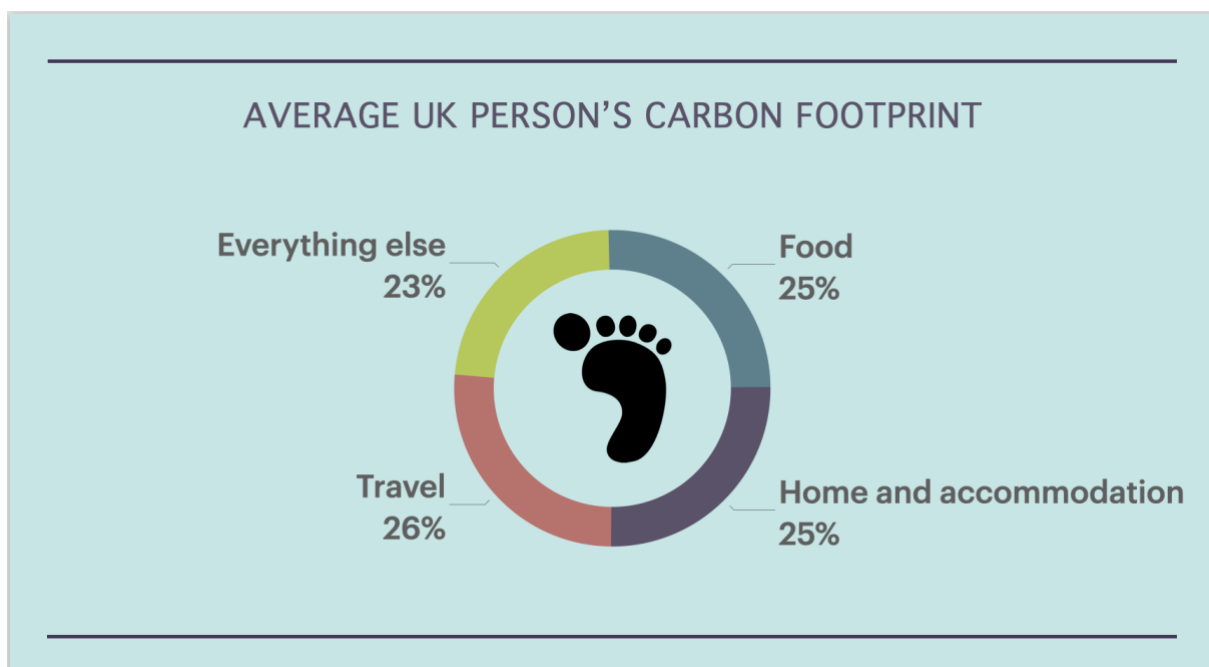


Figure 66: Presentation slide for understanding personal carbon footprints. Data for the information on the slide is from Berners-Lee (2020)

Findings from the evaluation suggested the environmental literacy course successfully enhanced knowledge and understanding, self-efficacy and awareness (see Section 9.2.1). It was also mentioned however that knowledge, understanding and skills were most valuable when they could be applied in practice (see Sam's comment in Section 9.4.1). Despite increases in instructor ability (EL-PACK and BiAtT), the application of knowledge and skills by some instructors was disproportionate to their enthusiasm. This lack of knowledge application emphasises a point made by Rouse (2006); that even when teachers have knowledge of theory, and theoretical knowledge of applying the theory, it is not always applied in the classroom because not all teachers can transfer the theoretical understanding into practice. The divide between subject knowledge and knowledge of facilitation was forewarned by experts who rightly stated that effective delivery is not possible unless the instructor has knowledge of both theory and practice (see Section 6.2.1.4.3).

Due to the experience of participating instructors, their self-reported environmental knowledge, and the expectation of self-directed learning to aid their knowledge development, I anticipated instructors to be capable of knowledge transfer into practice. Results from the course trialling and evaluation however have suggested that (1) experience does not always enable instructors to engage with online learning and therefore transferability should not be assumed (2) some instructors may over assess their environmental knowledge; a trait of Dunning-Kruger meaning instructors self-reported knowledge of environmental concepts may be higher than it actually is, and (3) instructors displayed an aversion to self-directed learning for increasing knowledge of theory.

Bridging the gap between PEB intention and actual behaviour change is a complex field (Kollmuss and Agyeman, 2002). For instructors integrating environmental conversations and activities into their OAAs, it was predicted that actual behaviour change would be mediated by their ability, motivation, and opportunity (see Section 3.2). This research focused on developing instructor ability, by focusing on EL-PACK and BiAtT. However, the reasons instructors gave for not performing the behaviour changes highlighted a combination of motivational and opportunity barriers (real and perceived), as well as ability (see Section 9.4.4). No instructors commented on barriers related to subject knowledge in a delivery context, or delivery knowledge in a subject context, however future research would benefit from itemising simplified EL-PACK criteria and discussing with instructors their strengths and weaknesses. Instructors largely put down their lack of application to it not being a priority, having a lack of time and having a lack of scientific environmental knowledge (particularly of global environmental concepts).

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Figure 67 presents a combined picture of the conceptual framework of environmental literacy coupled with the findings about outdoor instructors from the research. The text surrounding the model are findings that have occurred throughout the thesis and therefore may relate to one of the previous interim discussions. All findings are referenced to their respective discussion.

Figure 68 shows the aspect between intention and behaviour change in greater detail, presenting how the EL-PACK criteria have informed my understanding of instructors' situational ability, and which aspects have needed additional refining. **Error! Reference source not found.**

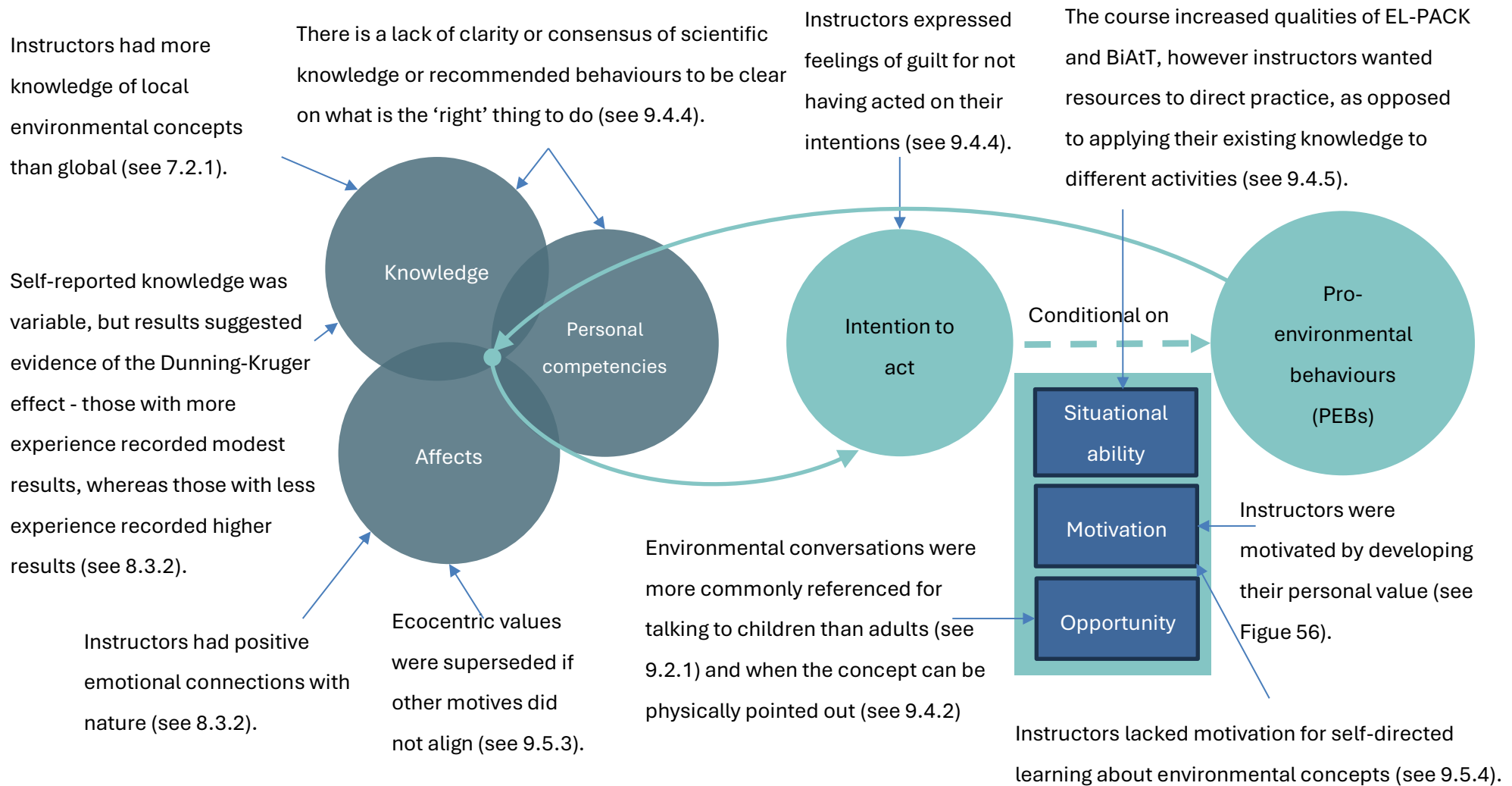
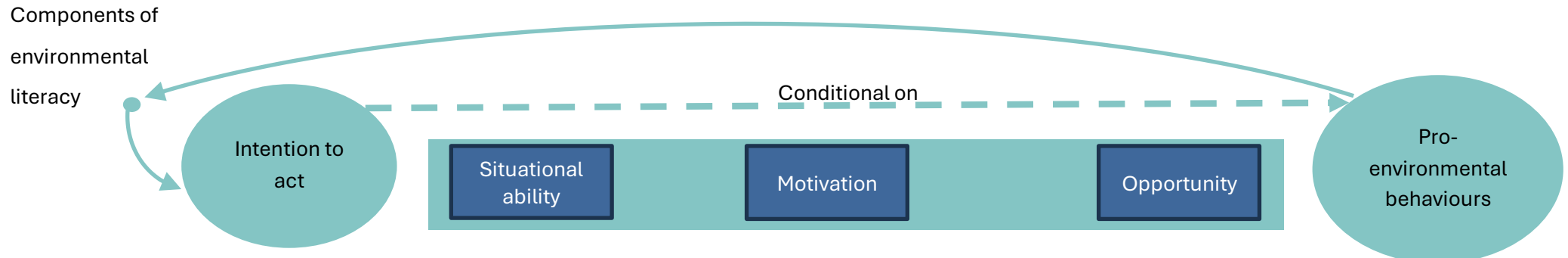


Figure 67: Summary of findings about outdoor instructor environmental literacy and AMO for integrating environmental literacy conversations and activities into OAAs



| <b>Belief in ability to teach</b>                                                                                                                                                                                                                                                                                                                  | <b>Subject knowledge</b>                                                                                                                                                                                                                                                                                                                                                                 | <b>Pedagogical and andragogical knowledge</b>                                                                                                                                                                                                           | <b>Subject knowledge in a delivery context</b>                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Delivery knowledge in a subject context</b>                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| On average, instructors had stronger beliefs about the outcome expectancy (1) than they did about their personal teaching efficacy (2). However, following participation in the course several instructors commented on the importance of their own facilitation, indicating feelings of greater responsibility and capacity to make a difference. | Instructors benefitted from the introduction to environmental literacy to increase their knowledge about the purpose of the course (3). Instructors' knowledge of theory (4) was variable and would benefit from greater attention. Knowledge of resources (5) informed the development of an additional design principle (DP7) and highlighted instructor need for additional material. | Instructors actively engaged in conversations and activities about the nature of teaching and learning (7), creating a safe environment (8), participant thinking (9) misconceptions (10) and the effects that environmental discussions can have (11). | Instructors indicated the academic tone of the course was a challenge. The course was updated to include alternative representations of concepts (the 3 H's) (13). Explanations (14) and facilitation strategies (15) were discussed during online courses; however, the course was updated to include more tasks to practise the application of content (17), consider the structure and connections (19), procedural knowledge (20) and methods of solution (21). | As predicted in the expert appraisals, despite goal setting being an expected trait of experiential learning through OAAs, many instructors do not include it in their practice. The application of environmentally related goal setting was limited following participation in the course. In response, the material was updated to include a greater focus on the impact of informal goal setting and tasks for instructors to practise. |

Figure 68: Summary of findings showing how the EL-PACK criteria (as shown in bracketed numbers) have informed my understanding of instructor' situational ability



**9.5.7 Design principle 7: The course should provide additional educational resources and where possible share regular updates about good practice.**

Design principle 7 was introduced as a supplementary principle in response to instructors requesting extra resources and a reluctance for self-directed learning.

As commented on under design principle 3, in contrast to Knowles' first assumption of andragogy being that the learner is increasingly self-directed (see Section 2.2.3), instructors indicated they wanted 'tools' to implement their learning, as opposed to applying their learning to develop their own creative ideas and strategies.

The intention for the course having a broad context was that instructors could learn about methods of facilitation and use their existing knowledge of their OAAs and locations to implement their learning. Where content knowledge was insufficient for directly applying it to their activity, based on AMO theory I expected instructors would have had the motivation to spend some time addressing their knowledge gaps. In contrast however, instructors implied they would benefit from the opposite; being taught about local and global environmental concepts, as well as how to integrate it into their OAAs. This method of learning resembles a teacher-led learning approach, as opposed to self-directed.

In his study on postgraduate outdoor learning students, Wood (2024) supported the use of students directing their own learning, as the students were able to explore subjects which motivated and interested them the most. However, Wood (2024) also saw the need for a balance between teacher and student-led delivery to ensure structure and to meet curriculum requirements. Outdoor instructors are characterised as being self-motivated and self-directed as they pursue their OAAs in their leisure to improve their skills, as well as in their professional capacity (as acknowledged by Filho, 2010, there are few professions where in one's spare time they choose to do the same thing as they do for work!). However, with respect to learning theory, self-directed learning does not appear to carry through.

Additional educational resources to prompt instructors' memory of the course material or provide activities they can implement within their OAAs was raised by several instructors as important for adding value to the course.

## **9.6 Interim conclusion**

This chapter has presented the final phase of empirical research. It presented an evaluation of the course and refined the design principles based on qualitative data collected from some of the

course participants in each of the iterations. The findings led to additional modifications of the course content, to add contextualisation and practical tasks, as recommended by participating instructors.

In response to instructors' lack of self-directed learning and their request for supplementary resources to aid their facilitation of environmental conversations and activities, one more design principle was added; "The course should provide additional educational material and where possible share regular updates about good practice". This resulted in seven final design principles.

The interim discussions presented throughout the thesis have built upon one another to inform the subsequent phase of research and development of design principles. The concluding chapter therefore does not reiterate the findings of the design principles but shares a summary of the research project and answers the overarching research question.

## Chapter 10 Conclusions, implications and contribution to the existing body of research

This chapter presents a summary of the study, informed by the interim discussions presented in Sections 6.4, 0, 8.3, and 9.5.

### 10.1 Answering the research question: “*What are the characteristics of an effective course for outdoor instructors, aimed to advance environmental literacy development through outdoor adventure activities (OAAs)?*”

The intention of the research was to advance environmental literacy training for instructors of outdoor adventure activities (OAAs), to increase the likelihood of clients adopting and maintaining pro-environmental behaviours (PEBs). The literature review outlined the contradiction in the outdoor sector, using ecologically diverse areas of big nature for OAAs to inspire psychological and cognitive nature connections, yet at the same time potentially contributing to disturbance, destruction, and/or pollution of those ecosystems. Moreover, despite OAAs being recognised as an opportunity to enhance client environmental literacy, there is no mandatory or umbrella qualification or certification to train instructors on how to facilitate such developments. With instructors having varied ability for facilitating environmental conversations or activities, sustained environmental outcomes for clients are anticipated to fall short of their potential.

To advance the potential environmental outcomes of OAAs, I have used a design-based research (DBR) approach to develop and test a course for instructors to increase their ability to integrate environmental conversations and activities into their OAAs. To increase instructor ability in this context, an original framework of *environmental literacy pedagogical and andragogical content knowledge* (EL-PACK) was created, based on the work of Dymont *et al.* (2018b), and influenced by Knowles (1977), Moseley *et al.* (2016) and Rouse (2006) (see Section 3.3). The EL-PACK framework presented criteria about *belief in ability to teach* (BiAtT), subject knowledge, pedagogical and andragogical knowledge, subject knowledge in a delivery context, and delivery knowledge in a subject context. The EL-PACK was used alongside existing literature about the development of components of environmental literacy to inform the creation of a first draft of the course material.

As per the intention of DBR, I used an iterative process to develop a course over four phases of research to identify design principles in response to the overarching research question: *“What are the characteristics of an effective course for outdoor instructors aimed to advance environmental literacy development through OAAs?”*. The emerging design principles have been discussed in depth throughout the interim discussions to validate the findings against existing research and to explain to readers why the principles are important for the designing of a course for outdoor instructors. The characteristics of an effective course (as stated in the research question) are successful implementation of these design principles.

Throughout the research there were seven design principles established. These principles inform the characteristics of an effective course, which state:

1. The course enhances outdoor instructor value by contributing to their personal and professional development.
2. The course enables instructors to facilitate OAAs that enhance clients cognitive and psychological connections to nature to promote sustained environmental outcomes.
3. The course challenges instructor perceptions about the value of nature.
4. The course delivery is relatable to outdoor instructors’ learning preferences.
5. The course uses appropriate terminology and language.
6. The course uses appropriate content to enhance instructor EL-PACK and BiAtT
7. The course provides additional educational material and shares regular updates about good practice.

For future theorists, or for practitioners looking to develop a similar course for outdoor instructors, these seven characteristics are what successful development of the course should look like. To achieve these characteristics, theorists and practitioners should reflect on the design principles to understand why they are important and how they influence an effective course.

## **10.2 Research contributions to educational theory and practice**

This research has made an original contribution to the academic body of literature as well as influencing practice. Since the final phase of empirical research (phase 4), the course has been delivered to students at the University of Stirling on an Environmental Science and Outdoor Education degree (and rebooked for 2025); it has been used to aid the development of a Sustainable Ski Lesson for Peak Snowsports and it is being considered for integration into one of the NGBs qualification pathways.

The research has contributed to academic knowledge in several ways. Firstly, in answering the research question, the findings present seven characteristics of an effective course for outdoor instructors which, underpinned by their respective design principles, can be used for future course development.

Secondly, the EL-PACK criteria (see Section 3.3), although developed for environmental communication and delivery, can be adapted and revised to assess other areas of outdoor instructor delivery. An effective outdoor instructor holds a multitude of skills and resources for enhancing qualities such as team building, communication, confidence and expertise, all while facilitating an exciting and safe adventure experience. Educating instructors in environmental literacy adds another branch to their existing tree of knowledge, through which they can implement new and existing methods of facilitation.

As climate change and biodiversity loss continue to change the environments used by outdoor recreationalists and instructors, there is a growing need for governing bodies and businesses to take accountability for their actions and implement environmental and sustainable policies and practices. Not only do these operators want to be *seen* as doing the right thing, but there is also an ecocentric motive among many, which drives an endeavour to *do* the right thing. The environmental literacy course developed as part of this research is a stepping stone in helping the outdoor sector reach its potential in delivering OAAs that can enhance clients' environmental knowledge, attitudes, skills, and behaviours.

### **10.2.1 Reflections on the seven characteristics of an effective course**

Having concluded the characteristics of an effective course, I now reflect on whether the environmental literacy course met the characteristics, and/or how it still needs to be improved.

#### **10.2.1.1 Characteristic 1: The course enhances outdoor instructor value by contributing to their personal and professional development**

Experts interviewed in the appraisals vouched that instructors and the wider outdoor sector would benefit from the environmental literacy course to advance environmental learning (see Section 6.2.1.1). Whether participation in the course would enhance professional development by making instructors more employable however, was unclear. Professional value as perceived by instructor employers is yet to be understood and would benefit from additional research. The course was however officially recognised by Canoe Wales and the Mountain Training Association as a course worthy of CPD points, therefore indicating it could enhance professional value.

Instructors emphasised the importance of courses contributing to personal development over professional development (see Figure 57 in Section 9.3.4), and explained how the course had

improved their knowledge and awareness of the subject and their ability to talk about environmental concepts to clients of OAAs (see Sections 9.2.1 and 9.4.1). Figure 56 in Section 9.2.2 showed almost all instructors that took the post-course survey (16 out of 17) held environmental conversations with their clients during their OAAs.

**10.2.1.2 Characteristic 2: The course enables instructors to facilitate OAAs that enhance clients cognitive and psychological connections to nature to promote sustained environmental outcomes**

Despite indicating personal development of knowledge acquisition, few instructors implemented environmental activities into their OAAs (see Figure 56 in Section 9.2.2). Findings from the post-course survey (n=17) showed that following participation in the course, only four instructors implemented citizen science activities, nine told environmentally related stories, and six used activities to promote nature connectedness. Moreover, references to “the experience” made in the post-course interviews reiterated the strong held beliefs about exposure being sufficient for strengthening connections (see Section 9.4.3).

Whether this characteristic is met in practice requires further research with OAA clients. Past research has indicated a readiness among clients for a greater environmental focus (see Section 6.4.2). However, how clients react to environmental conversations and activities, whether clients prefer to enjoy the OAA experience without specific environmental engagement, and/or how client experiences impact their future, are all areas which would benefit from future research.

**10.2.1.3 Characteristic 3: The course challenges instructor perceptions about the value of nature**

Several experts in the appraisals indicated the ‘use’ of nature as a free resource which is exploited for commercial gain without being recognised by instructors themselves (see Section 6.2.1.3). Following their participation in a course, several instructors indicated an increased awareness and consideration for non-human nature (see Section 9.2.3) however there was little evidence to indicate instructors would prioritise environmental or nature value in their work as an outdoor instructor.

The ethical dilemma of environmental impact versus benefits poses real challenges for instructors. Talking about environmental accountability and generational amnesia in outdoor businesses and between outdoor instructors should be encouraged to avoid being caught in believing OAAs do only good. However, as recognised in Section 2.1.2, the social movement in the outdoor sector is slow moving, particularly in the direction of a sustainability paradigm (Brown and Beames, 2017). Many instructors, particularly those who are experienced in the sector, may

have a reluctance to embrace change as they are accustomed to the personal benefits they receive from nature and hence unintentionally forget what it is like not to be exposed and immersed in big nature all the time. I get the impression that while a course such as this could benefit all instructors in the sector, it would be advantageous to increase the environmental focus on novice instructors to embed environmental morals which can guide their professional development.

#### **10.2.1.4 Characteristic 4: The course delivery is relatable to outdoor instructors' learning preferences**

Overall, the course was positively received in an online format. However, for many instructors the course would benefit from being run in person as per the initial intention of the course, where instructors could practise integrating environmental literacy activities and conversations in an OAA (see Section 5.2).

The course improved throughout the iterations as it adopted a greater task-centred delivery focus. This was done in response to the lack of self-directed learning done by instructors to increase their knowledge about specific environmental content. The reluctance for self-directed learning came as a surprise to me, given that instructors are complimented for being highly motivated in their overlapping personal and professional capacity (Filho, 2010). The crux of the course is that it is theory driven, and thus, where instructors 'practise' their job for fun (i.e. taking friends or family on OAAs in their spare time), there is less incentive for self-directed learning through theory.

Incorporating tasks into the course directed instructors to actively reflect and think about applying the theory (e.g. the homework task in iteration 4), which had positive results for learning.

#### **10.2.1.5 Characteristic 5: The course uses appropriate terminology and language**

The challenges of terminology and language have been discussed in previous chapters and the limitations of the academic nature of EL-PACK are addressed below in 10.4. It became apparent through instructor feedback that using the environmental literacy terminology will not suit everybody. Therefore, just as the course should be tailored to suit instructor EL-PACK and BiAtT, it should also be tailored with respect to language to suit the specific group. In a discussion about her research on Ocean Literacy, McKinley (2023, personal communication) explained how she may never say the words 'ocean literacy' in a workshop, if there are other words which are more relatable for the audience. In the same way, the environmental literacy course will be most effective for outdoor instructors if it is being taught in a relatable language. For university students on outdoor degree programmes, this could have a greater focus on EL-PACK and the concept of

environmental literacy. For practicing instructors, the terminology and language could be refined to focus on theories of Heart, Hand and Heart (see Section 9.5.5), and Knowing, Doing, and Believing (see Section 2.2.3.2).

**10.2.1.6 Characteristic 6: The course uses appropriate content to enhance instructor EL-PACK and BiAtT**

The EL-PACK framework was useful for the development of the environmental literacy course as it itemised criteria needed by instructors to reach the intended outcome. Due to its academic format however, the ability to reflect on the framework with outdoor instructors was challenging. On reflection, the course could be made more relatable to participants if they were able to decide for themselves which areas of EL-PACK were their strongest and weakest, and thus tailor the course to address their learning needs. Using a PCK framework to aid teaching in this way has been successfully done with the framework by Dymont *et al.* (2018b) with outdoor education teachers in New Zealand (North, 2022, personal communication). To do this successfully with outdoor instructors, it would be essential to adapt the language and design into something that is visually stimulating and clear to understand. I envisage adapting the framework into a set of cards with illustrations and examples of the different characteristics. Instructors could then use the cards in a practical activity to explore beliefs about their strengths, weaknesses and priorities.

**10.2.1.7 Characteristic 7: The course provides additional educational material and shares regular updates about good practice**

The need for additional materials which was raised by many of the instructors came as a surprise to me, particularly as all instructors were sent a copy of the slides, which included instruction for many activities. The finding is coupled with that addressed in 10.2.1.4 above; that when it comes to learning theory, instructors in this research did not show to be self-directed learners. It also supports the concept that the outdoor sector is slow to change. Team building activities (such as ‘bomb disposal’) are well known within the sector because they are passed down through generations of instructors. Introducing new activities, with alternative objectives can not only be daunting, but also require time and effort to think about, plan, and manage. In a sector which is renowned for being busy during the high season, this is not something that instructors may have the time or energy to focus on. Making instructional resources however, which guide instructors on how to facilitate activities and what to say, could enhance the integration of environmental literacy activities into OAAs.



### **10.3 Research contribution for outdoor instructors**

This research offers outdoor instructors a practical and evidence-informed pathway for integrating environmental literacy into OAAs, without compromising the integrity of the activity. The research responds to key gap between theory and practice in the sector, where environmental training for instructors has been scarce. In doing so, the research, and the course that has been developed as part of the research, addresses and advances the training for outdoor instructors. While clients of OAAs have been beyond the scope of this research, the development of the course supports a practical shift from passive engagement with nature to OAAs that can facilitate deliberate and transformative experiences, that empower some form of pro-environmental behaviour change.

#### **10.3.1 Reflections on my facilitation**

Just as PACK is important for developing environmental literacy while running OAAs, it is also an important teaching quality of a course leader. Being reflexive and constructively critical of my practice when trialling the course was important for understanding how the course could be improved, both through how the theory was being explained, and how practical activities were run. Positive comments about the course delivery were reassuring and suggested a quality of PACK that enabled learning. However, several times during the course trialling I felt I should have been more flexible, specifically, during the practical aspect of the second iteration, and during the explanation of nature connectedness in the third iteration. In both instances I was able to recognise participating instructors becoming disengaged or confused. For those in iteration two, this was because there was not enough facilitation or instruction to test different activities. For those in iteration three, it was due to their lack of understanding or familiarity with the pathways and activities of nature connectedness. Despite recognising the problem, I was unprepared and therefore underconfident in my responses. It emphasised the need for more theory to be included in the presentation, to be used if necessary depending on the experience of the group. For iteration three this would have enabled me to go into greater depth about nature connectedness, with more examples of activities for those with little experience or familiarity with the concept. For the practical aspect, having a repertoire of activities that can be suggested and trialled with groups, depending on their expertise, confidence, group size and location would be useful for maintaining engagement and maximising the benefit of being in-person.

### **10.4 Limitations of the study**

The overarching research methodology underpinned the potential challenges of conducting DBR for a time-sensitive project (see Section 4.3). While the research has produced meaningful design

principles, there were challenges around participant recruitment and involvement in the iterations of course trialling, and challenges around the academic structure of EL-PACK which are addressed below.

1. The number of course iterations were limited due to time constraints. While every effort was made to organise courses before the busy summer season, a combination of factors meant that some outdoor centres did not want to participate. The back-up plan to run courses through governing body organisations worked well, however it meant that instructors did not share the commonality of workplace, and courses had to be delivered online. This may have altered the strength of discussions between instructors, the rapport I was able to create and the relatability of all modules. Running more iterations, particularly with more outdoor centres, and doing in-person courses would have strengthened the results and enabled more trialling of practical elements of the course. Nevertheless, the course developed as part of the research is a living document, therefore while more iterations would have supplemented the research data, it would still not have produced a 'final' version.
2. The number of participants involved in each iteration of course trialling varied. For online courses instructors were required to sign-up in advance on the Governing Bodies administration system. This worked well in some respect as the course was marketed to an intended audience, however, it also caused some challenges:
  - 2.1. Firstly, as the course was free, there was no consequence for not attending. This meant on every occasion the course was fully booked, yet not all instructors showed up, therefore there were fewer participating instructors than I had hoped on three of the four courses.
  - 2.2. One of the Governing Body organisations preferred they did all the communications on my behalf (i.e. sharing the online call link etc). Unfortunately, they did not include all instructors in the email sharing the link for the second half of the course, therefore four instructors missed part of the second day. I was able to go over most of the material in a breakout group with the four instructors while others were doing a task, however the situation limited their involvement in the modules on citizen science and storytelling.
  - 2.3. The sample of instructors that took part in the research only partially represent the wide range of instructors that work in different activities and under different governing body organisations.
3. The difference in approach between academia and the outdoor sector (e.g. the language used and prioritisation of theory and practice) presented a limitation for unpicking individual criterion from the EL-PACK framework. Had the EL-PACK framework been more user-friendly (for example as recommended in the game format above), it could have elicited interesting findings about instructors' specific areas of strength and weakness. For developing the

course however and outlining the foundation of necessary characteristics, the EL-PACK would still be recommended for future work in course design for instructors.

## **10.5 Recommendations for future research**

Future research would benefit from a case study analysis on instructor practice before and after taking part in an evidence-informed environmental literacy course such as the one developed from this study. A longitudinal meta-study of client responses to environmental communications during OAAs could also be very informative to explore influences on habitual PEBs.

In response to the finding about instructor learning preferences, future research would benefit from exploring the motivations of outdoor instructors towards the learning of theory and the learning of practice. In contrast to this research, past findings have concluded instructors to be self-directed learners (Lewis and Kimiecik, 2018), who practise their OAAs both for personal and professional development (Filho, 2010). This research found participating instructors not to be self-directed learners. I suspect this finding is due to the course being theory driven, rather than practical (such as learning to surf). Advancing this area of research would provide interesting insights into the learning preferences and expected outcomes of outdoor instructors attending different courses.

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## Appendix A    Supplementary material for the literature review

### A.1    Table displaying pedagogies used in outdoor adventure activities (OAAs) to increase one or more components of environmental literacy (EL).

| Reference                           | Context                                                                                                                                                            | Location         | Participants                                                                | Pedagogical Approach                            | Component of EL            |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------|-------------------------------------------------|----------------------------|
| <b>Preston and Griffiths (2004)</b> | Conducting repeated visits to a nature location with a different pedagogical focus (experiential, historical, scientific, artistic) and journaling the experience. | Australia        | Post-graduate students on an outdoor and environmental education programme. | Experiential, historical, scientific, artistic. | Knowledge and dispositions |
| <b>Foran (2005)</b>                 | Understanding how unplanned moments of intensity can shape environmental education - from the perspectives of the educators.                                       | Nova Scotia, USA | Outdoor educators in public schools.                                        | Moments of Intensity                            | Dispositions               |
| <b>Payne and Wattchow (2008)</b>    | Students participated in 2, 3-day camps where they were given                                                                                                      | Australia        | Students on an undergraduate programme in Australia.                        | Slow, place-based                               | Dispositions               |

Appendix A

| Reference                           | Context                                                                                                                                                                     | Location                                                              | Participants                                                                                          | Pedagogical Approach                                                                                                          | Component of EL                             |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
|                                     | ‘experience’ sheets<br>(as opposed to<br>‘activity’ sheets)<br>which guided them<br>through experiential<br>experiences.                                                    |                                                                       |                                                                                                       |                                                                                                                               |                                             |
| <b>Stewart<br/>(2008)</b>           | Theoretical study<br>authored by two<br>outdoor educators,<br>exploring how stories<br>of history, culture<br>and landscape can<br>influence<br>environmental<br>awareness. | Theoretical but reflections<br>from personal practice in<br>Australia |                                                                                                       | Storytelling,<br>place-based.                                                                                                 | Knowledge and<br>dispositions               |
| <b>Reis and<br/>Roth<br/>(2009)</b> | Reflections of how<br>discursive<br>psychology and the<br>rhetorical<br>deployment of<br>emotion talk can<br>influence student<br>learning.                                 | Canada                                                                | Two public<br>educators in<br>outdoor and<br>environmental<br>education.                              | Emotion talk                                                                                                                  | Dispositions                                |
| <b>Preston<br/>(2011)</b>           | Reflection by the<br>author (lecturer) on<br>how her pedagogical<br>approach to teaching<br>has influenced the<br>moral framework of<br>the student.                        | Australia                                                             | Case study of<br>one student in an<br>Australian<br>outdoor<br>environmental<br>education<br>diploma. | Critical pedagogy -<br>critical<br>environmental<br>consciousness,<br>critical thinking<br>and problem-<br>solving skills, an | Knowledge,<br>dispositions,<br>competencies |



Appendix A

| Reference                           | Context                                                                                                                                    | Location         | Participants                                        | Pedagogical Approach                                      | Component of EL |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------------------------------------------|-----------------------------------------------------------|-----------------|
|                                     |                                                                                                                                            |                  |                                                     | environmental ethic and political literacy.               |                 |
| <b>Socha et al. (2016)</b>          | Participatory research during a 16-day canoe journey in North Canada where adolescents used slow photography to engage with nature         | Northern Canada  | Two adolescents (children of the researchers)       | Slow photography                                          | Dispositions    |
| <b>Root-Bernstein et al. (2014)</b> | A theoretical study exploring how '13 tools for thinking' can be used as a pedagogical model to influence outdoor environmental education. | Theoretical      |                                                     | Tools for Thinking                                        | Dispositions    |
| <b>Quay and Jensen (2018)</b>       | A theoretical paper exploring how being flexible and creative with pedagogies could elicit successful outcomes                             | Theoretical      |                                                     | Wilding pedagogies, nature centred and experience centred | Dispositions    |
| <b>Jukes and Reeves (2020)</b>      | Exploring how more-than-human stories can bring together aspects of place                                                                  | Australian Alps. | More-than-human story as presented by an Australian | More-than-human stories, place-based                      | Dispositions    |



Appendix A

| Reference                        | Context                                                                                                                                                                         | Location                   | Participants                                                                                                     | Pedagogical Approach                                                                                          | Component of EL            |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------|
|                                  | responsive-pedagogy and new materialist/post-human theories. Research drawn from a ski-touring journey.                                                                         |                            | undergraduate student.                                                                                           |                                                                                                               |                            |
| <b>Prins and Wattchow (2020)</b> | Theoretical study exploring how the four threads of enskilment (taskscape, guided attention, storytelling, and wayfinding), could be used to complement environmental learning. | Theoretical                |                                                                                                                  | Enskilment                                                                                                    | Knowledge and dispositions |
| <b>Evans and Acton (2021)</b>    | Using an ethnographic approach, the research follows an experienced educator to identify different pedagogies applied throughout the camp.                                      | Australia                  | Case study in Australia of a 4-day camp with year six students at an outdoor and environmental education centre. | Pedagogic agility. Place responsive, role-based learning, behaviours, constructivist, and socialist approach. | Knowledge and dispositions |
| <b>Porter and Couper (2021)</b>  | Exploring how the practice of auto-ethnography can be used with students to                                                                                                     | Plymouth Marjon University | Undergraduate students on an outdoor                                                                             | Autoethnography                                                                                               | Dispositions               |

Appendix A

| Reference                    | Context                                                                                                                                    | Location                                   | Participants                                                | Pedagogical Approach                                                        | Component of EL |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------|
|                              | enhance their environmental awareness.                                                                                                     |                                            | education degree programme.                                 |                                                                             |                 |
| <b>Tsevreli (2021)</b>       | Exploring how the practice of nature journaling could benefit environmental education courses in higher education.                         | Greece                                     | Students from an early childhood education degree in Greece | Nature journaling                                                           | Dispositions    |
| <b>Thomas (2015)</b>         | Exploring the importance of three of the signature pedagogies within outdoor education.                                                    | Literature Review                          |                                                             | Experiential, Transitional, Reflexive                                       | Knowledge       |
| <b>Monte and Reis (2021)</b> | The study presents a prototype design of a pedagogical model for education for environmental citizenship in primary education in Portugal. | Systematic analysis and literature review. |                                                             | Pedagogic model for education for environmental citizenship for primary ed. | All             |

**A.2 Framework for pedagogic content knowledge for outdoor educators (OEPCK) from Dymont *et al.* (2018b) showing characteristics needed by outdoor educators for effective teaching**

| PCK category                                             | Evident when the teacher ...                                                                                      | Example                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Clearly PCK</b>                                       |                                                                                                                   |                                                                                                                                                                                                                                                                                                        |
| <b>Beliefs about the nature of teaching and learning</b> | Discusses or uses personal or established philosophies and approaches to teaching the discipline                  | Discusses the use of ‘experiential pedagogies’ as a key facet of teaching outdoor education; makes use of particular places and their features to convey key outdoor education concepts                                                                                                                |
| <b>Teaching strategies</b>                               | Discusses or uses general or specific strategies or approaches for teaching an outdoor education concept or skill | Capitalises on unexpected learning opportunities that arise during activities (e.g. flight of unusual bird); uses ‘solo’ experiences to develop students’ confidence in self; uses a set of paint samples to help students become more aware of place by finding colours in the environment that match |
| <b>Student thinking</b>                                  | Discusses or addresses student ways of thinking about a concept, or recognises typical levels of understanding    | Realises that students think that ‘Leave no trace’ is fine as an outdoor ethic, but that they fail to generalise it to other situations; realises that students may privilege technical skills over interpersonal skills; knows                                                                        |

Appendix A

| PCK category                                       | Evident when the teacher ...                                                                | Example                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    |                                                                                             | when to step in to assist a student who is struggling with a skill or concept                                                                                                                                                                                                                                                                       |
| <b>Student thinking—<br/>misconceptions</b>        | Discusses or addresses student misconceptions about a concept                               | Recognises that students often think ‘Mountains are to be ‘conquered’’ and will fail to recognise other learnings that come from a ‘mountain experience’ (e.g. teamwork, decision-making); recognises that students on a wilderness expedition may think that ‘no humans have ever been here’ when there is a long history of indigenous occupation |
| <b>Student affect (in<br/>relation to content)</b> | Discusses or addresses students’ affective responses to particular outdoor education topics | Uses an activity, with a high degree of perceived risk (e.g. a cave abseil), to engage students’ interest in learning; recognises that students may have negative emotional reactions to participating in outdoor education experiences in local, low-risk, low-impact or low-adventure environments                                                |
| <b>Cognitive demand of<br/>task</b>                | Identifies aspects of an (OE) task that affect its complexity                               | Recognises the different demands associated with navigating via GPS vs navigating using map and compass; recognises that students may find it difficult to engage with the intellectual aspects of the discipline as they assume it is ‘fun’ and ‘easy’                                                                                             |

Appendix A

| PCK category                                      | Evident when the teacher ...                                                                        | Example                                                                                                                 |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Representations of concepts</b>                | Describes or demonstrates ways to model or illustrate a concept (can include materials or diagrams) | Uses sand features to demonstrate contour lines                                                                         |
| <b>Explanations</b>                               | Explains a topic, concept or procedure                                                              | Explains why a J-stroke can correct the direction of forward motion in a canoe                                          |
| <b>Knowledge of examples</b>                      | Uses an example that highlights a concept or procedure                                              | Uses a well-known tragedy to illustrate risk-management lessons                                                         |
| <b>Knowledge of resources</b>                     | Discusses/uses resources available to support teaching                                              | Identifies and uses a hiking club's website to obtain track and route information for hiking                            |
| <b>Curriculum knowledge</b>                       | Discusses how topics fit into the curriculum                                                        | Recognises that, in the Australian Curriculum, leadership theories need to be taught and critically analysed in year 12 |
| <b>Purpose of content knowledge</b>               | Discusses reasons for content being included in the curriculum or how it might be used              | Knows that leadership skills and qualities have relevance to other areas of life                                        |
| <b>Content knowledge in a pedagogical context</b> |                                                                                                     |                                                                                                                         |

# Appendix A

| PCK category                                         | Evident when the teacher ...                                                                                                       | Example                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>(Beliefs about) the nature of content</b>         | Expresses an appreciation of the nature of outdoor education that goes beyond the school curriculum                                | Compares the aesthetic qualities of climbing in a climbing gym versus in a natural rock environment                                                                                                                                                                                                                                       |
| <b>Profound understanding of fundamental content</b> | Exhibits deep and thorough conceptual understanding of identified aspects of outdoor education and its theories                    | Understands recent critiques around the role of adventure and risk in outdoor education, and the consequent need for a place-responsive pedagogy; has understanding of indigenous perspectives on the environment and the implications for indigenous activities; demonstrates knowledge of the natural environment in which he/she works |
| <b>Deconstructing content to key components</b>      | Identifies critical outdoor education components within a concept that are fundamental for understanding and applying that concept | Helps students identify the organisation and planning requirements (e.g. equipment requirements, emergency plans, first aid, participant screening) to manage risk on an extended expedition; can identify the sequence of moves that comprise a good paddle stroke                                                                       |
| <b>Structure and connections</b>                     | Makes connections between outdoor education concepts and topics, including interdependence of concepts                             | Identifies the connections between leadership practices, group dynamics, and strategies for handling risk                                                                                                                                                                                                                                 |

# Appendix A

| PCK category                                      | Evident when the teacher ...                                                                          | Example                                                                                                                                                                                                                                                             |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Procedural knowledge</b>                       | Displays skills for working in the outdoor environment (conceptual understanding need not be evident) | Can set up a top-rope rock-climbing system; can self-rescue a capsized kayak; can develop a risk-management plan; recognises that when a hiking group is cold, wet, and tired, camp needs to be established quickly, or that it might be better to push on to a hut |
| <b>Methods of solution</b>                        | Demonstrates or evaluates a method for solving a problem in an outdoor education context              | Recognises that when a student does not understand declination, a mnemonic may help them to remember the procedure, OR they may go back to first principles and review a model of the earth and its magnetic field                                                  |
| <b>Pedagogical knowledge in a content context</b> |                                                                                                       |                                                                                                                                                                                                                                                                     |
| <b>Assessment approaches</b>                      | Discusses or designs tasks, activities or interactions that assess learning outcomes                  | Designs a journal writing activity with a targeted focus topic, or facilitates a debriefing session after an activity                                                                                                                                               |
| <b>Goals for learning</b>                         | Describes a goal for students' learning                                                               | Justifies a team-building activity as developing understanding of leadership principles                                                                                                                                                                             |
| <b>Getting and maintaining student focus</b>      | Discusses or uses strategies for engaging students                                                    | Has clearly defined roles and responsibilities for all students on a high-ropes challenge course                                                                                                                                                                    |

Appendix A

| PCK category                    | Evident when the teacher ...                                 | Example                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>'Classroom' techniques</b>   | Discusses or uses generic classroom practices                | Talks about grouping students according to ability levels; sets up activities in such a way that students feel safe to take risks with new experiences |
| <b>Student affect (general)</b> | Describes how student affect influences pedagogical approach | Knows a particular student will show off or give silly answers if asked to demonstrate a skill in front of the whole group                             |



## Appendix B Ethical approval

### B.1 Approved ethics application form for phases 2, 3 and 4 of research

#### ETHICS APPLICATION FORM

#### Faculty of Social Sciences

**Please note:**

- ***You must not begin data collection for your study until ethical approval has been obtained.***
- ***It is your responsibility to follow the University of Southampton's Ethics Policy (<https://www.southampton.ac.uk/about/governance/policies/ethics.page>) and any relevant academic or professional guidelines in the conduct of your study. This includes providing appropriate information sheets and consent forms, and ensuring confidentiality in the storage and use of data.***
- ***You are advised to read the Advice on Applying guidance document, downloadable from the ERGO II website, before you submit your application.***

#### **Important notice on Risk Assessment:**

Health and Safety-type risk assessment is no longer part of the ethics review process. Questions pertaining to ethical and reputational risks have been moved from the old 'Risk Assessment Form for Assessing Ethical and Research Risks' to this form. Please do NOT upload a separate Risk Assessment Form to your ethics application.

However, it is your responsibility to undertake a Risk Assessment for your research study. Depending on whether your study is office based, involves off-site data collection and/or international travel, there are different risk assessment forms you can use. Please use this link to access the forms:

<https://groupsite.soton.ac.uk/Administration/FSHS-Health-and-Safety/Documents/Forms/AllItems.aspx?RootFolder=%2FAdministration%2FFSHS%2DHealth%2Dand%2DSafety%2FDocuments%2FRisk%20assessments%20and%20risk%20register%2FERGO%20interim%20documents&FolderCTID=0x012000BE79A4A3B3DC1143ABB38DFA6B580A8C&View={A5E79215-986A-4471-8CF9-B11F85214687}>

If you need guidance or are unsure about which form to use, please contact your Discipline Health and Safety Rep in the first instance, and the Faculty Health and Safety Officer, XXX, if you have further questions. Supervisors and Line Managers are responsible for ensuring risk assessments are completed for all research studies.

## Appendix B

1. **Name(s):** Ella Rose Sutton

2. **Current Position:** PhD Student

3. **Contact Details:**

**Division/School** Education

**Email** XXXX

**Phone** XXXX

4. **Is your study being conducted as part of an education qualification?**

Yes 

5. **If Yes, please give the name of your supervisor**

Main Supervisor: Professor Marcus Grace

Second Supervisor: Dr Ran Peleg

6. **Title of your project:**

Exploring environmental literacy training for outdoor instructors.

7. **Briefly describe the rationale, study aims and the relevant research questions of your study**

Outdoor adventure centres are becoming recognised as a platform for developing participants nature connectedness and engaging individuals in environmental learning. However, as participant learning and engagement is reliant on the instructor facilitation, the success of nature connectedness and engagement is in part determined by the knowledge and teaching ability of the instructor. Unlike teachers in formal education, outdoor instructors or guides are not required to take any teacher training, or CPD, and there is currently no certified means for instructors to progress with their environmental knowledge or teaching skills should they wish to. To increase the credibility of commercially led outdoor adventure activities being able to contribute to the development of nature connectedness and environmental engagement there is a need for a professional development course for outdoor instructors.

The purpose of this study is to address the rhetoric reality gap between the expectation of commercially led outdoor adventure activities as a platform for environmental engagement, and the current ability of outdoor instructors to achieve these outcomes with their clients. In doing so I attempt to progress the outdoor industry in their environmental contribution and enhance the credibility of commercially led outdoor adventure activities as a respected means to developing environmental knowledge, attitudes, and behaviours. To achieve this, the study engages with industry professionals (policy makers, outdoor educators, and environmental educators) to develop an environmental literacy course, based upon their knowledge and first-hand experiences from working within outdoor adventure education and/or environmental education.

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Following the development of the course with industry professionals, the course will be trialled with outdoor instructors to determine whether it can be used as a viable course for increasing instructor ability to teach about the environment, whilst facilitating adventurous activities.

The intentions of the course are to:

- a. Teach instructors the concept of environmental literacy, why its development is important for a sustainable future, and how, as outdoor instructors, they can inspire change among participants in engaging in pro-environmental behaviours
- b. Increase instructor confidence in their own ability to engage and educate about the environment
- c. Increase instructor knowledge of different pedagogic practices and explore how activities can be facilitated through different pedagogical lenses
- d. Increase instructor ability to read group dynamics and choose activities and pedagogies that will be relatable and beneficial to the groups' environmental literacy development

These objectives will be measured quantitatively using survey questions adapted from previous instruments (see example questions in Course Survey document).

### **8. Describe the design of your study**

The study follows an action research approach; a practice based methodological approach commonly used in education research to understand and improve educational practices (Cohen *et al.*, 2018). Engagement with the research will be participatory, as the course is being designed with and for workers in the outdoor industry. Whilst my own background is as an outdoor instructor, I believe it is important that other professionals in the industry are included in the development of the course. Furthermore, I believe it is important that they should be recognised for any contributions they make in the refining of the course design. The research will be conducted in two phases.

#### *Phase 2 – Expert Appraisals*

The first aspect of empirical work seeks to develop and refine a draft course prototype. Data will be collected qualitatively, using open interviews and focus groups, allowing participants to have some control over what they wish to talk about. This should generate rich data which covers aspects considered most important to the interviewee, as opposed to directed questions that could address preconceptions. It is intended that this aspect of research will involve 12 participants, all of whom will be involved in an individual or dyadic interview, followed by a focus group with all participants interviewed. Participants will be selected based on suitability for the research.

Where possible, interviews will be carried out with one researcher and two interviewees, within each participant group. As with focus groups the nature of dyadic or group interviews allows participants to build on, or challenge, each other's comments, providing one another with valuable prompts to share information that may otherwise be missed (Morgan, 2020). This will facilitate greater depth and perspective from each participant group than interviewing one person. Where a dyadic interview is not possible, for reasons of availability or suitability of staff a standard 1-1 interview will be carried out. The intention is to carry out all interviews in person, at a time and location that is mutually decided between myself as the

## Appendix B

researcher, and the participants. Face-to-face interaction is favoured to minimise misinterpretations and time restraints that may occur through virtual interactions.

Focus groups will be used to corroborate ideas from different participant groups and will be conducted online for ease of the participants. Microsoft Teams will be used as a platform to support the research as it has a recording functionality which is necessary for subsequent analysis.

### *Phase 2*

The second aspect of research will involve trialling the course with outdoor instructors. The course will run over a two-day period, one day being classroom based, and one day being practical an outdoor adventure activity. It is intended the course will be run with at least five groups of different outdoor instructors, with group sizes no less than five per-group, and no more than fifteen. Assessments of the course success will be made through quantitative research. Surveys will be used to collect information pre- and post-participation in the course. Survey questions are influenced by the Environmental Efficacy Teaching Belief Instrument (EETEBI), the PCK criteria and the Environmental Literacy Instrument (ELI). An additional survey will be administered five-months following participation in the course to gauge the longitudinal impact of the course, and how well (if at all) instructors were able to implement the training into their activity facilitation. In addition to the quantitative data being collected, qualitative data in the form of audio-recordings and notes will be taken throughout, and at the end of the course during a feedback group. Participants will always be asked and made aware if they are being audio recorded.

It is intended that all courses will be run with instructors before June of 2023, so to not interfere with their busy summer period. This also enables the training to be put into place (where they feel happy to) over the summer months of work. The follow-up survey will be administered no earlier than September of 2023.

## **9. Who are the research participants?**

### *Phase 2*

As testing the face validity of a course requires insight from experts in the subject matter, it will be necessary to consult specific experts within the departments of environmental education at universities, outdoor instructor education, and adventure tourism best practice directors. The table below details participant selection along with how their participation is expected to benefit the research. The research intends to include three people from each group, giving a total of 12 participants.

| <b>Area of Expertise</b>                      | <b>Organisation</b>            | <b>Justification</b>                                                                                                                                                                                                                                    |
|-----------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Policy makers / facilitators of best practice | Institute for Outdoor Learning | The IOL offer accreditation to courses and awards that meet their criteria for enhancing learning outdoors. They also facilitate the Field Studies Professional Practice Group and Adventure and Environmental Awareness Professional Discussion Group. |

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|                              |                                                                                                                         |                                                                                                                                 |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
|                              | Wales Adventure Tourism Organisation (WATO)<br>Pembrokeshire Coastal Forum (PCF)<br>Pembrokeshire Outdoor Charter (POC) | WATO, PCF and POC are all organisations that strive to make adventure tourism more sustainable, within Pembrokeshire and Wales. |
| Outdoor Instructor Educators | University lecturers                                                                                                    | University lecturers have an understanding about how outdoor students learn.                                                    |
| Environmental Educators      | (e.g. Field Study Council)                                                                                              | Environmental educators hold subject specific knowledge about how to teach about the environment.                               |

### Phases 3 and 4

The second aspect of research involves outdoor instructors that are in work. Outdoor centres will be contacted as the gatekeepers to request involvement in the research. The research should benefit the outdoor centres as it should increase the ability of their instructors to engage participants in the environment. To participate, instructors must be working in the outdoor adventure industry fulltime between June and September 2023. Outdoor centres within the UK will be found through the Adventure Activities Licencing Authority (AALA). Centres will be contacted if their website suggests they have an environmental ethos or is suggestive that their activities will incorporate some form of environmental engagement/education. It is intended that the course will be run with instructors from at least five different activity centres, with at least five instructors in each group. This means there should be a minimum of 25 instructor participants.

#### 10. If you are going to analyse secondary data, from where are you obtaining it?

*Please note that if you are analysing individual-level secondary data (e.g. survey data), you must also fill in and upload the Ethics Application Form for SECONDARY DATA ANALYSIS.*

N/A

#### 11. If you are collecting primary data, how will you identify and approach the participants to recruit them to your study?

*Please upload a copy of your information sheet. This must be based on the GDPR-compliant template that can be downloaded from the ERGO II website. Note that there is a separate template for UG/PGT applicants. If you are not using an information sheet, please explain why. If you are using posters, fliers or emails for recruitment, these must be uploaded, too. Please note that recruitment by mass emailing to @soton.ac.uk email addresses is not allowed.*

## Appendix B

Individuals are being selected for participation through purposive sampling. Initial contact will be made with individuals or organisations by email or phone to outline the research and summarise what participation will involve. Where participants are being contacted through their line of work, a gatekeeper letter will be sent to their workplace to request contact and individual participation. Subsequent contact will be made directly with the intended participants, provided access has been granted by the company. Detailed Participant Information Sheets will be sent to all individuals who have provisionally agreed to participate. Participants will be made aware that they can discontinue participation in the research at any time.

- 12. Will you be collecting Special Category data as defined by UK data protection legislation? Will you be collecting Criminal Offence data? If so, please give details.**

*Special Category data are sensitive personal data that require greater protection. They include data on an individual's religion; race; ethnicity; health; sex life and sexual orientation; politics; trade union membership; genetics; biometrics. For further information, see:*

*<https://ico.org.uk/for-organisations/guide-to-the-general-data-protection-regulation-gdpr/lawful-basis-for-processing/special-category-data/>*

*Criminal Offence data are personal data relating to criminal convictions and offences, or related security measures. For further information, see <https://ico.org.uk/for-organisations/guide-to-the-general-data-protection-regulation-gdpr/lawful-basis-for-processing/criminal-offence-data/>*

No

- 13. Where will your data collection take place?**

*Phase 1*

Where possible, every effort will be made to conduct interviews in person, at the participants place of work, and at a mutually decided time. Focus groups (and interviews if face-to-face interaction is not possible) will be conducted through Microsoft Teams.

*Phase 2*

The course delivery will take place in person, at the instructors' place of work.

- 14. Will participants be taking part in your study without their knowledge and consent at the time (e.g. covert observation of people)? If yes, please explain why this is necessary.**

No

- 15. If you answered 'no' to question 14, how will you obtain the consent of participants?**

*Please upload a copy of your consent form. A template consent form can be downloaded from the ERGO II site. Note that there is a separate template for UG/PGT applicants. If you are not using a consent form, please explain why.*

## Appendix B

Participants will be sent a consent form detailing their rights and outlining the research. Interviews, the focus group or the course delivery will not be conducted unless all participants in the group have signed and returned a copy of the consent form by Safesend to myself.

- 16. Is there any reason to believe participants may not be able to give full informed consent? If yes, what steps do you propose to take to safeguard their interests?**

No

- 17. If participants are under the responsibility or care of others (such as parents/carers, teachers or medical staff), what permission do you have to approach the participants to take part in the study?**

*Please upload evidence of approval from gatekeepers (e.g. Head Teacher, if conducting research in a school).*

Where participants are being contacted through their line of work, a gatekeeper letter will be sent to their workplace to request contact and individual participation. For example, centre managers will be contacted to request participation from their instructors and universities will be contacted to request participation from lecturers.

- 18. Describe what participation in your study will involve for study participants.**

*Specify in meaningful detail the experience of participation from the point of view of the participant. You MUST attach copies of any questionnaires and/or interview schedules and/or observation topic lists to be used.*

### Phase 1

After return of a signed consent form, and prior to the interview, participants will be sent a draft of a course prototype. The prototype details intended learning outcomes, method of delivery, criteria of assessment and possible ways in which the criteria can be taught and demonstrated. Participants will be asked to read the prototype and make note of any aspects which they feel need exploring, changing, addressing, or clarifying etc.

Open interviews will follow, allowing a discussion between the researcher and the participants on how the prototype can be refined and improved. The intention behind participatory research means it is less researcher-directed, and more participant-led than more traditional research methods. Participants and the researcher will therefore discuss the prototype together, before drafting in any changes or areas for further discussion.

Each participant group will be presented with the same prototype, however as interviews will be carried out consecutively according to dates and times available to the participants, the latest draft based on previous interviews may also be shown and discussed.

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Once all interviews have taken place, all participants will be invited to an online focus group to discuss the final course. The focus group should involve all participants involved in the interviews (approximately 12). The intention is that an open group discussion around the revised course prototype should iron out unnecessary aspects of the course and produce a finalised course that is of a recognisable quality by experts in the course areas.

### *Phase 2*

Contact with the outdoor centres as gatekeepers will be made to request participation in the research and discuss suitable dates. Provided outdoor centres are happy for the research to take place, dates will be arranged for the course to take place and participation from their instructors will be requested. Instructors will be asked to read the PIC and return a signed copy of the consent form prior to the course starting.

The beginning of the course will require instructors to complete a survey to assess their current belief in ability to teach about the environment, their pedagogic content knowledge, and their environmental literacy (see example questions in appendix). Once completed the surveys will be collected and stored for future analysis. The remainder of the first day will be a classroom based, using presentations, role play and practical activities to learn about environmental literacy and activities that can promote its development. The second day of the course will be a practical session, taking place in an outdoor activity that the centre provides. The day will involve putting the learning into practice to understand how environmental engagement can be facilitated within the outdoor adventure activities. Specific attention will be given to citizen science projects that can be incorporated into activities, nature connectedness and creative discussions.

At the end of the course participants will be asked to fill out the same survey, again to assess their belief in ability to teach about the environment, their pedagogic content knowledge, and their environmental literacy. These surveys will be compared to the pre-course surveys to analyse any differences the course has made. The end of the course will include a short group feedback discussion to gain qualitative data that could be used to refine the course.

A follow-up survey will be sent to the outdoor centres at the end of their busy season (around the end of September). This survey will assess the longitudinal success of the course. In addition, the survey will assess instructor self-perception of how well (if at all) they were able to include environmental engagement activities into their adventure activities. Where it is possible to visit the outdoor centres, these surveys will be administered in person, and discussions around the survey will be noted as qualitative data.

### **19. How will you make it clear to participants that they may withdraw consent to participate at any point during the research without penalty?**

*If there is a point after which it is not practicable to eliminate someone's data (e.g. after submission of dissertation), then please state this clearly here and on the Information Sheet.*

*Please note that in fully anonymous online or paper questionnaires, it is not possible to withdraw data after submitting / handing in the questionnaire.*



## Appendix B

Participation can be withdrawn at any stage of the study including during an interview if requested. This will be made clear in the information sheet, consent form and reiterated at the beginning of interviews and focus groups. However, whilst participation can be discontinued, data already collected from the person will not be retracted, i.e. further data will not be collected, but data already collected will still be analysed. This will also be made clear in the information sheet, consent form and will be reiterated at the beginning of interviews and focus groups. The reason for this is that data collected will be through notes on papers (course prototype) during interviews, as well as verbal. As the research does not collect any sensitive information it was thought unnecessary and problematic to attempt to separate all participant responses, without disregarding an entire interview. Furthermore, as discussions will stimulate thoughts, if a participant wishes to retract their participation it would be difficult for others to erase their ideas completely from the work. For these reasons it will be made explicit that participation can discontinue, but previous engagement cannot be withdrawn.

**20. Detail any possible distress, discomfort, inconvenience, harm or other adverse effects the participants may experience, including after the study, and how you will deal with this.**

*Give consideration to aspects such as emotional distress, anxiety, unmet expectations, unintentional disclosure of participants' identity, and assess the likelihood and severity of risks. Specify what precautions you will take or suggest to your participants to minimise any risks of harm (e.g. providing information about support services).*

It is not anticipated that participants will experience distress, inconvenience, harm, or other adverse effects from participation in the study. If, however participants do experience distress, they will be pointed to a wider support service.

**21. Specify any possible distress or harm to YOU arising from your proposed research, and the precautions you will take to minimise these.**

*Give consideration to the possibility that you may be adversely affected by something your participants share with you. This may include information of a distressing, sensitive or illegal nature.*

It is not anticipated that I will experience distress, harm, or other adverse effects from participation in the study.

**22. Does your planned research pose any additional risks as a result of the sensitivity of the research and/or the nature of the population(s) or location(s) being studied?**

*Give considerations to aspects such as impact on the reputation of your discipline or institution; impact on relations between researchers and participants, or between population sub-groups; social, religious, ethnic, political or other sensitivities; potential misuse of findings for illegal,*

*discriminatory or harmful purposes; potential harm to the environment; impacts on culture or cultural heritage.*

No

**23. How will you maintain participant anonymity and confidentiality in collecting, analysing and writing up your data?**

Participation in either phase of research cannot be fully confidential as interviews, focus groups and course participation will occur with other people. Participants will be made aware of this in their respective participant information sheet and will be asked to sign a statement indicating they will maintain research confidentiality.

In the write up of the project, participant groups in phase 1 will be labelled as seen in Table 1 (Q9). Individuals from the different groups will be referred to through pseudonyms. Any organisations referred to as part of the course trialling will be anonymised using generic identifiers (centre A etc), and individuals from the course trialling will be referred to through pseudonyms.

**24. How will you store your data securely during and after the study?**

*The University of Southampton has a Research Data Management Policy, including for data retention. The Policy can be consulted at <http://www.calendar.soton.ac.uk/sectionIV/research-data-management.html>*

*Please note that for UGs and PGTs, it is NOT correct that the University will store data for 10 years or longer. Instead, UG and PGT dissertation study data should be destroyed securely after conferment of the degree, unless strong justifications are made to retain the data for longer.*

Data and materials will be stored on my own, password protected, laptop hard drive. Copies will also be saved to the University of Southampton Onedrive.

Documents will be saved at least once daily when being altered. A back up of all materials will be made no less than once every two weeks. Online back-ups will be made to the University Onedrive. Back-ups of my own laptop will be made to my own, password protected, portable hard drive of which has a storage capacity of one terabyte.

The project will be written up in the form of the PhD thesis and results may be published in academic journals or magazines. Research finding made available in any reports or publications will not include information that can directly identify participants or their place of work without their specific consent.

Following the completion of the PhD, digital research data will be deposited in an appropriate disciplinary data repository (such as ESRC UK Data Service and Thesis Research Data Submission). Any non-digital data will be digitalised via scanning and deposited together with the digital data. Non-digital data will then be destroyed. Data held in the repository will be in the form of anonymised transcripts, audio recordings and survey database. Data sets will be grouped in line with phases 1 and 2 of research and aligned to the

## Appendix B

participant research groups. Company and centre names will be pseudonymised using Company A, B, C, etc and Centre A, B, C, etc, respectively.

Research data deposited in the Repository will be held there indefinitely.

The raw data collected will not be shared publicly. Findings from the data however will be shared openly, with (if successful) the course becoming a commercial enterprise.

### **25. Describe any plans you have for feeding back the findings of the study to participants.**

Participants involved in phase 1 of the research will be invited to attend one of the courses with instructors. Following data analysis, results of course success and research findings will be shared with all research participants from both phases 1 and 2 on request.

### **26. What are the main ethical issues raised by your research and how do you intend to manage these?**

The main ethical issue is conducting research with individuals that once collected cannot be withdrawn.

This will be managed through emphasis given to the issue in the participant information sheet and consent form, and reiterated prior to participation in the interview, focus group, and/or course.

Individuals will be made aware before the research starts that they do not have to participate, but in doing so they are agreeing to their data being used within the study. They will also be made aware they can cease participation at any time, without disclosing their reason. If this is done no future data will be collected from the individual, though data already shared will still be used.

### **27. Please outline any other information you feel may be relevant to this submission.**

Participant information sheets and consent forms are specific for participants in phase 1 and 2 of the study. Gatekeeper letters are for phase 2 of research only, and will not be sent out until February (earliest) of 2023.

Interest in the subject area stems from my background in adventure tourism and my awareness of environmental education opportunities in the outdoors. My undergraduate research indicated that despite having pro-environmental attitudes and behaviours, outdoor instructors showed varied knowledge of the marine environment and marine pollution (Sutton, 2019, unpublished). Driven by my own subjective experiences in gaining understanding and increased respect for the complexities of organisms and their unique place within the interconnected sphere of life, I support the presence of knowledge of the environment and nature being an influencer of pro-environmental attitudes. I therefore feel a valuable development for the outdoor sector is to educate outdoor instructors, so they have the knowledge and ability to use their activity setting effectively to enhance the literacy of clients, cognitively and psychologically, in the subject of the environment.

My positionality within the research is of an outdoor instructor, an environmentalist and an academic. My beliefs are that outdoor instructors have the opportunity to increase environmental engagement and learning while delivering activities, and to fulfil this potential there is a need for an environmental specific

course. Although this is my view on the future of the outdoor industry, it must be recognised that it is not everyone's vision. Some instructors may not wish to teach about the environment and may not be inclined to attend a course. Throughout the research I will be reflexive and respectful of views that do not align with my own to understand the viability of an environmental literacy course.

## **B.2 Approved participant information sheets (PIS) for phases 2, 3 and 4 of research)**

### **B.2.1 Approved PIS for phase 2**

Participant Information Sheet – Interviews and Focus Group (Phase 1)

**Study Title:** Exploring environmental literacy training for outdoor instructors.

**Researcher:** Ella Sutton

**ERGO number:** 77501

You are being invited to take part in the above research study. To help you decide whether you would like to take part or not, it is important that you understand why the research is being done and what it will involve. Please read the information below carefully and ask questions if anything is not clear or you would like more information before you decide to take part in this research. You may like to discuss it with others but it is up to you to decide whether or not to take part. If you are happy to participate you will be asked to sign a consent form.

#### **What is the research about?**

The project is being conducted as part of a PhD in Education with the University of Southampton and is being funded by the South Coast Doctoral Training Partnership (SCDTP).

My name is Ella Sutton, I have been an adventure guide in the outdoor adventure industry since 2015, based in Pembrokeshire, Wales. Through 2016-2019 I studied Outdoor Adventure Leadership and Management at the University of Worcester, where I was particularly interested in modules related to the environmental impacts (positive and negative) of adventure activities. This interest directed my dissertation subject 'Outdoor instructors' knowledge, attitudes and behaviours towards marine pollution'. My findings indicated that whilst outdoor instructors' predominately have positive attitudes towards the marine environment, knowledge and behaviours were variable. Through a combination of these findings, and my experience in the industry, it became apparent the sector (and environment) could benefit from an environmental course for outdoor instructors.

During activities, instructors are often expected to engage participants in the environment – to educate about flora and fauna, geology and geography, history, and ecology of where they are. However, the ability and knowledge of *how* to teach (regardless of context knowledge) is not generally a part of instructor training. The idea of an environmental course is to 'teach the teachers' how to educate in, about and for nature and the environment.

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The purpose of this study is therefore to progress the outdoor industry in their environmental contribution and enhance the credibility of commercially led outdoor adventure activities as a respected means to developing environmental knowledge, attitudes, and behaviours. To achieve this, the study engages with industry professionals (policy makers, outdoor educators, and environmental educators) to develop an environmental literacy course, based upon knowledge and first-hand experiences from working within outdoor adventure education and/or environmental education.

A draft course handbook has been created based on a criteria for pedagogic content knowledge (PCK) in outdoor education. The draft outlines intended learning outcomes from the course, the course delivery, a criteria for assessment, and examples of how the criteria may be taught and/or demonstrated. The intention of this research is to refine and enhance the course in a participatory manner, with others in the fields of environmental education, outdoor instructor training and policy and best practice directors.

Following the development of the course with industry professionals, the course will be trialled with outdoor instructors to determine whether it can be used as a viable course for increasing instructor ability to teach about the environment, whilst facilitating adventurous activities.

### **Why have I been asked to participate?**

You have been asked to participate in this study as an influential individual or organisation in environmental education, outdoor instructor training or policy and best practice. The study intends to collaborate with approximately twelve people, all of whom are being asked to participate in face-to-face interviews, and then a group focus group.

### **What will happen to me if I take part?**

If you agree to participate (and sign and return a copy of the consent form) you will be sent the draft course prototype. You will be asked to read the prototype prior to an interview and comment on it as you wish, making note of any aspects which you feel need exploring, changing, addressing, or clarifying etc.

At a mutually agreed time and location you will then be asked to meet in person for an informal interview, with myself as the researcher. Where possible, there will be two of you from your department in the interview so that ideas can be shared and built upon, and to reduce any tension felt from being in an interview situation by being with someone you know. The maximum number of participants in the interview will be three. Where it is not possible for more than one of you to attend the interview it will be carried out as a 1-to-1 interview/discussion in an informal manner.

We will discuss the prototype together, making alterations and refinements as appropriate, before drafting in any changes or areas for further discussion. It is anticipated that this may take up to 2.5 hours. This informal interview/discussion will be audio-recorded to allow for later transcription and data analysis. Each participant group will be presented with the same prototype, however as interviews will be carried out consecutively (in no particular order), according to dates and times available to the participants, the latest drafts based on previous interviews may also be discussed.

Once all interviews have taken place, all participants will be invited to an online focus group, to discuss the final course design. This will take place online for ease of access for participants. The intention is to interview 12 people; therefore, it is hoped that the focus group would also include 12 participants. Every effort will be made to accommodate all participants schedules, however where attendance is not possible for any individual they will be sent meeting minutes and contacted for any additional comments they wish to make. It is anticipated that the focus group will take place within two months of your interview, however this is subject to change according to availability of participants for interviews. The duration of the online focus group is anticipated to be no more than 2.5 hours. The focus group will be online and video-recorded to allow for later transcription and data analysis.

**Are there any benefits in my taking part?**

By taking part in this research, you are helping to increase the quality of the environmental literacy development course, through your experience and knowledge as a professional. In doing so we hope to collaboratively increase the quality of environmental training available to outdoor instructors, and hence the environmental impact outdoor adventure sessions have on participants environmental knowledge, attitudes, competencies and behaviours.

**Are there any risks involved?**

It is not anticipated that you will experience distress, harm, risk, or other adverse effects from participating in the study.

**What data will be collected?**

Data will be collected qualitatively through interviews and focus groups. Interviews will be structured around the participant handbook. An example interview structure can be found in the additional documents. Demographic questions (such as age, gender etc) will not be asked.

The questions asked will collect subjective data from the participants on their opinions and beliefs about the environmental literacy course; how it could be improved and revised in terms of content and structure, and how feasible the course will be for the outdoor industry.

Interviews and focus groups will all be audio-recorded to allow for later transcription and analysis. All recordings and transcripts will be deleted following completion of the degree. Until deleted all raw data will be kept on a portable hard drive in a password protected folder.

In addition to the audio and transcript data, participation in the research also involves participants writing on the draft prototype and making notes, before and during the interview process. This data will be reviewed and kept in hard copy form in a locked draw while not in use, as well as being scanned in to save in digital format in a password protected folder. Raw data will be erased following the completion of the degree.

**Will my participation be confidential?**

Demographic questions (such as age, education, gender etc) are not important for this study and will therefore not be requested.

As both the interview and focus group will be conducted with other people, it is not possible to ensure participant confidentiality. Each participant will be asked to sign a statement committing themselves to respect research confidentiality (who is participating in the research, and what information is shared), however it is beyond the capabilities of the researcher to ensure this is maintained. *If you do not want to risk your participation not being kept confidential, please do not agree to participate in the research study.*

Once data has been collected and recorded, only members of the research team and responsible members of the University of Southampton may be given access to data for monitoring purposes and/or to carry out an audit of the study to ensure that the research is complying with applicable regulations. Individuals from regulatory authorities (people who check that we are carrying out the study correctly) may require access to your data. All these people have a duty to keep your information, as a research participant, strictly confidential.

**Do I have to take part?**

No, it is entirely up to you to decide whether or not to take part. If you decide you want to take part, you will need to sign a consent form to show you have agreed to take part.

**What happens if I change my mind?**

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You have the right to change your mind and withdraw at any time without giving a reason and without your participant rights being affected. If you wish to do so, please contact the researcher (XXX).

If you withdraw from the study, we will keep the information about you that we have already obtained for the purposes of achieving the objectives of the study only.

### **What will happen to the results of the research?**

The project will be written up in the form of the PhD thesis and results may be published in academic journals or magazines. Research finding made available in any reports or publications will not include information that can directly identify you or the company you work for without your specific consent.

Following the completion of the PhD, digital research data will be deposited in an appropriate disciplinary data repository (such as ESRC UK Data Service and Thesis Research Data Submission). Any non-digital data will be digitalised via scanning and deposited together with the digital data. Non-digital data will then be destroyed. Data held in the repository will be in the form of anonymised transcripts, audio recordings and field notes. Data sets will be grouped in line with participant research groups and company names will be pseudonymised using Company A, B, C, etc. Individual participant names will not be recorded. This means your personal details will remain anonymous in all data that is stored, and any published material that references the study.

Research data deposited in the Repository will be held there indefinitely.

The outcome of the research should be a refined environmental literacy development course, targeted for use in outdoor instructor training. The course will be used in a second aspect of research with the PhD study, being trialled with outdoor instructors. The trial will assess the potential of the course in terms of achieving its intended learning objectives (increasing instructor belief in ability to teach about the environment, understanding of environmental literacy, knowledge of different pedagogic practices for facilitating environmental learning and gauging group dynamics to tailor environmental activities appropriately).

You will be invited to attend a course and following data analysis, results of the course success will be shared publicly.

Depending on the success of the course in achieving its learning objectives, the results and the course information may be shared with institutions such as the Institute for Outdoor Learning to seek course accreditation.

### **Where can I get more information?**

For more information about the research, please contact me, Ella Sutton, on XXX.

### **What happens if there is a problem?**

If you have a concern about any aspect of this study, you should speak to the researchers who will do their best to answer your questions.

|                     |                        |      |
|---------------------|------------------------|------|
| Student Researcher: | Ella Sutton            | XXXX |
| Main Supervisor:    | Professor Marcus Grace | XXXX |
| Second Supervisor:  | Dr Ran Peleg           | XXXX |

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If you remain unhappy or have a complaint about any aspect of this study, please contact the University of Southampton Research Integrity and Governance Manager (023 8059 5058, [rgoinfo@soton.ac.uk](mailto:rgoinfo@soton.ac.uk)).

### Data Protection Privacy Notice

The University of Southampton conducts research to the highest standards of research integrity. As a publicly-funded organisation, the University has to ensure that it is in the public interest when we use personally-identifiable information about people who have agreed to take part in research. This means that when you agree to take part in a research study, we will use information about you in the ways needed, and for the purposes specified, to conduct and complete the research project. Under data protection law, 'Personal data' means any information that relates to and is capable of identifying a living individual. The University's data protection policy governing the use of personal data by the University can be found on its website (<https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page>).

This Participant Information Sheet tells you what data will be collected for this project and whether this includes any personal data. Please ask the research team if you have any questions or are unclear what data is being collected about you.

Our privacy notice for research participants provides more information on how the University of Southampton collects and uses your personal data when you take part in one of our research projects and can be found at <http://www.southampton.ac.uk/assets/sharepoint/intranet/ls/Public/Research%20and%20Integrity%20Privacy%20Notice/Privacy%20Notice%20for%20Research%20Participants.pdf>

Any personal data we collect in this study will be used only for the purposes of carrying out our research and will be handled according to the University's policies in line with data protection law. If any personal data is used from which you can be identified directly, it will not be disclosed to anyone else without your consent unless the University of Southampton is required by law to disclose it. Where necessary in the write up of the PhD, organisations will be anonymised using generic identifiers (group A etc), individuals will be referred to (if necessary) through pseudonyms.

Data protection law requires us to have a valid legal reason ('lawful basis') to process and use your Personal data. The lawful basis for processing personal information in this research study is for the performance of a task carried out in the public interest. Personal data collected for research will not be used for any other purpose.

For the purposes of data protection law, the University of Southampton is the 'Data Controller' for this study, which means that we are responsible for looking after your information and using it properly. The University of Southampton will keep identifiable information about you for five years after the study has finished after which time any link between you and your information will be removed.

To safeguard your rights, we will use the minimum personal data necessary to achieve our research study objectives. Your data protection rights – such as to access, change, or transfer such information - may be limited, however, in order for the research output to be reliable and accurate. The University will not do anything with your personal data that you would not reasonably expect.

If you have any questions about how your personal data is used, or wish to exercise any of your rights, please consult the University's data protection webpage (<https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page>) where you can make a request using our online form. If you need further assistance, please contact the University's Data Protection Officer ([data.protection@soton.ac.uk](mailto:data.protection@soton.ac.uk)).

### Thank you.

Thank you for taking the time to read the information sheet and considering taking part in the research.



## **B.2.2      Approved PIS for phases 3 and 4**

### Participant Information Sheet – Course Participation and Survey (Phase 2)

**Study Title:** Exploring environmental literacy training for outdoor instructors.

**Researcher:** Ella Sutton

**ERGO number:** 77501

You are being invited to take part in the above research study. To help you decide whether you would like to take part or not, it is important that you understand why the research is being done and what it will involve. Please read the information below carefully and ask questions if anything is not clear or you would like more information before you decide to take part in this research. You may like to discuss it with others but it is up to you to decide whether or not to take part. If you are happy to participate you will be asked to sign a consent form.

#### **What is the research about?**

The project is being conducted as part of a PhD in Education with the University of Southampton and is being funded by the South Coast Doctoral Training Partnership (SCDTP).

My name is Ella Sutton, I have been an adventure guide in the outdoor adventure industry since 2015, based in Pembrokeshire, Wales. Through 2016-2019 I studied Outdoor Adventure Leadership and Management at the University of Worcester, where I was particularly interested in modules related to the environmental impacts (positive and negative) of adventure activities. This interest directed my dissertation subject 'Outdoor instructors' knowledge, attitudes and behaviours towards marine pollution'. My findings indicated that whilst outdoor instructors predominately had positive attitudes towards the marine environment, knowledge and behaviours were variable. Through a combination of these findings, and my experience in the industry, it became apparent the sector (and environment) could benefit from an environmental course for outdoor instructors.

During activities, instructors are often expected to engage participants in the environment – to educate about flora and fauna, geology and geography, history, and ecology of where they are. However, the ability and knowledge of how to teach (regardless of context knowledge) is not generally a part of instructor training. The idea of an environmental course is to 'teach the teachers' how to educate in, about and for nature and the environment.

The purpose of this study is therefore to progress the outdoor industry in their environmental contribution and enhance the credibility of commercially led outdoor adventure activities as a respected means to developing environmental knowledge, attitudes, and behaviours. An initial phase of the research involved the development of a draft course which I have created, modified, and refined with industry experts (policy directors, outdoor educators, and environmental educators). The course is now ready to be trialled with outdoor instructors to determine whether it can be used as a viable means for increasing instructor ability to teach about the environment, whilst facilitating adventurous activities.

The intentions of the course are to:

- a. Teach instructors the concept of environmental literacy, why its development is important for a sustainable future, and how, as outdoor instructors, they can inspire change among participants in engaging in pro-environmental behaviours
- b. Increase instructor confidence in their own ability to engage and educate about the environment
- c. Increase instructor knowledge of different pedagogic practices and explore how activities can be facilitated through different pedagogical lenses

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- d. Increase instructor ability to read group dynamics and choose activities and pedagogies that will be relatable and beneficial to the groups' environmental literacy development.

These objectives will be measured quantitatively using survey questions.

### **Why have I been asked to participate?**

You have been asked to participate in this study as outdoor instructor of an adventure centre that has environmentally orientated ethos. The intention of the study is to facilitate least five courses at different outdoor centres from across the UK, with a minimum of five instructors on each course.

### **What will happen to me if I take part?**

If you agree to participate you will be welcomed on to the (maximum) two-day course, being run at your place of work, or two online workshops (maximum eight-hours total). You will be asked to read, sign, and return a copy of the consent form prior to the course beginning.

The beginning of the course will require you to complete a survey that will assess your current belief in ability to teach about the environment and understanding of environmental literacy. Once completed the surveys will be collected and stored for future analysis. The first half of the course will be theory based, using presentations, role play and practical activities to learn about environmental literacy and activities that can promote its development.

The second half of the course (if being carried out face-to-face) will be a practical session, taking place in an outdoor activity that the centre provides. The day will involve putting the learning into practice to understand how environmental engagement can be facilitated within the outdoor adventure activities. Specific attention will be given to citizen science projects that can be incorporated into activities, nature connectedness and creative discussions.

At the end of the course, you will be asked to fill out the same survey and be involved in a short group feedback discussion to gain qualitative data that could be used to refine the course.

A follow-up survey will be sent to your outdoor centre at the end of the season to assess the longitudinal success of the course and your self-perception of how well (if at all) you were able to include environmental engagement activities into your adventure activities. Where it is possible to visit the outdoor centres, these surveys will be administered in person, and discussions around the survey will be noted as qualitative data. This survey should take no more than 15 minutes.

### **Are there any benefits in my taking part?**

By taking part in this research, you are helping to me to understand the quality of the course. In doing so I hope to collaboratively increase the quality of environmental training available to outdoor instructors, and hence the environmental impact outdoor adventure sessions have on participants' environmental knowledge, attitudes, competencies and behaviours.

### **Are there any risks involved?**

It is not anticipated that you will experience distress, harm, risk, or other adverse effects from participating in the study.

### **What data will be collected?**

Demographic questions (such as age, education, gender etc) are not important for this study and will therefore not be requested.

Quantitative data will be collected using surveys in a pre- and post- intervention method. Survey questions are set to analyse your knowledge of environmental literacy and your belief in your ability to teach about

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the environment. Additional materials will be presented alongside the presentation to gain an understanding of your identification of nature in self, and to identify areas of strength and weakness in environmental literacy.

Qualitative data will also be collected in the form of field notes, audio-recordings and video recordings taken during the course, to enable analysis of meaningful moments and participant discussions.

Hard-copy data (from surveys, field notes and recordings) will be reviewed and kept in a locked draw while not in use, as well as being scanned in to save in digital format in a password protected folder. Raw data will be erased following the completion of the degree. All recordings and transcripts will also be deleted following completion of the degree. Until deleted, all raw data will be kept on a portable hard drive in a password protected folder.

### **Will my participation be confidential?**

Demographic questions (such as age, education, gender etc) are not important for this study and will therefore not be requested.

Participation in the course trailing will be conducted with other people, therefore it is not possible to ensure participant confidentiality. Each participant will be asked to sign a statement committing themselves to respect research confidentiality (who is participating in the research, and what information is shared), however it is beyond the capabilities of the researcher to ensure this is maintained. *If you do not want to risk your participation not being kept confidential, please do not agree to participate in the research study.*

Once data has been collected and recorded, only members of the research team and responsible members of the University of Southampton may be given access to data for monitoring purposes and/or to carry out an audit of the study to ensure that the research is complying with applicable regulations. Individuals from regulatory authorities (people who check that we are carrying out the study correctly) may require access to your data. All these people have a duty to keep your information, as a research participant, strictly confidential.

### **Do I have to take part?**

No, it is entirely up to you to decide whether to take part. If you decide you want to take part, you will need to sign a consent form to show you have agreed to take part.

### **What happens if I change my mind?**

You have the right to change your mind and withdraw at any time without giving a reason and without your participant rights being affected. If you wish to do so, please tell myself (the researcher) during the course or contact me via email (XXX).

If you withdraw from the study, information that has already been obtained will be kept for the purposes of achieving the objectives of the study only.

### **What will happen to the results of the research?**

The project will be written up in the form of the PhD thesis and results may be published in academic journals or magazines. Research finding made available in any reports or publications will not include information that can directly identify you or the company you work for without your specific consent.

Following the completion of the PhD, digital research data will be deposited in an appropriate disciplinary data repository (such as ESRC UK Data Service and Thesis Research Data Submission). Any non-digital data will be digitalised via scanning and deposited together with the digital data. Non-digital data will then be destroyed. Data held in the repository will be in the form of anonymised transcripts, audio recordings,

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field notes and survey database. Data sets will be grouped in line with centre research groups and company names will be pseudonymised using Centre A, B, C, etc. Individual participant names will not be recorded. This means your personal details will remain anonymous in all data that is stored, and any published material that references the study.

Research data deposited in the Repository will be held there indefinitely.

The research is being conducted with the intention of establishing a recognised qualification or certification for environmental literacy development which, if successful, will be facilitated commercially. The results will therefore be used to assess the success and quality of the course, which will direct the future way of the course.

### Where can I get more information?

For more information about the research, please contact me, Ella Sutton, on XXX.

### What happens if there is a problem?

If you have a concern about any aspect of this study, you should speak to the researchers who will do their best to answer your questions.

|                     |                        |      |
|---------------------|------------------------|------|
| Student Researcher: | Ella Sutton            | XXXX |
| Main Supervisor:    | Professor Marcus Grace | XXXX |
| Second Supervisor:  | Dr Ran Peleg           | XXXX |

If you remain unhappy or have a complaint about any aspect of this study, please contact the University of Southampton Research Integrity and Governance Manager (023 8059 5058, [rgoinfo@soton.ac.uk](mailto:rgoinfo@soton.ac.uk)).

### Data Protection Privacy Notice

The University of Southampton conducts research to the highest standards of research integrity. As a publicly-funded organisation, the University has to ensure that it is in the public interest when we use personally-identifiable information about people who have agreed to take part in research. This means that when you agree to take part in a research study, we will use information about you in the ways needed, and for the purposes specified, to conduct and complete the research project. Under data protection law, 'Personal data' means any information that relates to and is capable of identifying a living individual. The University's data protection policy governing the use of personal data by the University can be found on its website (<https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page>).

This Participant Information Sheet tells you what data will be collected for this project and whether this includes any personal data. Please ask the research team if you have any questions or are unclear what data is being collected about you.

Our privacy notice for research participants provides more information on how the University of Southampton collects and uses your personal data when you take part in one of our research projects and can be found at <http://www.southampton.ac.uk/assets/sharepoint/intranet/ls/Public/Research%20and%20Integrity%20Privacy%20Notice/Privacy%20Notice%20for%20Research%20Participants.pdf>

Any personal data we collect in this study will be used only for the purposes of carrying out our research and will be handled according to the University's policies in line with data protection law. If any personal

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data is used from which you can be identified directly, it will not be disclosed to anyone else without your consent unless the University of Southampton is required by law to disclose it. Organisations will be anonymised using generic identifiers (centre A etc), individuals will be referred to (if necessary) through pseudonyms.

Data protection law requires us to have a valid legal reason ('lawful basis') to process and use your Personal data. The lawful basis for processing personal information in this research study is for the performance of a task carried out in the public interest. Personal data collected for research will not be used for any other purpose.

For the purposes of data protection law, the University of Southampton is the 'Data Controller' for this study, which means that we are responsible for looking after your information and using it properly. The University of Southampton will keep identifiable information about you for five years after the study has finished after which time any link between you and your information will be removed.

To safeguard your rights, we will use the minimum personal data necessary to achieve our research study objectives. Your data protection rights – such as to access, change, or transfer such information - may be limited, however, in order for the research output to be reliable and accurate. The University will not do anything with your personal data that you would not reasonably expect.

If you have any questions about how your personal data is used, or wish to exercise any of your rights, please consult the University's data protection webpage (<https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page>) where you can make a request using our online form. If you need further assistance, please contact the University's Data Protection Officer ([data.protection@soton.ac.uk](mailto:data.protection@soton.ac.uk)).

**Thank you.**

Thank you for taking the time to read the information sheet and considering taking part in the research.

## B.3 Approved consent forms for phases 2, 3 and 4)

### B.3.1 Approved phase 2 consent form

#### CONSENT FORM

#### INTERVIEWS AND FOCUS GROUP (Phase 2)

**Study Title:** Exploring environmental literacy training for outdoor instructors.

**Researcher name:** Ella Rose Sutton

**ERGO number:** 77501

**Please initial the box(es) if you agree with the statement(s):**

|                                                                                                                                                                                                                                           |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| I have read and understood the information sheet (version 4) dated 14 <sup>th</sup> September 2022 and have had the opportunity to ask questions about the study.                                                                         |  |
| I agree to take part in this research project and agree for my data to be used for the purpose of this study.                                                                                                                             |  |
| I understand my participation is voluntary and I may withdraw (at any time) for any reason without my participation rights being affected.                                                                                                |  |
| I understand that should I withdraw from the study then the information collected about me up to this point will still be used for the purposes of achieving the objectives of the study only.                                            |  |
| I understand that I may be quoted directly in reports of the research but that I will not be directly identified (i.e., that my name will not be used).                                                                                   |  |
| I understand that taking part in the study involves audio and video recording which will be transcribed and then destroyed, for the purposes set out in the participation information sheet.                                              |  |
| I understand that my anonymity cannot be guaranteed in the focus group or interview, but that any information collected by the researchers will be kept confidential and participants will be asked to keep the discussions confidential. |  |
| I understand that I must keep the discussions and research participation confidential.                                                                                                                                                    |  |
| I understand that my personal information collected about me such as my name and where I work will not be shared beyond the study team.                                                                                                   |  |

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|                                                                                                                                                                                                                            |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| I understand the research is being conducted with the intention of establishing a recognised qualification or certification for environmental literacy development which, if successful, will be facilitated commercially. |  |
| I agree to participate in an informal interview about the course to discuss areas that require attention and refining.                                                                                                     |  |
| I agree to participate in a focus group with the other interview participants, to discuss and finalise the course material.                                                                                                |  |

Name of participant (print name).....

Signature of participant.....

Date.....

Name of researcher (print name).....

Signature of researcher .....

Date.....

-----

**Optional - please only initial the box(es) you wish to agree to:**

|                                                                                                                                                                |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| I am happy to be contacted individually for further discussion of the course (if yes, please provide the email address you wish to receive correspondence on). |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

**B.3.2 Approved consent form for phases 3 and 4**

## CONSENT FORM

## COURSE PARTICIPATION AND SURVEY (Phases 3 and 4)

**Study Title:** Exploring environmental literacy training for outdoor instructors.

**Researcher name:** Ella Rose Sutton

**ERGO number:** 77501

***Please initial the box(es) if you agree with the statement(s):***

|                                                                                                                                                                                                                                        |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| I have read and understood the information sheet (version 5, dated 9 <sup>th</sup> February 2023) and have had the opportunity to ask questions about the study.                                                                       |  |
| I agree to take part in this research project and agree for my data to be used for the purpose of this study.                                                                                                                          |  |
| I understand my participation is voluntary and I may withdraw (at any time) for any reason without my participation rights being affected.                                                                                             |  |
| I understand that should I withdraw from the study then the information collected about me up to this point will still be used for the purposes of achieving the objectives of the study only.                                         |  |
| I understand that I may be quoted directly in reports of the research but that I will not be directly identified (i.e., that my name will not be used).                                                                                |  |
| I understand that taking part in the study involves audio and video recording which will be transcribed and then destroyed, for the purposes set out in the participation information sheet.                                           |  |
| I understand that my anonymity cannot be kept during participation in the course, but that any information collected by the researchers will be kept confidential and participants will be asked to keep the discussions confidential. |  |
| I understand that I must keep the discussions and research participation confidential.                                                                                                                                                 |  |
| I understand that my personal information collected about me such as my name and where I work will not be shared beyond the study team.                                                                                                |  |



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|                                                                                                                                                                                                                            |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| I understand the research is being conducted with the intention of establishing a recognised qualification or certification for environmental literacy development which, if successful, will be facilitated commercially. |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

Name of participant (print name).....

Signature of participant:.....

Date:.....

Name of researcher (print name).....

Signature of researcher .....

Date.....

-----

***Optional - please only initial the box(es) you wish to agree to:***

|                                                                                                                                                                      |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| I am happy to be contacted individually for further discussion of the course (if yes, please provide the email address you wish to receive correspondence on below). |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

## B.4 Approved gatekeeper letter

Ella Sutton

University of Southampton

Date: 12<sup>th</sup> September 2022

Email: [XXXX](#)

Phone: XXXX

Address Line 1

Address Line 2

Address Line 3

Postcode

Dear Sir or Madam,

I am writing to formally invite you, and your instructors, to take part in an Environmental Instructor Training Course. This course has been developed as part of a PhD programme at the University of Southampton and is being funded by the South Coast Doctoral Training Partnership. The aim is to create a recognised and accredited course that will increase outdoor instructors' beliefs about their ability to teach about the environment, their understanding of environmental literacy, and their knowledge of facilitation strategies that can be adopted to actively engage clients in the environment during adventure activities.

With this letter I am seeking your formal permission to take part in the project, as the Gatekeeper of the outdoor centre. Participation would involve instructors (at least five) taking part in a two-day face-to-face course, of which is split equally into classroom and activity based. Following this, after your season has quietened down, I would request instructors to fill in an additional survey which would take up to 15 minutes. This survey would give an indication of any longitudinal benefits of the course, as well as instructor perceptions of how well (if at all) they were able to facilitate environmental engagement activities within your adventures. I will not be collecting any sensitive or special category data.

I am requesting permission for survey data to be collected pre- and post- course participation, which would be analysed to assess the quality and success of the course. In addition, I request permission to take field notes and record group discussions using an audio recorder, to gain qualitative data that can be used to later explain some of the quantitative findings.

I will provide participant information sheets and consent forms to your instructors which will be approved by the University's Ethics committee. A copy of each is included here to provide you with more

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information about the study. I must have a signed copy of the consent form from all instructors before beginning the course.

Running the course will require access to an indoor facility at your workplace, for either one full day (0900 – 1700) or two mornings (0900 – 1230). It will also require going out on an activity session with your instructors to put into practice environmental engagement activities. Ideally, this will involve participating in two of your activities, either throughout one full day, or over two afternoons. I will adhere to your Health and Safety procedures, and both activities will be facilitated within your working ratios. I have an enhanced DBS certificate which I can send to you upon request, and experience working in the outdoor industry as an adventure instructor.

Data collected will be used in the write up of my PhD, as well as for the development or accreditation of the course. Data may also be used in research publications. In all areas where data is publicised, your personal information (both your organisation and individual instructors) will remain confidential. If you would like your outdoor centre to be named in the promotion of the course in the future please let me know.

If you have any questions about the project, please do not hesitate to contact us. We look forward to hearing from you.

Best wishes,

Ella Sutton

### Outdoor Centre agreement statement

Please *initial* each of the statements below to indicate agreement:

|                                               |  |
|-----------------------------------------------|--|
| I agree for this study to take place at ..... |  |
|-----------------------------------------------|--|

Name: .....

Signature:.....

Date: .....

## **Appendix C    Supplementary material for the expert appraisals**

### **C.1    Final version of the participant handbook for the environmental literacy course**

# The Environmental Literacy Course Participant Handbook



## Preface

“It is not merely a matter of exposing people to outdoor experiences and hoping that they become infused with environmental awareness or sensitivity.”

– Alison Lugg (2007)

Inspiring environmental awareness, sensitivity, knowledge, or pro-environmental behaviours takes more than exposing people to beautiful places. It is a good start, but without sharing knowledge and skills to enable pro-environmental behaviours, the long-term benefit for the environment is reduced.

Taking part in outdoor adventure activities has the potential to increase clients' understanding and connection with nature, to inspire pro-environmental attitudes and behaviours. To a certain extent this can happen as a by-product of adventuring – the thrill or beauty of the place can bring about a sense of awe and appreciation for nature; but these benefits tend to be short-lived. To make a bigger difference when it comes to the environment, there needs to be more attention given to environmental conversations and activities.

This environmental literacy course has been developed as an introductory course for outdoor instructors in how to effectively engage clients with the environment, through activities, conversation, and science. To gain most benefit from the course, it relies on instructors having some environmental knowledge they can relate to the area they work in.

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## Glossary of Terms

|                         |                                                                                                                                                                                                                          |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outdoor leader:         | ‘Leader’ is used throughout the handbook as an all-inclusive term for guide, instructor, coach, outdoor professional, and any other identity label used in the outdoor sector.                                           |
| Outdoor sector:         | The branch of outdoor work involving commercially based outdoor adventure activities. Business may be run out of centres or vans, or as freelance individuals.                                                           |
| Environmental literacy: | The process of engaging with the environment through knowledge, emotion, and experience, to enable competent decision making and to empower individuals to take some form of positive action to benefit the environment. |

## Course Objectives

Understand the concept of environmental literacy and why it is important for a sustainable future.

Increase competence and confidence for engaging adventure clients in environmental conversations.

Develop facilitation strategies for developing environmental knowledge, attitudes, skills, and behaviours.

Understand the difference between human-centred and environment-centred views, climate anxiety and denial, and how to communicate effectively with different audiences.

## Course Structure

The course involves approximately six hours of interactive, theory-based delivery. It can be conducted either online over two sessions, or in-person. In either mode of delivery, the course is interactive and will involve group discussions and activities.

Where the course is held in-person there will be an additional focus on practising different delivery methods and activities to promote environmental literacy.

Full participation in the course is rewarded with a certificate of attendance.

The Environmental Literacy course has been recognised by the Mountain Training Association and Canoe Wales as a valuable training course. For members of the above organisations, 1 CPD point can be awarded for course participation.

## Environmental Literacy

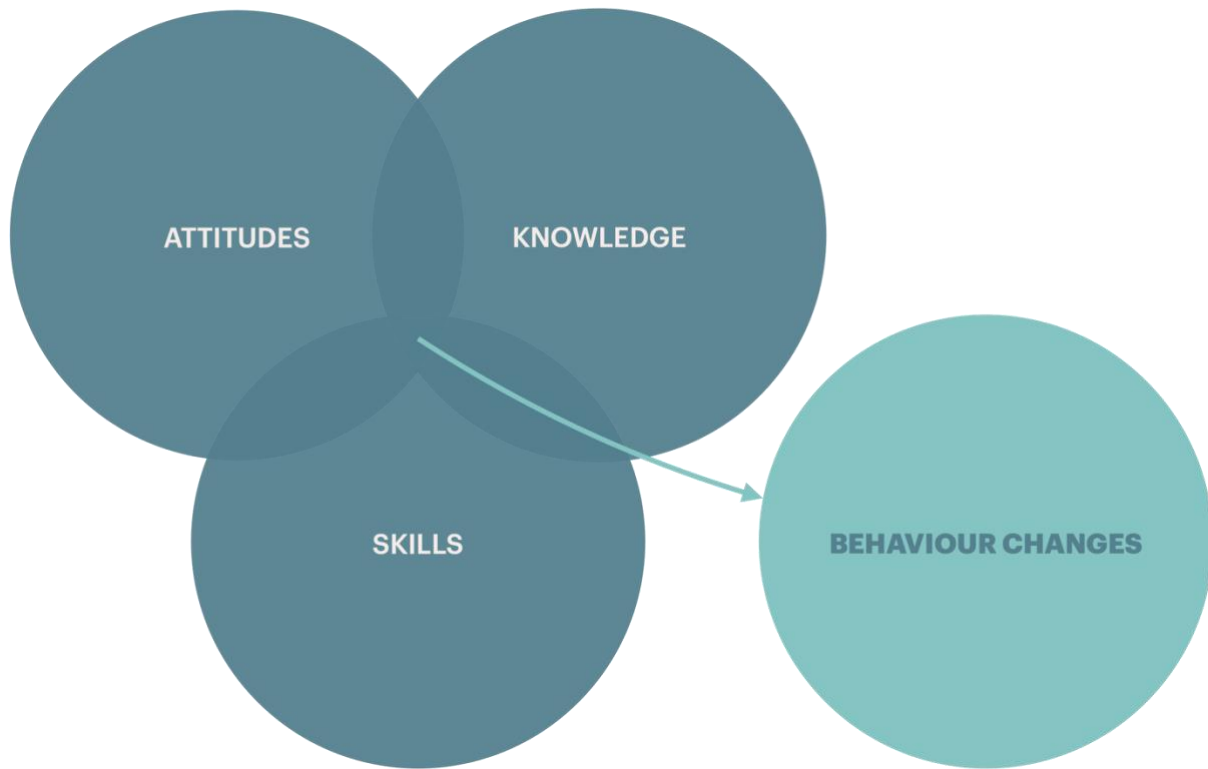
**Environmental literacy** is a process of engaging with the environment through *knowledge, emotion, and experience, to enable competent decision making and to empower individuals to take some form of positive action to benefit the environment.*

Being present outdoors can boost people's mood, making them feel happier, healthier, more peaceful, creative, less anxious, or less stressed. But not only can it make us *feel* better, humans rely on environmental connections to continue living. The oxygen breathed comes from plankton in the oceans and the trees on land. The materials we use in our daily lives to clothe ourselves, keep warm, travel, eat etc are all sourced from naturally existing resources. As outdoor enthusiasts we are dictated to by weather conditions, not just of the day, but of days or weeks leading up to adventures. Our interaction with nature is constant and inseparable.

The environmental challenges being faced on a local and global scale are undeniable. Outdoor leaders work in niche locations that highlight nature's beauty and provide an opportunity to motivate and empower others to take positive action that will benefit local and global environments. The potential of environmental learning through outdoor activities can be enhanced by developing knowledge and skills to frame and facilitate environmental learning.

The intended outcome of environmental literacy is to enable competent decision making and to empower individuals to take some form of positive action to benefit the environment. To do this, the course looks at the combination of knowledge, attitudes, and skills.





The course explores how knowledge, attitudes, and skills can be developed in an adventure setting through storytelling, citizen science, and nature connection pathways, to encourage commitments to pro-environmental behaviour change. Throughout the course there will also be a focus on participant expectations and appropriate framing techniques for initiating environmental conversations.

**By the end of the course, you should be able to...**

Understand the concept of environmental literacy and why it is important.

Integrate environmental activities and conversations into outdoor adventure activities.

Use a range of facilitation strategies to communicate environmental topics.

## What is Nature?

Finding a definition for nature is challenging. How would you begin to define what nature is? Does it have a size or worth? Are there living organisms? Are humans nature?

Challenging how we perceive nature can help us to understand how clients might view nature and therefore help us to gauge appropriate behaviours and conversations that we can have to help nature recovery.

The course challenges participants to think about what nature is, and how the places we work in can impact outdoor adventure clients. A particular focus of the course is on the human-nature relationship, the impacts and connections.

### **Areas for consideration:**

- How does exposure to nature through outdoor adventure activities influence clients?
- How are humans connected to nature?

### **By the end of the course, you should be able to...**

Be aware of different ways that participants might think about nature.

Understand the idea of 'big' and 'small' nature and how both can be important for developing environmental literacy.

## Participant Thinking

Understanding how clients think and learn is key for developing a good rapport, effectively communicating, and enhancing learning. It is important to understand client expectations and intentions for participating in the activities. Expectations of the activity can be formed from the product advertising and marketing, word-of-mouth, and company photos, prior to clients arriving to take part.

*What is being sold, and how, becomes an important part of the process if the aim is to promote sustainability and environmental considerations.*

The course gives an overview of how activity framing can impact the expectations of clients, from the moment the advertisement is seen, to the moment they arrive at the centre and meet their activity leader. The course introduces the perspectives of ecocentrism (environment-centred beliefs) and anthropocentrism (human-centred beliefs) as well as climate anxiety and how different conversations and behaviours are appropriate for different clients.

### **Areas for consideration:**

- What are the expectations of clients when they arrive to participate in your activities?
- Are there appropriate and inappropriate times for environmental conversations and/or activities?

### **By the end of the course, you should be able to...**

Demonstrate the ability to discuss or address common environmental misconceptions.

Discuss the potential effects of environmental communication in outdoor activities.

## Participant thinking: Goal setting and Reflection

Outdoor education has a strong history of being linked with experiential learning - the practice of learning through doing. A lot can be learnt about oneself through experience, but unless the experiences are reflected on, the opportunity for developing learning is not taken advantage of. Goal setting and reflection is what ties together participant expectations and environmental conversations, to reach the potential of environmental learning through adventure activities.

Goal setting gives participants a heads up as to what they will be asked or doing later in the session. Reviewing knowledge of the environment, both scientific and personal, is then an essential stage for reinforcing learning, and relating that learning to their home environment to address how they might change their own behaviour.

Having facilitated activities and conversations to develop knowledge and attitudes, it is the reflection that builds on skills and commitments to motivate and empower behaviour change.

### **Areas for consideration:**

- What stops you from setting goals with your group and facilitating reviews?
- What kind of goals should be set?
- How can we help make environmental learning transferable?
- What makes for a good review?

### **By the end of the course, you should be able to...**

Demonstrate an understanding of how goal setting and reflection work together.

Discuss how goals set can be made specific to group members.

Demonstrate how active reflection can be carried out throughout an activity, with individuals or as a group.

## Nature Connectedness

The rapport created between leaders and clients is set within minutes, and it can be difficult to build the mutual trust or respect needed for a successful adventure, or successful learning if you get off on the wrong foot! As in all areas of outdoor leading, acknowledging participant attitudes is important to be able to effectively communicate.

If you think about potential environmental attitudes within a group of adventure clients they might vary significantly, from someone who is hugely environmentally anxious, to someone who doesn't give it a second thought. How to engage with these participants when it comes to environmental conversations will also be different to respect their views and encourage them to share their opinions.

Researchers at the University of Derby have come up with five pathways to enhance a nature connection: senses, emotion, compassion, meaning and beauty. These contribute to the 'attitudes' aspect of environmental literacy, shaping motivation, sense of responsibility, emotion, and beliefs.

Nature connection activities involve slowing down. On a hill walk or kayak journey this can be easy as the pace is generally slower. Spreading out and taking a few minutes to oneself can be managed relatively easily (conditions dependent). On faster-paced activities it can be harder, if you're being faced with big swells or are time limited. Asking guided questions can encourage clients to open their minds to their senses, emotions, and beauty of the place, and as a result they are likely to grow in their emotional connection or bond with nature.



Emotion



Meaning



Senses



Compassion



Beauty

**Areas for consideration:**

- How do you respond to the term 'nature connectedness', and how might clients respond?
- What might help or hinder clients building positive attitudes towards helping the environment?

**By the end of the course, you should be able to...**

Demonstrate an understanding of the concept of nature connectedness, and the different pathways that can be used to increase a nature connection.

Demonstrate knowledge of activities and resources that could be used to increase nature connectedness during outdoor activities.

Explain how nature connectedness activities can be used and transferred to different aspects of life.

## Environmental Knowledge: Citizen Science

How often do you think about your own impact on the environment you're working in? From micro-plastics being scraped off kayaks while rock-hopping, to path degradation on mountains and wildlife disturbance; there is always some kind of impact to the environment from adventure activities. Finding the balance between providing memorable adventures, preserving wildlife, and maintaining a profitable business can be a challenge.

An aspect of the environmental literacy course explores how citizen science projects can be incorporated into activities to contribute to a wider understanding of change, both that caused by activities, and local or global changes that may have an impact on activities, the good and the bad.

Changes happen in environments for many reasons, both naturally and unnaturally, for example, seasonal and temporal changes, pollution, (agricultural run-off, sewage, chemical, plastic etc), and disturbance (noise and trampling) to name a few. As visitors to these natural areas of beauty and wildlife we are obligated to protect and conserve wherever possible, conforming to area codes, best practice, and leave no trace principles.

Taking part in citizen science projects doesn't mean you have to lead a scientific experiment. Projects exist worldwide to monitor flora and fauna species, air quality, water quality or temperature etc. Platforms such as iRecord and iNaturalistUK are used popularly UK-wide, and for Wales specifically there is the Wales Coast Explorer App (founded by Pembrokeshire Coastal Forum) which provides an easy way to document sightings.

### Areas for consideration:

- How do activities you run impact the environment?
- What could you do to help mitigate your impact?
- Have you witnessed any changes in your activity environment?

**By the end of the course, you should be able to...**

Discuss local projects that are carrying out environmental monitoring or assessments.

Demonstrate how you could engage clients in citizen science projects; where you would record your information, and why.



## Environmental Knowledge: Storytelling

Storytelling has been used to as a tool for environmental communication in different ways: factual stories of change, relaying experiences, or imaginative role play. It is important to gauge how clients might respond to environmental discussions and learning, and to facilitate activities accordingly.

Storytelling isn't about a 'once upon a time' sit down with a cup of tea, its conversational storytelling. It can be combined with citizen science and experiences to educate and inspire others.

Telling an ACE story:

**Action** – what has happened, or what is happening?

**Colour** – give the details, the weather, the sounds, the smells

**Emotion** – interpret the emotion of the creatures/people involved

### Areas for consideration:

- How do you identify wildlife during your activities? Do you name them, or do you tell something about their story?
- How can you manage role play – when might you allow for wild imagination and when might you need to intervene?

### By the end of the course, you should be able to...

Demonstrate how historical, geographical, socio-cultural, or ecological knowledge can be shared through storytelling.

Explain how stories can be used to engage clients in the life and connections of the past, present, and future of the location(s).

## C.2 Description of top-level codes

### 1. **Value:** “*Giving us [instructors] added value*” (Alex) and “*Ultimately selling the course!*” (Elinor)

By value I mean the course must be **of value** to the instructors and businesses. In addition, the outcome of instructors taking part in the course should be valuable to the end user (the adventure clients). Value was interpreted in different ways: commercial value i.e., how it will make the company earn more money and receive more clients; individual value i.e., will it make instructors more employable or more valuable to the sector, will it benefit their C.V. and/or will it be recognised as CPD; subjective value i.e., will it be seen as valuable step to take to increase motivation and ability to be able to achieve environmental teaching opportunities.

### 2. **Influencing change:** “*Planting the seed*” (Finn)

The course must be informative so that instructors go away having learned something. They need to have environmental content knowledge for the pedagogic knowledge to make sense and be valuable. What can they take away from the course with them (something physical) to help recap during their practice and keep them informed. It must be informative on a practical and theoretical level.

The course isn't trying to solve climate change; but it is creating the starting points from which people (instructors and their clients) can grow on. 'Planting the seed' is giving the initial step in the process to challenge their thinking and behaviours, alluding to their opportunities and their responsibilities.

### 3. **Challenging perceptions (of nature):** “*The nature store cupboard*” (Ben)

The traditional ethos of outdoor adventure is “let the mountains speak for themselves”; provide an outdoor experience and the awareness and emotional engagement with nature will grow because of being present, rather than anything specifically facilitated. On the one hand, participants seem to value nature, however there is little recognition of the damage the outdoor activities can do.

Businesses want to be 'seen' to be doing the right thing so want to be on top of their environmental propaganda (greenwashing) – businesses also genuinely want to be doing the right thing by the environment so will do what they can to increase their environmental responsibility.

Adventure clients want to feel less guilty about their travel so if they are contributing to helping the environment in some way then they can feel better about themselves. There is also more 'readiness' in the public for environmental conversations and action. Therefore, how will the course meet a marketing demand and satisfy the business / instructor / consumer demand.

This code highlights the rhetoric reality of ideologies not being mirrored by behaviours. It recognises the need for beginning a process of a new social movement where 'nature' is viewed and recognised as more than an 'other'. The human-nature 'othering' was compared to the 'othering' people of ethnic minority groups, homosexuals, and transgender. The idea that nature needs to be accepted as 'us' in a new social movement of ecocentricism.

#### **4. Relatability:**

##### **a. Appropriate course delivery:** *"Learning in very different ways"* (Alex)

How relatable is the course to the outdoor sector and outdoor instructors, and how relatable is the information that instructors would share with their adventure clients. This linked to 'knowing your audience'.

- Knowing your audience (1) – instructor audience
  - What are the common learning styles of outdoor instructors?
  - How ready are they to accept an environmental responsibility?
  - What are they already capable of, and what do they do?
- Knowing your audience (2) – adventure client audience
  - How ready are they to accept an environmental responsibility?
  - Meeting expectations

##### **b. Appropriate terminology:** *"A broad field"* (Alex)

Two themes arose in the interviews around terminology.

1. The various identities that people associate with when working in the outdoor sector (such as instructor, leader, guide, professional, etc). Whether the terminology used is a matter of identity, or one of semantics seemed to vary, but it highlighted the consideration of deciding specifically who the course should be presented to, and therefore what terminology should be being used.
2. The outdoor sector has grown to include businesses, companies, centres, and individuals. It was highlighted that the terminology used must be inclusive and representative of the population to receive maximum participant uptake.

##### **c. Appropriate content:** *"The divorce in the actual environmental knowledge from how to deliver environmental knowledge"* (Heydon)

For instructors to facilitate environmental literacy development during their OAAs, they require environmental content knowledge, pedagogic and andragogic knowledge, content knowledge in a delivery context and delivery knowledge in a content context (as outlined in the EL-PACK criteria). This code highlights experts anticipated instructor EL-PACK (or lack of).

### C.3 Extract of coded transcript

Key:

Value

Influencing change

Perception of Nature

Delivery

Terminology

Content

So I was wondering, so when it says 'how relevant are the course objectives', it does tie into another question further down as well, is I was wondering whether there is something around having an element of just a **general introduction** to carbon accounting. Because I think that's where some of- when you go back to the **foundational knowledge**, yeah, then **you've got something to build on**. And I was thinking about **entry behaviour** and I was thinking about that **foundational knowledge** like how do we know the people we've got in the room know what we think they know? **And how are they interpreting that knowledge** before you even start? The reason I'm poking this bear, and I'll probably poke it quite a lot through this whole conversation is that, I think that we have got, within education generally, more specifically from circumstances within outdoor education is that, we've, we've, **we've got the wool pulled over our eyes in terms of how we see ourselves in this environment** right?- learning environment, education environment, market environment, right. Because **we are engaged with the outdoors, professionally all the time, we've got this warm fuzzy feeling that we're actually doing something about the environment, and we aren't**. I think that's where I want to just kind of draw this out a little bit. I'm drawing it out because I think it's important to get those- you know, if you're building a curriculum you need to **start in the right place**. And I thought of things like hierarchical task analysis- I don't know whether you have come across that model for curriculum design?

[...]

So this is where **this process of marketisation for me gets entangled with the process of pedagogy**. **And if I'm honest, I still haven't fully in my own mind, worked out how to pull those things apart**. **And that's where my work is, because pedagogy the process, but it's also the product**. So for that product to survive you have to then **take that product and attach it to someone's specific world**, right? So this goes to your question about somewhere about would

outdoor centres give the time to their staff to do it? So, what's the value? The value is because you then have to entangle is good, this is positive good with their world in a way that they can see that it has value. And that's the principle of performativity, which is a theory I'm using, so. So, this is where it gets a bit chewy. So that's why I was thinking about foundational knowledge, cause where this is kind of going, if you start building that, that network of who are the 'actors' if you like, and actors could be human, could be materials; an actor is a kayak. (9:32) An actor, you know, an actor is the instructor, an actor is the minibus that gets the young people to the centre, an actor is the parent sitting at home. So, you know, one thing is that you might think the kids on the residential are having the adventure, but if they're 11 years old and have never been away from home before, it's the parents that are having the biggest adventure.

So it's how do you draw in and ameliorate all of those actors, or decide which one you're going to discard because they weren't that powerful, or the ones that you actually realise you need to connect with because they are powerful. So that kind of course objectives bit for me was- and I come back to this as well because it's about- you called, you've used word outdoor 'industry', and 'adventure clients', and I found that jarred a little bit because I don't think there is an 'outdoor industry' per se. Because the outdoor industry, an 'industry' is about efficiency, and I don't think the outdoor sector is about efficiency somehow! Call me a traditionalist! I mean, I have word settings, commercial settings, where, where efficiency has been a very important principle, and they might be approaching what you would call industry, but they see themselves not as an outdoor industry, they see themselves as a travelling industry, or hospitality, right? So because she got this pedagogical overlay, part of your product is about is about altruistic change of behaviour bailed up on a moral grounding; you're not about commercial efficiency, you're about something else. So I just thought I'd poke at that bear a little bit. So, you know the words industry and clients, work in some settings but not in others, and I've struggled with that a little bit myself. So I'm just, I'm sharing that really is a kind of, a very, well, I haven't got an answer really. I've talked about markets because that works for me in my setting. But I know if I then went and stood in front of the IOL tribe and used to work market, I'd lose 30% of the room straight off the bat. If I use the word outdoor movement, that captures another group of people but then loses another group. So I've still not managed to find a way to describe this hodgenous group of people from, from a centre manager who works with PGL or Kingswood who's turning over in their centre turning over 17 million a year and all the profits come from selling pick and mix, right, and they do the outdoor activities cause it's the thing that gets people through the doors so they can sell them the pick and mix right thing, right, been there, got the T-shirt right! Or you can go to, you know, an entirely ideologically entrenched bushcrafter, right, who thinks that, you know, their kind of this luddite, who thinks technology is a bad thing and we need to dress in wool that we've knitted ourselves, and they're all in the same room together, and that's for me,

that's the problem with the, the problematizing this setup. (12:55) So that's why I said, just to put the kind of critique into that kind of context, that's where it's coming from cause I'm struggling with it as well. And I've used the phrase nature-based learning, that's where I've ended up, and then when I was thinking down that avenue, it forced me to question whether or not this needs to be just for outdoor instructors; is this just about educators full stop. You know, I don't know, and then you end up butting up against forest schools, and you end up butting up against John Muir Award or. So this is market considerations about how you frame it as well, and how you delimit it. So that's just a question mark for me.

## Appendix D Pre-course survey (phase 3a)

### D.1 Development of preliminary survey questions based on the design principles.

| Design principle |                                                                                                                                              | Question asked in the pre-course survey                                                                     |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| 1                | “Participating in an environmental literacy course must enhance outdoor instructor value by contributing to their professional development”. | No question asked in response to this design principle.                                                     |
| 2                | “The course should aim to initiate environmental change among adventure clients”.                                                            | Which environmental concepts (if any) do you talk about during your activities (Please tick all that apply) |
| 3                | “The course must challenge instructor perceptions of nature”                                                                                 | Inclusion of Nature in Self scale (INS) by Schultz (2002)                                                   |
| 4                | “The course delivery must be relatable to outdoor instructors”.                                                                              | How long have you worked as an outdoor instructor?                                                          |
|                  |                                                                                                                                              | Are you fully qualified to instruct at least one activity? This can include an in-house sign-off.           |

# Appendix D

| Design principle |                                                                                                 | Question asked in the pre-course survey                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5                | “The course must use appropriate terminology to reach the identities of the intended audience”. | How do you identify your role in the outdoor sector? Please tick all that apply.                                                                                                                                                         |
| 6                | “The course must have appropriate content to enhance instructor EL-PACK and BiAtT”.             | With reference to the environmental concepts you didn’t tick (in question X, from design principle 2) what are the barriers that stop you talking about these environmental concepts during your activities? Please tick all that apply. |



**D.2 Development of the environmental literacy belief in ability to teach instrument (EL-BiAtT)**

| Original statement from the EETEBI by<br>Moseley <i>et al.</i> (2016) |   |                                                                                                                                                   | First draft<br>Modified with supervisors                                                                                                           | Second draft<br>Modified after piloting                                                                              | Final survey                                                                                                         |
|-----------------------------------------------------------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Environmental<br>Education<br>Outcome<br>Expectancy                   | 1 | When students do better than usual in environmental education, it is because the teacher exerted extra effort and teaching environmental concepts |                                                                                                                                                    |                                                                                                                      |                                                                                                                      |
|                                                                       | 2 | When students' grades in environmental education improve, it is due to their teacher using effective teaching strategies                          | An improvement in clients' attitudes and emotions towards the environment is generally due to the way the instructor has facilitated the activity. | The way the instructor facilitates the activity can improve clients' attitudes and emotions towards the environment. | The way the instructor facilitates the activity can improve clients' attitudes and emotions towards the environment. |
|                                                                       | 3 | If students do not understand environmental                                                                                                       | An increase in clients' environmental knowledge is generally due to the                                                                            | An increase in clients' environmental knowledge is generally due to the                                              | An increase in clients' environmental knowledge is generally due to the                                              |

Appendix D

| Original statement from the EETEBI by Moseley <i>et al.</i> (2016) |   |                                                                                                                                    | First draft<br>Modified with supervisors                                                                                                             | Second draft<br>Modified after piloting                                                                                                  | Final survey                                                                                                                             |
|--------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                    |   | concepts, it is due to ineffective teaching                                                                                        | instructor using effective communication strategies.                                                                                                 | instructor's effective communication.                                                                                                    | instructor's effective communication.                                                                                                    |
|                                                                    | 4 | When an individual student's academic achievement improves in environmental education, it is due to extra attention by the teacher | Increased effort in communicating environmental concepts produces positive changes in clients' environmental literacy.                               | Covered in PCK - see purpose of content knowledge.                                                                                       |                                                                                                                                          |
|                                                                    | 5 | Increased effort in teaching environmental concepts produces positive change in students' academic achievement                     | When clients' are engaged in environmental learning, it is usually because the instructor has made an effort to talk about an environmental concept. | When clients' are engaged in environmental learning, it is usually because I have made an effort to talk about an environmental concept. | When clients' are engaged in environmental learning, it is usually because I have made an effort to talk about an environmental concept. |

Appendix D

| Original statement from the EETEBI by Moseley <i>et al.</i> (2016) |   |                                                                                                                                            | First draft<br>Modified with supervisors                                                    | Second draft<br>Modified after piloting                                              | Final survey                                                                         |
|--------------------------------------------------------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                                                                    | 6 | The teacher is responsible for students' understanding environmental concepts                                                              | The <b>instructor</b> is responsible for clients' becoming more environmentally literate.   | The instructor is responsible for clients' becoming more environmentally literate.   | The instructor is responsible for clients' becoming more environmentally literate.   |
|                                                                    | 7 | If parents comment that their child is showing more interest about the environment, it is due to effective teaching by the child's teacher |                                                                                             |                                                                                      |                                                                                      |
| Personal Environmental Education Teaching Efficacy                 | 8 | I can find effective ways to teach about the environment                                                                                   | I can find effective ways to <b>talk</b> about the environment during adventure activities. | I can find effective ways to talk about the environment during adventure activities. | I can find effective ways to talk about the environment during adventure activities. |
|                                                                    | 9 | In spite of my best efforts, I cannot teach about the environment as well as I                                                             | I cannot <b>engage clients</b> in environmental                                             | <b>I can't</b> engage clients in environmental conversations                         | I can't engage clients in environmental                                              |

Appendix D

| Original statement from the EETEBI by Moseley <i>et al.</i> (2016) |    |                                                                                            | First draft                                                              | Second draft                                                             | Final survey                                                             |
|--------------------------------------------------------------------|----|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|
|                                                                    |    |                                                                                            | Modified with supervisors                                                | Modified after piloting                                                  |                                                                          |
|                                                                    |    | can teach about other topics                                                               | conversations as well as I can in other topics.                          | as well as I can in other topics.                                        | conversations as well as I can in other topics.                          |
|                                                                    | 10 | I understand strategies to effectively teach environmental concepts                        | I understand strategies to subtly introduce environmental conversations. | I can subtly introduce environmental conversations through the activity. | I can subtly introduce environmental conversations through the activity. |
|                                                                    | 11 | I do not believe that I am effective when facilitating environmental education activities  |                                                                          |                                                                          |                                                                          |
|                                                                    | 12 | I cannot teach about the environment effectively                                           |                                                                          |                                                                          |                                                                          |
|                                                                    | 13 | I understand environmental concepts well enough to be effective in teaching those concepts |                                                                          |                                                                          |                                                                          |

Appendix D

| Original statement from the EETEBI by Moseley <i>et al.</i> (2016) |    | First draft<br>Modified with supervisors                                                        | Second draft<br>Modified after piloting                                                               | Final survey                                                                                   |
|--------------------------------------------------------------------|----|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
|                                                                    | 14 | I cannot effectively explain environmental concepts to students                                 | I cannot effectively explain environmental <b>problems to clients.</b>                                | I can't effectively explain environmental problems to clients.                                 |
|                                                                    | 15 | I can answer students' items about the environment                                              | I can <b>generally</b> answer <b>clients' questions</b> about the environment.                        | I can generally answer clients' questions about the environment.                               |
|                                                                    | 16 | I have the outdoor teaching skills to effectively teach about the environment                   | I have the outdoor teaching skills to <b>incorporate environmental activities into the adventure.</b> | I have the outdoor teaching skills to incorporate environmental activities into the adventure. |
|                                                                    | 17 | Given a choice, I will not invite the principal to evaluate my environmental education teaching | <b>I would prefer not to instigate conversations about the environment during my activity.</b>        | I would prefer not to start conversations about the environment during my activity.            |

Appendix D

| Original statement from the EETEBI by Moseley <i>et al.</i> (2016)                                                       |    |                                                                                                              | First draft<br>Modified with supervisors                                                                                | Second draft<br>Modified after piloting                                                                   | Final survey                                                                          |
|--------------------------------------------------------------------------------------------------------------------------|----|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                                                                                                          | 18 | When a student has difficulty understanding an environmental concept, I do not know how to help that student | When a <b>client</b> has difficulty understanding <b>their connection in the environment, I don't know what to say.</b> | When a client has difficulty understanding their connection in the environment, I don't know what to say. |                                                                                       |
|                                                                                                                          | 19 | When teaching about the environment, I encourage student items                                               | <b>When out on an adventure activity, I encourage clients to ask questions about the environment.</b>                   | I encourage clients to ask questions about the environment.                                               | I encourage clients to ask questions about the environment.                           |
|                                                                                                                          | 20 | I do not know how to motivate students about environmental concepts                                          | I don't know how to motivate <b>clients about environmentally responsible behaviours.</b>                               | I don't know how to motivate clients <b>to adopt</b> environmentally responsible behaviours.              | I don't know how to motivate clients to adopt environmentally responsible behaviours. |
| Additional question to explore instructors' beliefs about the power of 'being' in nature versus instructor facilitation. |    |                                                                                                              | A client's perception of the environment is generally                                                                   | A client's awareness of the environment is generally                                                      | A client's awareness of the environment is generally                                  |

Appendix D

| Original statement from the EETEBI by Moseley <i>et al.</i> (2016)                                                                                | First draft<br>Modified with supervisors                                                  | Second draft<br>Modified after piloting                                                   | Final survey                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
|                                                                                                                                                   | influenced by the place, rather than the instructor.                                      | influenced by the place, <b>more</b> than the instructor.                                 | influenced by the place, more than the instructor.                                        |
| Additional question to explore instructor perspectives about aligning OAAs with environmental advocacy to address the current societal challenge. | Environmental advocacy does not have a place within adventure tourism.                    | Environmental advocacy does not have a place within <b>the activities I instruct.</b>     | Environmental advocacy does not have a place within the activities I instruct.            |
| Additional question to explore whether instructors intentionally seek to increase clients' nature connectedness.                                  | I try to incorporate activities that will help clients feel connected in the environment. | I try to incorporate activities that will help clients feel connected in the environment. | I try to incorporate activities that will help clients feel connected in the environment. |

### D.3 Development of the environmental literacy pedagogic and andragogic content knowledge instrument

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |                                                   | Statements developed to address the criteria |                                                                                                             | First draft<br>Modified with supervisors                                                                    | Second draft<br>Modified after piloting                                                                     | Final survey                                                                          |
|-------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Clearly PCK                                                             | Beliefs about the nature of teaching and learning | 1                                            | Although this is a complex topic, I feel prepared to teach it                                               |                                                                                                             |                                                                                                             |                                                                                       |
|                                                                         |                                                   | 2                                            | I can make use of places and there features to initiate conversations about the environment.                | I can make use of places and there features to initiate conversations about the environment.                | I can make use of places and there features to <b>start</b> conversations about the environment.            | I make use of places and there features to start conversations about the environment. |
|                                                                         | Facilitation strategies                           | 3                                            | I can use a range of communication styles within the activity in response to individual and group dynamics. | I can use a range of communication styles within the activity in response to individual and group dynamics. | I can use a range of communication styles within the activity in response to individual and group dynamics. |                                                                                       |



Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |  | Statements developed to address the criteria |                                                                                                                      | First draft<br>Modified with supervisors                                                                             | Second draft<br>Modified after piloting                                                                                         | Final survey                                                                       |
|-------------------------------------------------------------------------|--|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|                                                                         |  | 4                                            | I know a variety of teaching approaches that I could use with different groups to engage them with the environment   |                                                                                                                      |                                                                                                                                 |                                                                                    |
|                                                                         |  | 5                                            | I can capitalise on unplanned learning opportunities that arise during activities (e.g., flight of an unusual bird). | I can capitalise on unplanned learning opportunities that arise during activities (e.g., flight of an unusual bird). | I can <b>take advantage of</b> unplanned learning opportunities that arise during activities (e.g., flight of an unusual bird). | I take advantage of unplanned learning opportunities that arise during activities. |
|                                                                         |  | 6                                            | I can use creative strategies to help clients notice and appreciate non-human life.                                  | I can use creative strategies to help clients notice and appreciate non-human life.                                  | I can use creative strategies to help clients notice and appreciate non-human life.                                             | I use creative activities to help clients notice and appreciate non-human life.    |

Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |                                     | Statements developed to address the criteria |                                                                                         | First draft<br>Modified with supervisors                                                | Second draft<br>Modified after piloting                                                 | Final survey |
|-------------------------------------------------------------------------|-------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--------------|
|                                                                         | Participant thinking                | 7                                            | Clients generally want technical skill development more than environmental learning.    | Clients generally want technical skill development more than environmental learning.    | Clients generally want technical skill development more than environmental learning.    |              |
|                                                                         |                                     | 8                                            | Most clients see humans and nature as disconnected.                                     | Most clients see humans and nature as disconnected.                                     | Most clients see humans and nature as disconnected.                                     |              |
|                                                                         | Participant thinking—misconceptions | 9                                            | I am able to anticipate learners' common misconceptions related to climate science      |                                                                                         |                                                                                         |              |
|                                                                         |                                     | 10                                           | Clients generally believe they cannot make a difference in terms of the climate crisis. | Clients generally believe they cannot make a difference in terms of the climate crisis. | Clients generally believe they cannot make a difference in terms of the climate crisis. |              |

Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |                                                | Statements developed to address the criteria |                                                                                                                                                                                     | First draft<br>Modified with supervisors                     | Second draft<br>Modified after piloting                      | Final survey |
|-------------------------------------------------------------------------|------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------|
|                                                                         |                                                | 11                                           | I know how to effectively address learners' misconceptions                                                                                                                          |                                                              |                                                              |              |
|                                                                         | Participant effect<br>(in relation to content) | 12                                           | I can recognise discomfort from environmental conversations.                                                                                                                        | I can recognise discomfort from environmental conversations. | I can recognise discomfort from environmental conversations. |              |
|                                                                         |                                                | 13                                           | I understand that individuals may be anxious about the climate crisis and therefore information should be shared appropriately, with positive solutions to environmental challenges |                                                              |                                                              |              |

Appendix D

| Original criteria from the PCK framework by Dymment <i>et al.</i> (2018) |                          | Statements developed to address the criteria |                                                                                                                           | First draft<br>Modified with supervisors                                          | Second draft<br>Modified after piloting                                           | Final survey |
|--------------------------------------------------------------------------|--------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------|
|                                                                          |                          | 14                                           | Increasing knowledge of the environment is important to get people emotionally invested in helping environmental problems |                                                                                   |                                                                                   |              |
|                                                                          | Cognitive demand of task | 15                                           | Teaching participants technical skills during the activity increases their feeling of a connection to nature              | Learning technical skills can objectify nature rather than increase appreciation. | Learning technical skills can objectify nature rather than increase appreciation. |              |
|                                                                          |                          | 16                                           | Participants come away from activities with a greater knowledge of the environment and a stronger sense of                |                                                                                   |                                                                                   |              |

Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |                             | Statements developed to address the criteria |                                                                                                                                                                   | First draft<br>Modified with supervisors                                                            | Second draft<br>Modified after piloting                                                             | Final survey |
|-------------------------------------------------------------------------|-----------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------|
|                                                                         |                             |                                              | connection to nature, without being specifically taught                                                                                                           |                                                                                                     |                                                                                                     |              |
|                                                                         |                             | 17                                           | Environmental literacy concepts and activities can be included in activities regardless of weather conditions                                                     |                                                                                                     |                                                                                                     |              |
|                                                                         | Representations of concepts | 18                                           | I could illustrate to participants how each component of environmental literacy is connected, and important for increasing environmentally responsible behaviours | I can explain how environmental knowledge, attitudes, and skills contribute to changing behaviours. | I can explain how environmental knowledge, attitudes, and skills contribute to changing behaviours. |              |

Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |                        | Statements developed to address the criteria |                                                                                                                            | First draft<br>Modified with supervisors                                              | Second draft<br>Modified after piloting                                     | Final survey                                                                |
|-------------------------------------------------------------------------|------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|
|                                                                         | Knowledge of examples  | 19                                           | I am able to use examples to teach this topic                                                                              |                                                                                       |                                                                             |                                                                             |
|                                                                         | Knowledge of resources | 20                                           | I have a knowledge of available resources that can support environmental literacy development                              | I feel happy using resources to support the facilitation of environmental activities. | I feel happy facilitating environmental activities within my main activity. | I feel happy facilitating environmental activities within my main activity. |
|                                                                         |                        | 21                                           | I don't know what resources I could use to aid the development of environmental knowledge, attitudes, skills or behaviours |                                                                                       |                                                                             |                                                                             |
|                                                                         | Knowledge of theory    | 22                                           | I am able to answer learners' questions about                                                                              | I have sufficient knowledge of the local                                              | I have enough knowledge of the local environment I                          |                                                                             |

Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |  | Statements developed to address the criteria |                                                                                                                                                                       | First draft<br>Modified with supervisors                                                                   | Second draft<br>Modified after piloting                                                      | Final survey |
|-------------------------------------------------------------------------|--|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------|
|                                                                         |  |                                              | the specific environment I work in (such as geology, flora, fauna, environmental changes etc)                                                                         | environment I work in, in terms of the geology, flora and fauna to be able to teach clients something new. | work in, in terms of the geology, flora and fauna to be able to teach clients something new. |              |
|                                                                         |  | 23                                           | I am able to answer learners' questions about the wider subject of the environment (physical, ecological, socio-political, problems, solutions and action strategies) |                                                                                                            |                                                                                              |              |
|                                                                         |  | 24                                           | I welcome learners' questions on the environment                                                                                                                      |                                                                                                            |                                                                                              |              |

Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |                              | Statements developed to address the criteria |                                                                                             | First draft<br>Modified with supervisors                                                    | Second draft<br>Modified after piloting                                                                | Final survey                                                                                |
|-------------------------------------------------------------------------|------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|                                                                         |                              | 25                                           | I don't feel confident about answering learners' questions                                  |                                                                                             |                                                                                                        |                                                                                             |
|                                                                         |                              | 26                                           | I don't feel confident when explaining environmental concepts                               |                                                                                             |                                                                                                        |                                                                                             |
|                                                                         | Purpose of content knowledge | 27                                           | I understand the purpose of developing environmental literacy through adventure activities. | I understand the purpose of developing environmental literacy through adventure activities. | I understand the purpose of developing environmental literacy through adventure activities.            | I understand the purpose of developing environmental literacy through adventure activities. |
|                                                                         |                              | 28                                           | I believe I have the opportunity to make a positive difference for the                      | I am able to engage clients in activities that will help contribute to                      | I am able to engage clients in activities that will help contribute to solving environmental problems. | I am able to engage clients in activities that will help contribute to                      |



Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |  | Statements developed to address the criteria |                                                                                                                                                 | First draft<br>Modified with supervisors                          | Second draft<br>Modified after piloting                                | Final survey                                                           |
|-------------------------------------------------------------------------|--|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------|
|                                                                         |  |                                              | environment whilst facilitating activities                                                                                                      | solving environmental problems.                                   |                                                                        | solving environmental problems.                                        |
|                                                                         |  | 29                                           | I don't think environmental education has a place within adventure tourism                                                                      |                                                                   |                                                                        |                                                                        |
|                                                                         |  | 30                                           | We don't need to teach about the environment, as long as they enjoy the activity they will fall in love with nature enough to make a difference |                                                                   |                                                                        |                                                                        |
|                                                                         |  | 31                                           | If we inspire participants in our activities, they will make pro-environmental                                                                  | I believe the adventure experiences I lead change the way clients | I believe the adventure experiences I lead will change the way clients | I believe the adventure experiences I lead will change the way clients |

Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |                                       | Statements developed to address the criteria |                                                                                                           | First draft<br>Modified with supervisors | Second draft<br>Modified after piloting | Final survey                      |
|-------------------------------------------------------------------------|---------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------|-----------------------------------|
|                                                                         |                                       |                                              | changes in their lifestyle when they return home                                                          | value nature and the environment.        | value nature and the environment.       | value nature and the environment. |
| Content knowledge in a pedagogical context                              | (Beliefs about) the nature of content | 32                                           | Increased effort and teaching environmental concepts produces positive changes in participants behaviours |                                          |                                         |                                   |
|                                                                         |                                       | 33                                           | It is individuals' experience of the activity that shapes their environmental literacy                    |                                          |                                         |                                   |
|                                                                         | Profound understanding of             | 34                                           | I am confident including citizen science projects in adventure activities                                 |                                          |                                         |                                   |

Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |                                          | Statements developed to address the criteria |                                                                                                                | First draft<br>Modified with supervisors                                                                            | Second draft<br>Modified after piloting                                                                             | Final survey |
|-------------------------------------------------------------------------|------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------|
|                                                                         | fundamental content                      | 35                                           | I believe emotions are more important than knowledge for changing behaviours                                   |                                                                                                                     |                                                                                                                     |              |
|                                                                         | Deconstructing content to key components | 36                                           | I feel confident teaching technical skills alongside teaching about nature                                     |                                                                                                                     |                                                                                                                     |              |
|                                                                         |                                          | 37                                           | I tend to objectify nature and see it as a playground for us before appreciating it is a home to other animals | I am able to establish a balance in activities between adventure, technical skills and environmental conversations. | I am able to establish a balance in activities between adventure, technical skills and environmental conversations. |              |
|                                                                         | Structure and connections                | 38                                           | I do not feel confident linking environmental                                                                  |                                                                                                                     |                                                                                                                     |              |

Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |                      | Statements developed to address the criteria |                                                                                | First draft<br>Modified with supervisors | Second draft<br>Modified after piloting | Final survey |
|-------------------------------------------------------------------------|----------------------|----------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------|--------------|
|                                                                         |                      |                                              | literacy activities together to make meaning that promotes behaviour change    |                                          |                                         |              |
|                                                                         | Procedural knowledge | 39                                           | I understand strategies to effectively teach environmental concepts            |                                          |                                         |              |
|                                                                         |                      | 40                                           | I do not have the necessary skills to teach about nature and the environment   |                                          |                                         |              |
|                                                                         | Methods of solution  | 41                                           | If I saw rubbish during my activity I would take the opportunity to engage the |                                          |                                         |              |

Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |                                     | Statements developed to address the criteria |                                                                                                       | First draft<br>Modified with supervisors | Second draft<br>Modified after piloting                                      | Final survey |
|-------------------------------------------------------------------------|-------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------|------------------------------------------------------------------------------|--------------|
|                                                                         |                                     |                                              | group in a discussion on plastic pollution                                                            |                                          |                                                                              |              |
|                                                                         |                                     | 42                                           | I don't see how I can help solve environmental problems                                               |                                          |                                                                              |              |
| Pedagogical knowledge in a content context                              | Goals and expectations for learning | 43                                           | I introduce the subject of the environment and environmental learning at the beginning of the session | I set environmentally related goals.     | I set environmentally related goals or learning objectives in my activities. |              |
|                                                                         |                                     | 44                                           | I only incorporate environmental teaching if participants suggest they want to learn                  |                                          |                                                                              |              |

Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |                       | Statements developed to address the criteria |                                                                                                                     | First draft<br>Modified with supervisors                                                             | Second draft<br>Modified after piloting                                             | Final survey |
|-------------------------------------------------------------------------|-----------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------|
|                                                                         | Reflection approaches | 45                                           | I facilitate informal debriefs or reviews of the activity, during and/or at the end of the activity.                | I facilitate informal debriefs or reviews of the activity, during and/or at the end of the activity. | I facilitate informal reviews of the <b>activity to recap what has been learnt.</b> |              |
|                                                                         |                       | 46                                           | I inform participants at the start of the activity that we will reflect on the experience at the end of the session |                                                                                                      |                                                                                     |              |
|                                                                         |                       | 47                                           | I do not feel confident leading a reflection                                                                        |                                                                                                      |                                                                                     |              |
|                                                                         |                       | 48                                           | I value the importance of reflection                                                                                |                                                                                                      |                                                                                     |              |

Appendix D

| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |                                           | Statements developed to address the criteria |                                                                                                                                          | First draft<br>Modified with supervisors                                                                                               | Second draft<br>Modified after piloting                                                                                               | Final survey                                                                                                               |
|-------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
|                                                                         | Getting and maintaining participant focus | 49                                           | I feel like I am able to inspire participants to engage in a range of environmental activities (sensory activities, citizen science etc) | I feel like I am able to inspire participants to engage in a range of environmental activities <b>as well as in the main activity.</b> | I am able to inspire participants to engage in a <b>balance</b> of environmental activities (sensory activities, citizen science etc) | <b>I am able to establish a balance in activities between adventure, technical skills and environmental conversations.</b> |
|                                                                         | Participant effect (general)              | 50                                           | I am confident in trying different facilitation styles to successfully engage the group                                                  |                                                                                                                                        |                                                                                                                                       |                                                                                                                            |
|                                                                         |                                           | 51                                           | I struggle to decide the best way to engage groups in the environment                                                                    |                                                                                                                                        |                                                                                                                                       |                                                                                                                            |
|                                                                         |                                           | 52                                           | I find talking about the environment a taboo                                                                                             |                                                                                                                                        |                                                                                                                                       |                                                                                                                            |

# Appendix D

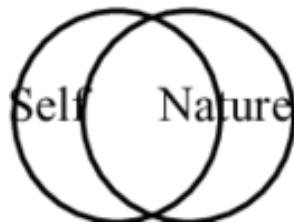
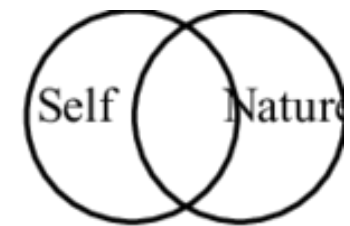
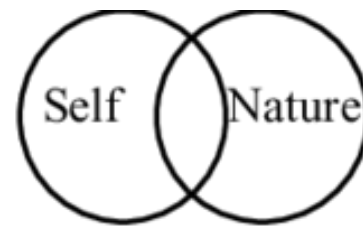
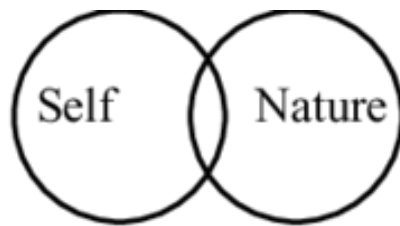
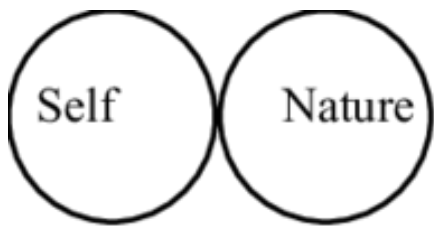
| Original criteria from the PCK framework by Dymont <i>et al.</i> (2018) |  | Statements developed to address the criteria |                                                          | First draft<br>Modified with supervisors | Second draft<br>Modified after piloting | Final survey |
|-------------------------------------------------------------------------|--|----------------------------------------------|----------------------------------------------------------|------------------------------------------|-----------------------------------------|--------------|
|                                                                         |  |                                              | subject because I don't know how participants will react |                                          |                                         |              |



#### D.4 Inclusion of Nature in Self Scale (INS) from Schultz (2002)

“Please answer spontaneously with what comes to your mind first.

Please choose the picture below which best describes your relationship with the natural environment”.



## D.5 Instructor responses to the pre-course survey

Pre-course survey question 1: How do you identify your role in the outdoor sector? Please tick all that apply.

|                         | Frequency | Percent |
|-------------------------|-----------|---------|
| Instructor              | 18        | 52.9    |
| Guide                   | 10        | 29.4    |
| Coach                   | 18        | 52.9    |
| Outdoor Professional    | 18        | 52.9    |
| Adventure Sports Coach  | 9         | 26.5    |
| Leader                  | 22        | 62.7    |
| Other (please specify*) | 10        | 29.4    |
| Total                   | 34        | 100.0   |

\*‘Other’ identities:

|                                                                                                                |
|----------------------------------------------------------------------------------------------------------------|
| Club Coach                                                                                                     |
| DofE Coordinator                                                                                               |
| Manager (Charity)                                                                                              |
| Mountain Leader Trainee                                                                                        |
| Qualified Teacher in OAE, Coach educator, course provider, eco campsite owner, eco farming and OPD development |
| RCDI and Development Coach                                                                                     |
| Research                                                                                                       |
| Senior instructor and tutor                                                                                    |
| Trainee Leader                                                                                                 |

## Appendix D

Pre-course survey question 2: How long have you worked as an outdoor instructor?

|                         | Frequency | Percent |
|-------------------------|-----------|---------|
| Less than 1 year        | 4         | 11.8    |
| Between 1 and 5 years   | 6         | 17.6    |
| Between 5 and 10 years  | 6         | 17.6    |
| Between 10 and 15 years | 5         | 14.7    |
| Over 15 years           | 13        | 38.2    |
| Total                   | 34        | 100.0   |

Pre-course survey question 3: Are you qualified to lead at least one activity?

|       | Frequency | Percent |
|-------|-----------|---------|
| Yes   | 32        | 94.1    |
| No    | 2         | 5.9     |
| Total | 34        | 100.0   |

## Appendix D

Pre-course survey question 4: Which environmental concepts (if any) do you talk about during your activities? Please tick all that apply.

|                         | Frequency | Percent |
|-------------------------|-----------|---------|
| Flora                   | 27        | 79.4    |
| Fauna                   | 27        | 79.4    |
| Air pollution           | 11        | 32.4    |
| Plastic pollution       | 26        | 76.5    |
| Global warming          | 16        | 47.1    |
| Geology                 | 27        | 79.4    |
| Citizen science         | 3         | 8.8     |
| Nature connectedness    | 13        | 38.2    |
| Other (please specify*) | 10        | 29.4    |

\*‘Other’ environmental concepts talked about during activities:

|                                                         |
|---------------------------------------------------------|
| Dilute pollutants                                       |
| Electric cars                                           |
| General respecting the countryside and keeping it clean |
| History                                                 |
| Human history                                           |
| Human impact                                            |
| River pollution                                         |
| Water cycle                                             |
| Water pollution                                         |
| Wind and water power                                    |

## Appendix D

Pre-course survey question 5: With reference to the ones you didn't tick in question 4, what are the barriers that stop you talking about these environmental concepts during your activities? Please tick all that apply.

|                               | Frequency | Percent |
|-------------------------------|-----------|---------|
| Time                          | 11        | 32.4    |
| My knowledge                  | 25        | 73.5    |
| My ability to teach           | 7         | 20.6    |
| It's not what my clients want | 12        | 35.3    |
| I'm not interested            | 2         | 5.9     |
| Other (please specify*)       | 10        | 29.4    |

\*'Other' barriers that prevent talking about these environmental concepts during activities:

|                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------|
| Air pollution – not really a subject that comes up much in West Wales.                                                       |
| I wasn't sure on the term without looking it up and didn't want to gain knowledge that may be covered during these sessions. |
| It is not one of the higher priorities currently within my industry area                                                     |
| Just doesn't seem to come up but this is probably my bias towards other areas                                                |
| N/a                                                                                                                          |
| Seems less relevant or less achievable individual actions                                                                    |

Pre-course survey question 6: The following statements relate to the options **you did** tick in question 4 (i.e. flora, fauna, geology, air pollution, plastic pollution, global warming, citizen science, nature connectedness, and any others you talk about).

| Environmental literacy belief in ability to teach (EL-BiAtT) instrument. |                                                                                     | Frequency                  | Percent |      |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------|---------|------|
| 1                                                                        | I can find effective ways to talk about the environment during adventure activities |                            |         |      |
|                                                                          |                                                                                     | Strongly disagree          | 2       | 5.9  |
|                                                                          |                                                                                     | Somewhat disagree          | 6       | 17.6 |
|                                                                          |                                                                                     | Neither agree not disagree | 6       | 17.6 |
|                                                                          |                                                                                     | Somewhat agree             | 12      | 35.3 |
|                                                                          |                                                                                     | Strongly agree             | 8       | 23.5 |

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|          |                                                                                                 |                            |    |       |
|----------|-------------------------------------------------------------------------------------------------|----------------------------|----|-------|
|          |                                                                                                 | Total                      | 34 | 100.0 |
| <b>2</b> | <b>I can't engage clients in environmental conversations as well as I can in other topics</b>   |                            |    |       |
|          |                                                                                                 | Strongly disagree          | 3  | 8.8   |
|          |                                                                                                 | Somewhat disagree          | 10 | 29.4  |
|          |                                                                                                 | Neither agree not disagree | 9  | 26.5  |
|          |                                                                                                 | Somewhat agree             | 10 | 29.4  |
|          |                                                                                                 | Strongly agree             | 2  | 5.9   |
|          |                                                                                                 | Total                      | 34 | 100.0 |
| <b>3</b> | <b>I can subtly introduce environmental conversations through the activity</b>                  |                            |    |       |
|          |                                                                                                 | Strongly disagree          | 1  | 2.9   |
|          |                                                                                                 | Somewhat disagree          | 1  | 2.9   |
|          |                                                                                                 | Neither agree not disagree | 1  | 2.9   |
|          |                                                                                                 | Somewhat agree             | 23 | 67.6  |
|          |                                                                                                 | Strongly agree             | 8  | 23.5  |
|          |                                                                                                 | Total                      | 34 | 100.0 |
| <b>4</b> | <b>I try to incorporate activities that will help clients feel connected in the environment</b> |                            |    |       |
|          |                                                                                                 | Strongly disagree          | 1  | 2.9   |
|          |                                                                                                 | Somewhat disagree          | 3  | 8.8   |
|          |                                                                                                 | Neither agree not disagree | 11 | 32.4  |
|          |                                                                                                 | Somewhat agree             | 11 | 32.4  |
|          |                                                                                                 | Strongly agree             | 8  | 23.5  |
|          |                                                                                                 | Total                      | 34 | 100.0 |
| <b>5</b> | <b>I can't effectively explain environmental problems to clients</b>                            |                            |    |       |
|          |                                                                                                 | Strongly disagree          | 2  | 5.9   |
|          |                                                                                                 | Somewhat disagree          | 12 | 35.3  |
|          |                                                                                                 | Neither agree not disagree | 10 | 29.4  |

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|          |                                                                                                      |                            |    |      |
|----------|------------------------------------------------------------------------------------------------------|----------------------------|----|------|
|          |                                                                                                      | Somewhat agree             | 9  | 26.5 |
|          |                                                                                                      | Strongly agree             | 1  | 2.9  |
|          |                                                                                                      | Total                      | 34 | 100  |
| <b>6</b> | <b>I can generally answer clients' questions about the environment</b>                               |                            |    |      |
|          |                                                                                                      | Strongly disagree          | 0  | 0.0  |
|          |                                                                                                      | Somewhat disagree          | 8  | 23.5 |
|          |                                                                                                      | Neither agree not disagree | 8  | 23.5 |
|          |                                                                                                      | Somewhat agree             | 15 | 44.1 |
|          |                                                                                                      | Strongly agree             | 3  | 8.8  |
|          |                                                                                                      | Total                      | 34 | 100  |
| <b>7</b> | <b>I have the outdoor teaching skills to incorporate environmental activities into the adventure</b> |                            |    |      |
|          |                                                                                                      | Strongly disagree          | 2  | 5.9  |
|          |                                                                                                      | Somewhat disagree          | 6  | 17.6 |
|          |                                                                                                      | Neither agree not disagree | 10 | 29.4 |
|          |                                                                                                      | Somewhat agree             | 12 | 35.3 |
|          |                                                                                                      | Strongly agree             | 4  | 11.8 |
|          |                                                                                                      | Total                      | 34 | 100  |
| <b>8</b> | <b>I would prefer not to start conversations about the environment during my activity</b>            |                            |    |      |
|          |                                                                                                      | Strongly disagree          | 2  | 5.9  |
|          |                                                                                                      | Somewhat disagree          | 5  | 14.7 |
|          |                                                                                                      | Neither agree not disagree | 8  | 23.5 |
|          |                                                                                                      | Somewhat agree             | 9  | 26.5 |
|          |                                                                                                      | Strongly agree             | 10 | 29.4 |
|          |                                                                                                      | Total                      | 34 | 100  |
| <b>9</b> | <b>I encourage clients to ask questions about the environment</b>                                    |                            |    |      |
|          |                                                                                                      | Strongly disagree          | 0  | 0.0  |

Appendix D

|           |                                                                                                               |    |      |
|-----------|---------------------------------------------------------------------------------------------------------------|----|------|
|           | Somewhat disagree                                                                                             | 4  | 11.8 |
|           | Neither agree not disagree                                                                                    | 11 | 32.4 |
|           | Somewhat agree                                                                                                | 9  | 26.5 |
|           | Strongly agree                                                                                                | 10 | 29.4 |
|           | Total                                                                                                         | 34 | 100  |
| <b>10</b> | <b>I don't know how to motivate clients to adopt environmentally responsible behaviours</b>                   |    |      |
|           | Strongly disagree                                                                                             | 1  | 2.9  |
|           | Somewhat disagree                                                                                             | 8  | 23.5 |
|           | Neither agree not disagree                                                                                    | 9  | 26.5 |
|           | Somewhat agree                                                                                                | 16 | 47.1 |
|           | Strongly agree                                                                                                | 0  | 0.0  |
|           | Total                                                                                                         | 34 | 100  |
| <b>11</b> | <b>A clients' awareness of the environment is generally influenced by the place, more than the instructor</b> |    |      |
|           | Strongly disagree                                                                                             | 3  | 8.8  |
|           | Somewhat disagree                                                                                             | 10 | 29.4 |
|           | Neither agree not disagree                                                                                    | 10 | 29.4 |
|           | Somewhat agree                                                                                                | 10 | 29.4 |
|           | Strongly agree                                                                                                | 1  | 2.9  |
|           | Total                                                                                                         | 34 | 100  |
| <b>12</b> | <b>Environmental advocacy does not have a place within the activities I instruct</b>                          |    |      |
|           | Strongly disagree                                                                                             | 8  | 23.5 |
|           | Somewhat disagree                                                                                             | 1  | 2.9  |
|           | Neither agree not disagree                                                                                    | 3  | 8.8  |
|           | Somewhat agree                                                                                                | 6  | 17.6 |
|           | Strongly agree                                                                                                | 16 | 47.1 |
|           | Total                                                                                                         | 34 | 100  |



|           |                                                                                                                                               |    |      |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------|----|------|
| <b>13</b> | <b>When clients are engaged in environmental learning, it is usually because I have made an effort to talk about an environmental concept</b> |    |      |
|           | Strongly disagree                                                                                                                             | 0  | 0.0  |
|           | Somewhat disagree                                                                                                                             | 2  | 5.9  |
|           | Neither agree not disagree                                                                                                                    | 9  | 26.5 |
|           | Somewhat agree                                                                                                                                | 17 | 50.0 |
|           | Strongly agree                                                                                                                                | 6  | 17.6 |
|           | Total                                                                                                                                         | 34 | 100  |
| <b>14</b> | <b>An increase in clients' environmental knowledge is generally due to the instructor's effective communication</b>                           |    |      |
|           | Strongly disagree                                                                                                                             | 1  | 2.9  |
|           | Somewhat disagree                                                                                                                             | 0  | 0.0  |
|           | Neither agree not disagree                                                                                                                    | 5  | 14.7 |
|           | Somewhat agree                                                                                                                                | 20 | 58.8 |
|           | Strongly agree                                                                                                                                | 8  | 23.5 |
|           | Total                                                                                                                                         | 34 | 100  |
| <b>15</b> | <b>The instructor is responsible for clients' becoming more environmentally literate</b>                                                      |    |      |
|           | Strongly disagree                                                                                                                             | 1  | 2.9  |
|           | Somewhat disagree                                                                                                                             | 4  | 11.8 |
|           | Neither agree not disagree                                                                                                                    | 6  | 17.6 |
|           | Somewhat agree                                                                                                                                | 18 | 52.9 |
|           | Strongly agree                                                                                                                                | 5  | 14.7 |
|           | Total                                                                                                                                         | 34 | 100  |
| <b>16</b> | <b>The way the instructor facilitates the activity can improve client attitudes and emotions towards the environment</b>                      |    |      |
|           | Strongly disagree                                                                                                                             | 0  | 0.0  |
|           | Somewhat disagree                                                                                                                             | 0  | 0.0  |

Appendix D

|    |                                                                                             |                            |    |      |
|----|---------------------------------------------------------------------------------------------|----------------------------|----|------|
|    |                                                                                             | Neither agree not disagree | 1  | 2.9  |
|    |                                                                                             | Somewhat agree             | 13 | 38.2 |
|    |                                                                                             | Strongly agree             | 20 | 58.8 |
|    |                                                                                             | Total                      | 34 | 100  |
| 17 | <b>I make use of places and their features to start conversations about the environment</b> |                            |    |      |
|    |                                                                                             | Strongly disagree          | 0  | 0.0  |
|    |                                                                                             | Somewhat disagree          | 3  | 8.8  |
|    |                                                                                             | Neither agree not disagree | 4  | 11.8 |
|    |                                                                                             | Somewhat agree             | 17 | 50.0 |
|    |                                                                                             | Strongly agree             | 10 | 29.4 |
|    |                                                                                             | Total                      | 34 | 100  |
| 18 | <b>I take advantage of unplanned learning opportunities that arise during activities</b>    |                            |    |      |
|    |                                                                                             | Strongly disagree          | 0  | 0.0  |
|    |                                                                                             | Somewhat disagree          | 1  | 2.9  |
|    |                                                                                             | Neither agree not disagree | 3  | 8.8  |
|    |                                                                                             | Somewhat agree             | 17 | 50.0 |
|    |                                                                                             | Strongly agree             | 13 | 38.2 |
|    |                                                                                             | Total                      | 34 | 100  |
| 19 | <b>I use creative activities to help clients notice and appreciate non-human life</b>       |                            |    |      |
|    |                                                                                             | Strongly disagree          | 2  | 5.9  |
|    |                                                                                             | Somewhat disagree          | 12 | 35.3 |
|    |                                                                                             | Neither agree not disagree | 12 | 35.3 |
|    |                                                                                             | Somewhat agree             | 6  | 17.6 |
|    |                                                                                             | Strongly agree             | 2  | 5.9  |
|    |                                                                                             | Total                      | 34 | 100  |
| 20 | <b>I feel happy facilitating environmental activities within my main activity</b>           |                            |    |      |

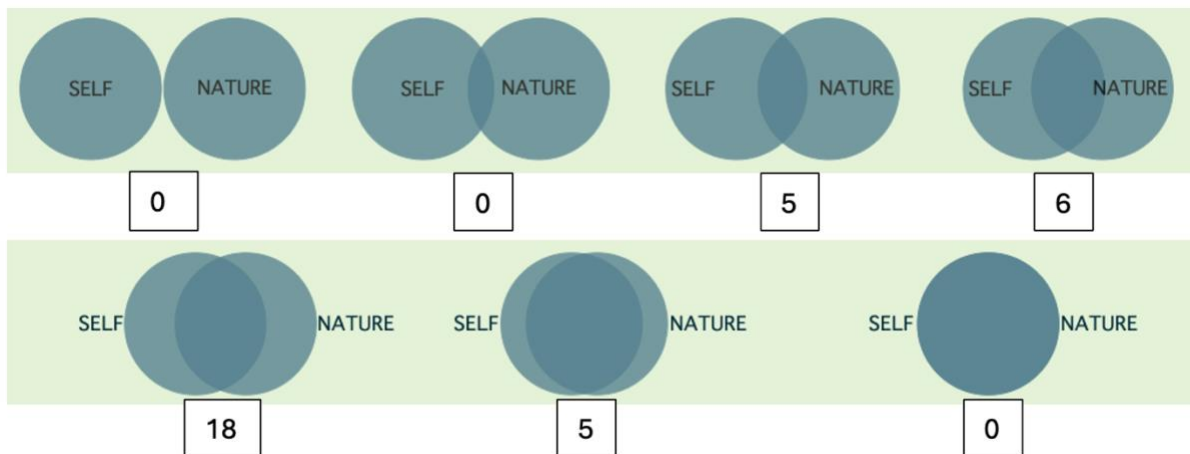
Appendix D

|           |                                                                                                                           |                            |    |      |
|-----------|---------------------------------------------------------------------------------------------------------------------------|----------------------------|----|------|
|           |                                                                                                                           | Strongly disagree          | 0  | 0.0  |
|           |                                                                                                                           | Somewhat disagree          | 5  | 14.7 |
|           |                                                                                                                           | Neither agree not disagree | 9  | 26.5 |
|           |                                                                                                                           | Somewhat agree             | 18 | 52.9 |
|           |                                                                                                                           | Strongly agree             | 2  | 5.9  |
|           |                                                                                                                           | Total                      | 34 | 100  |
| <b>21</b> | <b>I understand the purpose of developing environmental literacy through adventure activities</b>                         |                            |    |      |
|           |                                                                                                                           | Strongly disagree          | 0  | 0.0  |
|           |                                                                                                                           | Somewhat disagree          | 2  | 5.9  |
|           |                                                                                                                           | Neither agree not disagree | 3  | 8.8  |
|           |                                                                                                                           | Somewhat agree             | 18 | 52.9 |
|           |                                                                                                                           | Strongly agree             | 11 | 32.4 |
|           |                                                                                                                           | Total                      | 34 | 100  |
| <b>22</b> | <b>I am able to establish a balance in activities between adventure, technical skills and environmental conversations</b> |                            |    |      |
|           |                                                                                                                           | Strongly disagree          | 0  | 0.0  |
|           |                                                                                                                           | Somewhat disagree          | 7  | 20.6 |
|           |                                                                                                                           | Neither agree not disagree | 9  | 26.5 |
|           |                                                                                                                           | Somewhat agree             | 15 | 44.1 |
|           |                                                                                                                           | Strongly agree             | 3  | 8.8  |
|           |                                                                                                                           | Total                      | 34 | 100  |
| <b>23</b> | <b>I believe the adventure experiences I lead will change the way clients value nature and the environment</b>            |                            |    |      |
|           |                                                                                                                           | Strongly disagree          | 0  | 0.0  |
|           |                                                                                                                           | Somewhat disagree          | 1  | 2.9  |
|           |                                                                                                                           | Neither agree not disagree | 5  | 14.7 |
|           |                                                                                                                           | Somewhat agree             | 20 | 58.8 |

# Appendix D

|    |                                                                                                       |                            |    |      |
|----|-------------------------------------------------------------------------------------------------------|----------------------------|----|------|
|    |                                                                                                       | Strongly agree             | 8  | 23.5 |
|    |                                                                                                       | Total                      | 34 | 100  |
| 24 | I am able to engage clients in activities that will help contribute to solving environmental problems |                            |    |      |
|    |                                                                                                       | Strongly disagree          | 2  | 5.9  |
|    |                                                                                                       | Somewhat disagree          | 5  | 14.7 |
|    |                                                                                                       | Neither agree nor disagree | 13 | 38.2 |
|    |                                                                                                       | Somewhat agree             | 12 | 35.3 |
|    |                                                                                                       | Strongly agree             | 2  | 5.9  |
|    |                                                                                                       | Total                      | 34 | 100  |

Pre-course survey question 7: Please choose the picture below which best describes your relationship with the natural environment. One circle represents you and the other represents the natural environment. Please answer spontaneously with what comes to your mind first.



## Appendix D

Pre-course survey question 8: If you have any comments you would like to add please do so in the box below.

"Due to the diverse nature of what I do I had to answer as I did. If I were to focus on one element such as D of E expeditions or OFA courses my answers would have been different opposed to on the fence".

"I'd love to have an up-to-date resource of summarised, accessible, and relevant environmental science so I can ensure my knowledge is up to date".

"I'm extremely passionate about outdoor environments, I personally feel well connected to the environments I work in. However, I feel I lack the knowledge and confidence to go deeper into certain subjects. Sometimes, this can affect engagement. These workshops are one thing I will use to develop".

"Looking forward to it".

"No".

"None".

"Situation varies depending on group and activity. If I'm working with a bronze DofE group I wouldn't bother talking about the environment. In contrast with a group of retirees I would do so. I do find it hard to start the conversations – always seems a bit random and would appreciate tools to make the topic more engaging. Ways to link flora/fauna to environmental impact/climate change would be useful".

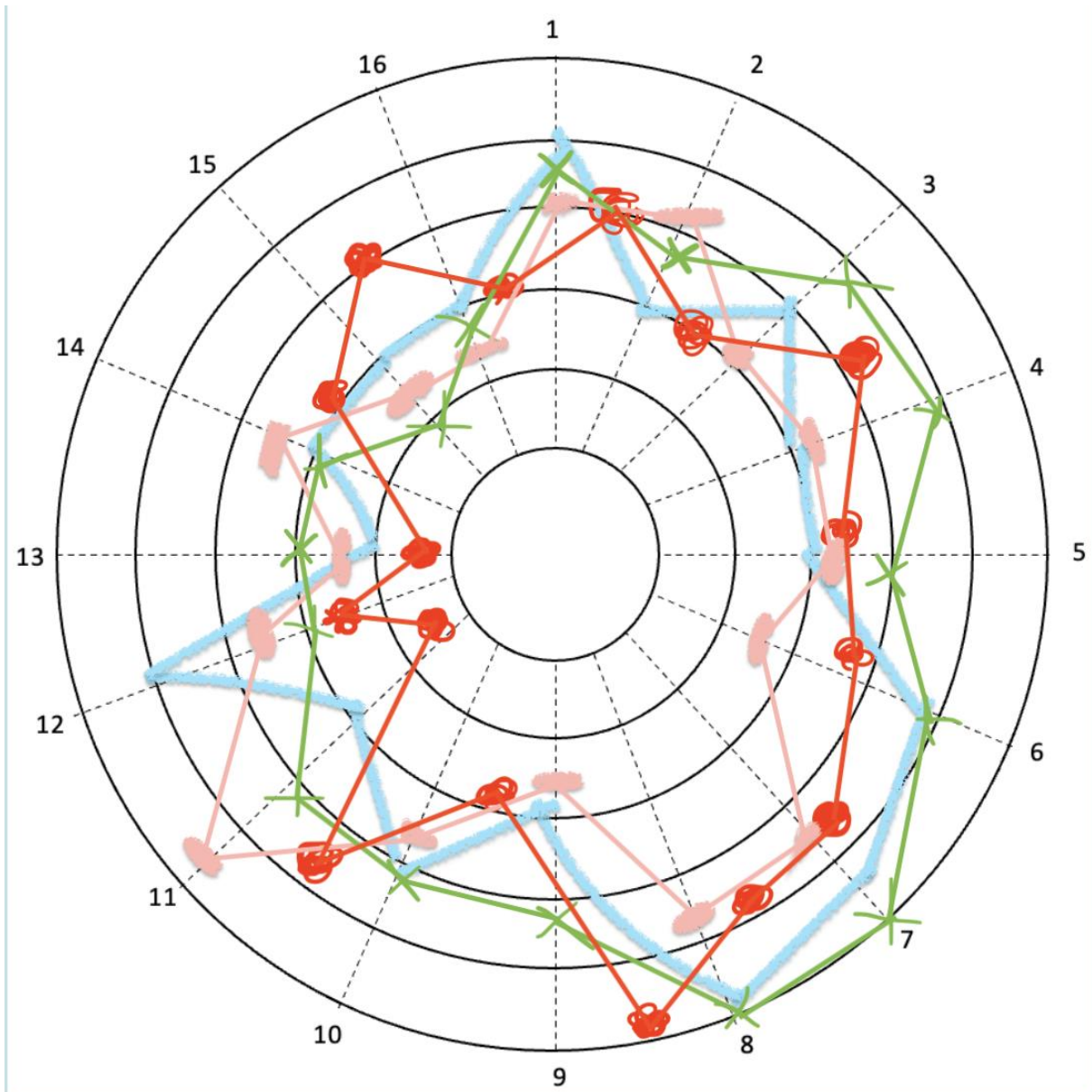
"The degree of engagement with the client/group depends on where the activity is being run, who they are and what the focus of the session is, and every session varies. There is always 'intent' to be environmentally aware however even if it's only a case of leading by example".

**D.6 Table showing an example of different outdoor qualifications and the identity terminology they elicit**

|                                                                 | Instructor                                           | Guide                        | Leader                                      | Coach                            |
|-----------------------------------------------------------------|------------------------------------------------------|------------------------------|---------------------------------------------|----------------------------------|
| Paddle UK                                                       | Paddlesport Instructor<br>SUP Instructor             | Endorsed Guide<br>Raft Guide | Paddlesport Leader<br>Sea Kayak Leader      | Coach Award<br>Performance Coach |
| Mountain Training (MT)                                          | Climbing Wall Instructor<br>Rock Climbing Instructor |                              | Hill and Moorland Leader<br>Mountain Leader | Development Coach (Climbing)     |
| National Coasteering Charter (NCC)                              |                                                      | Coasteering Guide Award      |                                             |                                  |
| International Surfing Association (ISA)                         | Level 1 Instructor                                   |                              |                                             | Level 2 Coach                    |
| British Association of Snowsports Instructors (BASI)            | Snowboard or Ski Instructor                          |                              |                                             |                                  |
| International Federation of Mountain Guides Association (IFMGA) |                                                      | IFMGA Mountain Guide         |                                             |                                  |

## Appendix E Course trialling

### E.1 Example of the original data collected on the wonky wood diagram from instructors in Iteration 1



## Appendix F Post-course evaluation

### F.1 Post-course survey responses

Post-course survey question 1: Has participation in the environmental literacy course influenced your instructing/coaching/guiding work this summer?

|            | Frequency | Percent |
|------------|-----------|---------|
| Not at all | 1         | 5.9     |
| Not really | 2         | 11.8    |
| A little   | 12        | 70.6    |
| A lot      | 2         | 11.8    |
| Total      | 17        | 100.0   |

Post-course survey question 2: Why do you feel it was not influential? Question asked only to those that answered “not at all” or “not really” to question 1.

“I have a BEd Hons in Outdoor Education and work with all ages in the outdoors daily so I am constantly moving up and down the continuum to be able to communicate clearly.”

“I was already doing a lot of this, I also missed part of the course due to not having a link sent through along with other candidates so I can't comment on 1/4 of the content.”

“I've not had a great deal of opportunity over the summer. Most of my work has been with DofE groups and I struggle to get them interested in the environment.”

Post-course survey question 3: In what way/s has the course been influential to you?  
Question asked only to those that answered “a little” or “a lot” to question 1.

“Deep thinking in to the environment and environmental items are taught and spoken about. How best to put that over to people in the positive light that it should be taught.”

“Giving me confidence to talk about the environment more in my sessions.”

“Has made me think more carefully about the opportunities to introduce environmental topics into the information given to participants throughout the courses they attend.”

“Highlighting the need to educate (not just ‘mention in passing’) how to get the ‘best’ from the particular participants”.



|                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| "I have been made aware in depth of my surroundings".                                                                                                          |
| "It encouraged me to do more".                                                                                                                                 |
| "It has made me reflect on my practice and I know I need to include more environment input to my coaching".                                                    |
| "Making more of an effort to inform and influence my clients view on the environment and how they impact it in day to day life".                               |
| "More sgared trabsprt to launch spots. More emphasis on wildlife sensitivity, more collecting plastic in the sea".                                             |
| "More ways to talk about the environment to children".                                                                                                         |
| "Reconsidering design of our courses to ensure we cover environmental areas effectively".                                                                      |
| "Thinking about delivering from a different aspect".                                                                                                           |
| "Try and ensure I include things when working on DofE's".                                                                                                      |
| "We've looked at building more information around the environment into many of our sessions, and applied specifically for funding to tackle invasive species". |

Post-course survey question 4: This summer, have you included any of the aspects below in your work delivering outdoor activities? Please tick all that apply.

|                                                    | Frequency | Percent |
|----------------------------------------------------|-----------|---------|
| Story telling                                      | 9         | 52.9    |
| Citizen science                                    | 4         | 23.5    |
| Encouraging pro-environmental behaviours           | 14        | 82.4    |
| Goal setting (environmentally related)             | 4         | 23.5    |
| Nature connectedness activities                    | 6         | 35.3    |
| Conversations about nature                         | 16        | 94.1    |
| Conversations about what environmental literacy is | 5         | 29.4    |

## Appendix F

Post-course survey question 5: With reference to the ones you didn't tick, what are the barriers that stopped you introducing these environmental concepts during your activities? Please tick all that apply.

|                               | Frequency | Percent |
|-------------------------------|-----------|---------|
| Time                          | 11        | 64.7    |
| My knowledge                  | 5         | 29.4    |
| My ability to teach           | 2         | 11.8    |
| It's not what my clients want | 10        | 58.8    |
| I'm not interested            | 0         | 0.0     |
| Other (please specify)*       | 5         | 29.4    |

\* "Other" barriers that stopped someone introducing environmental concepts during activities

"Clients/situation/time I had with them weren't necessarily suited."

"I quite often forget to include environmental aspects in my sessions."

"I think, with the individuals I usually have, the 'nudge' is better than preaching about the environment. It also depends on the type of session/location as to how much can be included."

"The elements I didn't tick are in my opinion more of a stand alone element opposed to integrated through the day. I also missed the section on citizen science".

The language is too academic airy fairy and I don't want to sound like an academic when kayaking. It's not a natural way of communicating."

## Appendix F

Post-course survey question 6:      How satisfied were you with the knowledge you gained from the course?

|                                    | Frequency | Percent |
|------------------------------------|-----------|---------|
| Very satisfied                     | 5         | 29.4    |
| Satisfied                          | 11        | 64.7    |
| Neither satisfied nor dissatisfied | 1         | 5.9     |
| Dissatisfied                       | 0         | 0.0     |
| Very dissatisfied                  | 0         | 0.0     |
| Total                              | 17        | 100.0   |

Post-course survey question 7:      How relevant were the following modules within the course?

|                                        |                      | Frequency | Percent |
|----------------------------------------|----------------------|-----------|---------|
| Introduction to environmental literacy |                      |           |         |
|                                        | Extremely irrelevant | 0         | 0.0     |
|                                        | Somewhat irrelevant  | 0         | 35.3    |
|                                        | Neutral              | 6         | 0.0     |
|                                        | Somewhat relevant    | 3         | 17.6    |
|                                        | Extremely relevant   | 8         | 47.1    |
|                                        | Can't remember       | 0         | 0.0     |
|                                        | Total                | 17        | 100.0   |
| What is nature                         |                      |           |         |
|                                        | Extremely irrelevant | 1         | 5.9     |
|                                        | Somewhat irrelevant  | 1         | 5.9     |
|                                        | Neutral              | 3         | 17.6    |
|                                        | Somewhat relevant    | 5         | 29.4    |
|                                        | Extremely relevant   | 7         | 41.2    |

Appendix F

|                      |                      |    |       |
|----------------------|----------------------|----|-------|
|                      | Can't remember       | 0  | 0.0   |
|                      | Total                | 17 | 100.0 |
| Nature connectedness |                      |    |       |
|                      | Extremely irrelevant | 1  | 5.9   |
|                      | Somewhat irrelevant  | 1  | 5.9   |
|                      | Neutral              | 1  | 5.9   |
|                      | Somewhat relevant    | 7  | 41.2  |
|                      | Extremely relevant   | 7  | 41.2  |
|                      | Can't remember       | 0  | 0.0   |
|                      | Total                | 17 | 100.0 |
| Participant thinking |                      |    |       |
|                      | Extremely irrelevant | 0  | 0.0   |
|                      | Somewhat irrelevant  | 2  | 11.8  |
|                      | Neutral              | 1  | 5.9   |
|                      | Somewhat relevant    | 4  | 23.5  |
|                      | Extremely relevant   | 8  | 47.1  |
|                      | Can't remember       | 2  | 11.8  |
|                      | Total                | 17 | 100.0 |
| Citizen science      |                      |    |       |
|                      | Extremely irrelevant | 0  | 0.0   |
|                      | Somewhat irrelevant  | 1  | 5.9   |
|                      | Neutral              | 2  | 11.8  |
|                      | Somewhat relevant    | 7  | 41.2  |
|                      | Extremely relevant   | 5  | 29.4  |
|                      | Can't remember       | 2  | 11.8  |
|                      | Total                | 17 | 100   |

## Appendix F

| Story telling |                      |    |      |
|---------------|----------------------|----|------|
|               | Extremely irrelevant | 1  | 5.9  |
|               | Somewhat irrelevant  | 2  | 11.8 |
|               | Neutral              | 1  | 5.9  |
|               | Somewhat relevant    | 4  | 23.5 |
|               | Extremely relevant   | 8  | 47.1 |
|               | Can't remember       | 1  | 5.9  |
|               | Total                | 17 | 100  |

Post-course survey question 8: Did the course meet your expectation?

|          | Frequency | Percent |
|----------|-----------|---------|
| Yes      | 11        | 64.7    |
| No       | 1         | 5.9     |
| Not sure | 5         | 29.4    |
| Total    | 17        | 100.0   |

## Appendix F

Post-course survey question 9: How likely are you to recommend this course to a colleague? 1 star = not at all likely. 10 stars = very likely.

|          | Frequency | Percent |
|----------|-----------|---------|
| 1 star   | 0         | 0.0     |
| 2 stars  | 0         | 0.0     |
| 3 stars  | 1         | 5.9     |
| 4 stars  | 0         | 0.0     |
| 5 stars  | 0         | 0.0     |
| 6 stars  | 4         | 23.5    |
| 7 stars  | 2         | 11.8    |
| 8 stars  | 4         | 23.5    |
| 9 stars  | 2         | 11.8    |
| 10 stars | 4         | 23.5    |
| Total    | 17        | 100.0   |

Post-course survey question 10: Which aspect/s of the course were of most benefit to you?

"Creating an environmental activity made me reflect on how to introduce environmental activities to my practice".

"General discussion and time spent considering the environment and how we can improve."

"Giving me confidence and more things to discuss in my sessions with clients".

"How to apply it to my clients".

"How to engage participants."

"Importance of keeping environmental considerations to the fore".

"Joining elements of story telling was of interest".

"Making me think about how my communication is received".

|                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| "Making me think about what I could be doing and what I am already doing".                                                                                                                                                                                    |
| "My ability to speak to various groups about the environment".                                                                                                                                                                                                |
| "Overall appreciation of how outdoor professionals can play a role in educating and driving behaviour change. I think story telling is probably the most beneficial. It can be engaging, educational and works with most age groups whilst out on the hills". |
| "Sharing games and ideas with other participants, understanding the breadth of what can be included in teaching and coaching regarding nature".                                                                                                               |
| "Specific examples of activities/applications that could be applied directly to my work with participants".                                                                                                                                                   |
| "Story telling".                                                                                                                                                                                                                                              |
| "The basic concept of including environmental topics in each and every paddle. We try and look out for the places we paddle in but if it's taken 'as read' others don't learn to appreciate it the same way".                                                 |
| "The open conversations and relaxed delivery".                                                                                                                                                                                                                |
| "They make me think of lesson plans and key areas I would like to improve on and go deeper in to for games and stories for example."                                                                                                                          |

Post-course survey question 11: Which aspect/s of the course were least helpful to you?

|                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| "1. All the participants would have 'connected' better and got far more out of it if it was face-to-face rather than online. 2. It can be great getting a variety of views and experiences but if the groups' backgrounds/work situations are too different not everyone will be able to relate it to their situation. It was a fairly varied group".                                                           |
| "All of it was helpful, I think I would have used some take away worksheets, crib cards or resources if there were some developed."                                                                                                                                                                                                                                                                             |
| "Had a wee technical issue on the second event".                                                                                                                                                                                                                                                                                                                                                                |
| "I'm a citizen science app sceptic".                                                                                                                                                                                                                                                                                                                                                                            |
| "If anything I would say the item about the use of words although very interesting as to make me think of the way that items can come across. I'm not sure many 'aggressive' words that are used are really meant in an aggressive way just as expressive adjective words. I can see your point but we change the way we talk depending on the group. Certainly got me thinking which is what it's all about!." |
| "Importance of words. I think I'm very unlikely to use the terms that you listed as degrading to nature".                                                                                                                                                                                                                                                                                                       |
| "It tended to go into too much detail of smaller ites and not included the bigger picture ie the discharges into seas and rivers".                                                                                                                                                                                                                                                                              |

|                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| "N/a".                                                                                                                                                                                                                                                                     |
| "None".                                                                                                                                                                                                                                                                    |
| "None".                                                                                                                                                                                                                                                                    |
| "Not receiving links or being able to get them for ¼ of the course".                                                                                                                                                                                                       |
| "Nothing was unhelpful but the nature of my work with participants means we generally have very limited time with specific goals they want to achieve. As such it's only really practical to include very short, specific pieces of input as part of other conversations". |
| "Story telling".                                                                                                                                                                                                                                                           |
| "Storytelling".                                                                                                                                                                                                                                                            |
| "Tangibility".                                                                                                                                                                                                                                                             |
| "The language used eg citizen science, environmental literacy. Also being a sea kayaker, the course needed to be more specific to the sea and as a club we are pretty good at that stuff anyway".                                                                          |
| "The walk was good and a nice opportunity to talk about things, but we didn't cover much extra content during this time."                                                                                                                                                  |

Post-course survey question 12: How could the course be improved for future participants?

|                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| "A few quick and easy to implement pieces of information, games or ideas would be great".                                                                                                                                                                                                                                                                                                                 |
| "A lot of the time people hate break out groups for short discussions, but sometimes they work really well to get people to know each other a tiny bit and some of the quieter ones may give more suggestions to a small group."                                                                                                                                                                          |
| "By bringing it back to the individuals and what the impact is on them".                                                                                                                                                                                                                                                                                                                                  |
| "Change the course name, as it appears a bit too nerdy!".                                                                                                                                                                                                                                                                                                                                                 |
| "Direct communication with the organiser/provider opposed to through another person which is where the emails weren't sent to a number on the course."                                                                                                                                                                                                                                                    |
| "Don't have any clear ideas I'm afraid".                                                                                                                                                                                                                                                                                                                                                                  |
| "Face-to-face with others in similar situations – big difference between Club Coaches and how they run sessions to [say] Instructors at Activity Centres, etc, etc. Course could then be tailored to the situation and therefore more appropriate/relative to the group. Ice-breakers are hard online and getting to know a bit about others on the course would make for a better learning environment". |



## Appendix F

|                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| "Information to go away with to consolidate further".                                                                                                              |
| "It was great, I feel like more folks in the outdoors would really benefit from this course".                                                                      |
| "More examples given when actually outside".                                                                                                                       |
| "More on story telling. Maybe a resource of stories for different areas of the country or different age groups".                                                   |
| "More practical involvement".                                                                                                                                      |
| "Not sure".                                                                                                                                                        |
| "Nothing".                                                                                                                                                         |
| "Practical walk around".                                                                                                                                           |
| "Toolbox of useful items."                                                                                                                                         |
| "Unpacking the language and being more specific about things to do rather than concepts and ideas that you have to work hard to translate into actual activities". |

## F.2 Examples of coded transcript

### F.2.1 Example 1: “What makes CPD courses valuable to you?”

As the themes were generated deductively from the interview questions, the first example of coding shows multiple answers to a single question.

Themes generated: **Personal learning** **Resources** **Sharing learning** **Facilitating change**  
**Enjoyment/interest** **Meeting a standard**

#### Oscar

**Learning something.** I wouldn't go on to a course like a CPD course on how to set up a 3-to-1 pulley system because I know how to do that, but if I'm going and learning something and **I have then resources I can pull from** that to **carry on and improving my coaching** or **passing it on to other instructors**, that's what makes it worthwhile for me.

#### Frank

Going out and **looking for increasing your own knowledge.** Yeah, it just that's that's I've gained from just doing that.

**I try and try and pass courses on.** If I've done well, **enjoy the course** and what have you. I'd try and get other people onto it so you know, I'd like all of you could do it on a parental level. You could. You know, you could do. You could run this kind of course for for everybody in the club, you know, to give them a bit of understanding about **just opening their eyes to to what they're doing.** **It doesn't have to be focused on coaches or just the coaching side of it, does it?**

**I don't normally log my CPD as in- I don't go for something to to just to get CPD just to qualify for CPD.** It's just **it's interesting** when it, when it when it's there. I did something else that CPD recently just by attending, I was supposed to get something, but I didn't really.

I think the hardest, the hardest part, I think- With this course is not having real discussions about the environment, I think it just naturally opens itself up, doesn't it? To to having conversations. And I know you're because I'm looking at some of the the keywords and the bits and pieces, nudge theory and stuff like that. I love nudge theory because I use all the time. Some of the technical side of it, if you like the the, the teaching, the coaching side of it, it's important, but it's not as important as the theory of doing it- of the ethos, the ethos. That's that's that's that's what I'm looking for. **But I don't think you can separate it from the real life examples and discussions that you're going to have in, in a group and I think.**

I'm learning how to coach here, but I'm also learning.

### Phoebe

So, I think if it lines up with my interests and is possibly something I feel rusty on or something I don't know about that I'd be interested in developing. Something I think that has practical elements cause like my brain doesn't- I can't sit still for that long, staring at a projector, it just goes into white noise after a while. Like when I did my First aid renewal end of last year, that was very practical based. We did like a very small about talking and like watching a projector and then we did a practical and it was like building it bits on bits. So we then revisit things and then do the next step so like, when you're coming into a first aid scenario, we do like the first bit coming in addressing how to, like check if they're responsive and then we talk about the next bit and then we do like the checks for like building up step by step in bits. But recapping the last bit rather than just moving on to the next bit. I think that's really helpful for remembering processes as part of our CPD course rather than just going right, here's a bit of information next. Because especially in a day of information, you're gonna forget bits if you're not recapping regularly.

### Sam

I guess something that's gonna create some change like afterwards, so something that can be to have some action points to to to go away with them to actually do so that that's something changes from when I started, you know. So if I do it, let's spend another time on something and don't really end up changing anything as a result of it or then that's not as valuable. But yeah, I think to be able to take something away that we would get that there's definitely going to be used or built into some sort of system or something. Yeah.

### Indie

But I think with many of the other qualifications that I've done, there's kind of like a syllabus that you have to learn and then you like, demonstrate that you've learned that syllabus and then you that's you complete the course. I think I was very surprised by how kind of welcoming and open it was like not quite a kind of discussion. There was no kind of fixed lists of things that we had to look at or cover or learn. It was. It was much more about kind of sharing and thinking about how we build the stuff into practice. And I don't know whether that was just whilst you think about putting the course together or whether it'll always be like that. But yeah, I think it was different from what I expected, a kind of prescriptive course to be.

[In a good way or a bad way, or just different?]

I think so. I guess the challenge is of that is how repeatable it is because if you know you had like we had a really keen bean group on that didn't we? And like there's so much knowledge and

there was that Lady who knew like every bird species of the British Isles and the other chap with his amazing like fungus videos. And if you if you had a whole group of people who were completely new to it and and didn't know anything know anything.

I think it was really interesting to hear from other members on the course, you know what their challenges were as well. So I think some of them, it was about not going too close to the seals not approaching the the wildlife and then thinking about kind of bank erosion and portaging. And like you say, like the breadth of of things that we have to cover is is huge. And even with something that is should be really simple and really prescriptive.

I guess on some selfish level that kind of imposter syndrome thing, so something like a first aid course, if you've done that training, that gives you a little bit of confidence that you have been taught stuff and you do know what to do and you could help someone. So yeah, I think we've like whitewater safety and rescue courses and other coaching courses like I feel a little bit more confident that at least one other person has deemed that I am in fact competent. So. So I don't know what the word for that is, but I guess. Meeting some kind of standard or doing some kind of training is is valuable in that respect. I think. Enjoying it on some level and being able to recommend it to other people is really important as well.

### Jack

If I can, if I take the course and I can hand, I can. Obviously I can put it over to transfer it to the the children or the adults when we are another, you know. Through my skills, or through verbally telling them I'm instructed, I'm shown them even to the point of showing them where to go for it. You know, you're just directing them in the direction. Do you want them to go or they need to go to have a look and see what's done?

If it'll interest me, and if it'll interest the children. But if I can pass that knowledge on to the children, that's what I'm more interested in. It's not so much the canoe side of it, it's more of the life life saving side of it, where we have the children to pass that knowledge on to and they can take it away with them. Whereas a lot of the adults, like I'm 66. So I'm not going to get very far with a lot of the adults that I deal with around that age as well. You know, at that age, you're not going to change them much. The only thing you can do is give them a knowledge so that they can pass the knowledge back to the younger generation. It's too late for us, but it's not too late for the younger generation.

### Ken

For me, I'm just. I'm looking for more things, just more information. For example, I should have done one this winter, but I didn't. It didn't happen. In the end, there was trees in winter. I'm not

really good at trees in winter, you know, so I thought I would go on a course. So there's you've always got an area that you can pick up on. Ducks. You know, all that world of birds. I don't know anything about ducks. You know, I need to do more on ducks. But because where I am, the sort of person I am. I can use the self teach as well. You know I read a book and go and have a look, and not everybody can do that.

So it's personal learning, but also looking for new stories.

## Ross

Staying current within best practice is is what? So we have to do a lot of CPD that I don't like doing and it's compulsory. So doing something CPD, which I so I've got an environmental degree background and but I don't use it. I don't really use it in my work, but I'd quite like to be able to update on on on things things that have happened since I've sort of graduated, so you know there's things I'm I'm not keeping up with so that CPD- it's interesting stuff and I can I can use it in different- I can use it with the canoe club. I can use it at work. You know I can use it with friends. That would be that that would be really interesting because I'm interested in it. That, rather than having to do something because I have to do it, I'd rather be doing something that I I'm sort of passionate about and like doing. Even though I sort of get distracted by lots of other things. It's something that would force me to sit down and I'm be sort of current if that's the right word.

### F.2.2 Example 2: Resources

The second phase of coding was inductive to identify themes that arose from multiple codes. This second example shows the inductively generated code “resources”. Writing in square brackets are the questions and/or responses from me.

#### Oscar

[How could this course improve that value for you?]

I think it was- I think I said it to you when we did the course was the resources and I think having them resources to pull up and go Ohh yeah, well I know that you want to talk about this more, OK, this is where you want to go and find out a bit more about this information and having that kind of almost like that, like a poster or a leaflet or something about different aspects that I can pull up and go. You want this? There you go and pass it on or little fact sheet and and that sort of thing of like, you know like in the mountain leader stuff you get the little flora and fauna cards, little things like that and where you can just kind of pull little things out. Little facts like having your lights turned on unnecessarily for this amount of time has this much impact that that sort of stuff.

[In terms of communication in general, do you feel like you and the instructors that you work with have the resources that mean they can communicate about environmental subjects as best you can?]

I don't think so. I think there could be a lot more emphasis on the training on that side when we do the hill walks and stuff, that's when we only really do any training about the environment and we're talking about the facts of the the quarrying on the hills and nightwalk. We talked about light pollution. We talked about what you can see, the stars, that sort of stuff, so, we do a bit when we go out, away from the centre, but not really when we're in the centre. That's more down to me as the course director, seeing in the groups and in our initial briefings we're talking about with light, we're talking about taking our shoes off before going inside and and that sort of stuff.

#### Frank

The biggest thing for me is is that I I need a bit more knowledge behind what I'm doing. To do more than what I'm doing, what I'm already doing. If you like, I need need a bit more knowledge and I I like to be correct about what I'm doing

**Sam**

No, I guess, I guess we haven't had as much. I guess the shame a little bit is when you're busy, you'll do a course like that and then you don't really and then you have lots of good ideas and you don't necessarily put the time aside to actually action it. And I guess we're probably guilty of that because you're trying to prioritise lots of things, I guess so, yes, that's the priority, but there's lots of other things. So I guess it's the, you know, how do we continue to put this at the forefront? And so I guess maybe people did a course and then what could be quite nice if there was an, don't know, a support group onwards or like a Facebook group or like just a monthly Mailer about some ideas and what other people are doing maybe because it's I guess it's a topic that that is there, but then it's easier to put aside when you've got a million other things to do. So I think it's just that Oh yeah, that's a nice idea. Let's copy them, you know, I guess it's it's a great thing to do is copying.

**Indie**

I think one of the things that I raised on the course and that I still have a problem with now is kind of knowing what's best sometimes because you don't want to talk about using, you know, like biodegradable cups over reusable cups over paper cups. And unless you actually know which one has the best footprint and what's what's best. So I think I'm, I'm still missing a little bit of a resource in terms of what's the consensus amongst the scientific community on the moment as to whether it's better to recycle your kayaks or to use them until they fall apart, by which point they've essentially become microplastics in the environment. Or you know whether whether we should be taking a flask with us or taking a Kelly kettle and heating our water on site with you know, I just, I don't know which, if any of those and I guess I am not aware of like a footprint calculator to even let me put in the data to to figure out any of those things. So I think I'm still a bit apprehensive to kind of (being an) advocate for best practice on some of those things. Just 'cause. I don't know what the the right thing

I don't know if you've seen like the 'Check, Clean, Dry' little flyer, they they gave us some kits for that and it was just like had some stickers in it and like this tiny little squeegee bottle, but it didn't identify. It didn't say, you know like 'these' are the most dangerous situations as if you're transporting your kayak from one waterway to a different waterway or from, you know, saltwater to freshwater or from, you know, an SSSI to an urban waterway or vice versa, and- yeah, just like this little bundle of, like, plastic bits and pieces that when you weren't ever gonna be able to clean any size of boat with this like tiny little bottle when there's, you know, there's no public water points anywhere anymore. So like, is it good enough to use the river water to clean it, or does that defeat the point? Like, how long can these things survive without water or if the weed dries out? Does it still survive? Is, is it still a risk? So yeah, I think something that should be as

simple as good bio security isn't being done well and doesn't kind of travel particularly well between all of the different venues and clubs and craft and everything else. So to then expand across the whole, the whole of nature, I think.

it would be lovely if it was a little bit like the first aid where it was like a usual bolt on that was really recognised and appreciated by everyone.

I think we maybe talked about this during the course was having some kind of like forum or page or group or like somewhere we could share some of the ideas or like briefings or lessons that worked really well because I didn't know that guys videos on the train existed and I don't know if I'd even be able to find them again now. So like somewhere that, that, that stuff exists together would be a useful resource, but I don't know where and you don't want to like reinvent the wheel if that stuff already.

### Jack

Even along the lines of what the WCA could do, it's like we should be linking up with people like surfers against sewage and things like that. I know they're mostly on the coast and all that. OK, we I will say that this is in the rivers, but there's nothing to stop which could be forming a link with them because at the end of the day, a lot of these sewage pumping stations are not pumping out into the sea directly. A lot of them pumping into the rivers as well. So, so we are probably quite the way behind them.

Let's see a course on it so you can teach it or you can teach the courses to teach it to the children because not a lot about it is known. And if the coaches could get together and talk about it, you like, I don't know what goes on in the way Valley and what's being dumped in the river and they probably don't know what's happening, what's happening down around the coast of South Wales, you know, it's just if you can compare notes, then it's easier to teach it.

### Ken

Are there going to be some resources for individuals and volunteers or are are there going to be some packages that like a private company could could buy into so that so that would help us to train our staff and train our volunteers that that was my sort of question. Back to you and it sort of made me reflect on what I do as a professional and as a volunteer and thinking how can I fit environmental literacy into what I do. And at the moment, considering at work into adventure therapy- so I I work with a big a big care company for young people. So we've got we've probably got around one-hundred instructors in total. So how can we get one-hundred people doing the stuff that is really important.



There are like flash cards on a key ring for my guy up in North Wales. I bought them. I haven't used them, but I, but I have taken them on sessions so I they're they're in the back of my mind. But I haven't because I'm not doing it face to face a lot. They're not. It's not forefront. And and it's not natural and normal to do. But yeah, but it doesn't have to be. It could be, it could be, it could be an electronic cue card could it could be on your phone or yeah, could be a laminate or something, or it could be like you say, a little little cue cards or something. But yeah, those are the type of things that would I think would help our staff if they had something in their pocket that related to something that they wanted to or they were keen keen about and I suppose just thinking off the top of my head now if if there were different areas, so we do quite a lot of different outdoor activities. So maybe there might be something designed for mountain biking and forests, maybe one design for coasteering, maybe there's one designed for paddle boarding on on lakes or on the sea. Those. Yeah. Different sort of- Quite quite user friendly sort of things where they're quite visual as well. So you just pick up something and it's just hitting you with three or four different things that you could sort of keywords that could that could trigger some some kind of. Yeah, something simple that will remind you that there are certain things you could chat about.

I think something that you can pick up off the shelf you give to an instructor and they can just run with it. That would be really useful. And then something possibly then as an overlaying thing for managers or senior people where they've got like the big picture where things are like explained and it explains how to to to use them as as as a tool. Yeah.

[So you can use them to train your instructors as well?]

Yeah. So you're so there's a big file where there's a physical file or electronic file you can just take off the shelf, open it up. All right. Coasteering today. OK. It's coasteering, but it's not on a lake. It's on a river. So we need to talk about a river environment and those maybe those cue cards are the same for rivers as they are for paddle boarding on a river or walking down the river because you're going to see the same things. But it's just like- almost like a reference point where a cross reference and things where you can just pick them out.

I suppose with younger people it would be nice to have some kind of child friendly sort of game where they've got different environments and they can just click on them and but then then you'd have to adapt that, wouldn't you? For primary schools and different key stages. Oh, yeah. I mean, there's awful lot of work, isn't it? But, if there was something very sort of generic and simple, which is reminds you of stuff right, go click on this link and it's all there. You can read as much as you like or as little as like.

## List of References