Teaching accessibility as a shared endeavour: building capacity across academic and workplace contexts

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ABSTRACT

The social model of disability, accessibility legislation, and the digital transformation spurred by COVID-19 expose a lack of accessibility capacity in the digital workforce, indicating persistent gaps in academic and professional education. This paper reports qualitative research with 30 expert educators in academia and the workplace to consider the relationship between these sectors in building accessibility capacity. Their insights highlight important disconnects and contextual challenges that educators must manage and navigate. Digital accessibility is increasingly recognised as a shared endeavour in the workplace. However, in academia, faculty cultures and disciplinary silos can result in responsibility for accessibility defaulting to individuals. To prepare accessibility-skilled professionals, cross-role education and training is necessary across disciplines. With a focus on teaching and training practices, we highlight the need for academia and the workplace to learn from each other and adapt together to generate pedagogies that will better prepare learners for accessibility practice.

CCS CONCEPTS

•Social and professional topics ~ Professional topics ~ Computing and Education •Human-centered computing ~Accessibility ~Accessibility theory, concepts and paradigms

KEYWORDS

Web accessibility, higher education, pedagogy, teaching, workplace training.

ACM Reference format:

Andy Coverdale, Sarah Lewthwaite and Sarah Horton. 2022. Teaching accessibility as a shared endeavour: building capacity across academic and workplace contexts. In *Proceedings of 19th International Web for All Conference (Web4All 2022). ACM, New York, NY, USA, 5 pages.* https://doi.org/10.1145/3493612.3520451

W4A'22, April 25–26, 2022, Lyon, France

ACM ISBN 978-1-4503-9170-2/22/04...$15.00
https://doi.org/10.1145/3493612.3520451

1 Introduction

More disabled people are using digital tools and services than ever before [1]. However, there are significant disparities in Internet use and access. Despite advances in international digital disability rights legislation (e.g. [2, 3]) and broader understanding of the socio-cultural barriers that constitute disabled experience [4], older and disabled people remain amongst the most digitally disenfranchised groups. COVID-19 has intensified the need for accessible digital services and tools, with society now reliant on digital platforms for communication and societal participation [5].

Initiatives to address access and skills amongst marginalised populations are gaining momentum (see [6]). But there is still no guarantee that digital tools and services will work for people who use assistive technologies, adaptations, or other accessibility strategies. The technology sector's accessibility skills gap is recognised as a critical issue [7], highlighting the need to build accessibility capacity in the digital workforce. Accessibility education, in both academic and professional sectors, is pivotal to building this capacity.

There is growing recognition of the importance of collaborations between academia and the workplace, sharing up-to-date accessibility knowledge, practice, and pedagogy (e.g. [8]). These sectors constitute a range of distinctive learning contexts and environments that make specific pedagogical demands on educators, even when teaching the same material [9]. Yet, academic and workplace educators share key challenges and opportunities. For more effective capacity building, dialogue and collaboration between sectors is required.

1.1 The Challenges of Teaching Accessibility

Digital accessibility is challenging to teach. It incorporates multiple disciplines, and requires a unique combination of theoretical knowledge, procedural understanding, and technical skill [10]. While increasingly recognised as a core competency for technology professionals [11], there is no formally agreed curriculum and in many territories accessibility is not required for degree accreditation or professional certification. As an academic topic, accessibility lacks visibility within technology-oriented disciplines, and is typically categorised under the umbrella of legal and ethical issues, as a sub-group of Human Computer Interaction and sometimes of web development [10]. At the same time, accessibility is commonly presented in the context of evaluation

and repair of existing resources, rather than as the application of a comprehensive inclusive design strategy that keeps pace with innovation [10]. Learner attitudes can also be challenging, with some Computer Science students considering HCI itself 'easy' and somehow 'commonsense' [12]. With HCI and accessibility often being an elective, some students may not choose to study it at all. In the workplace, learners may participate in accessibility training as a condition of employment rather than out of interest in the topic.

1.1.1 Pedagogic insights and influences. Reviews of recent research in accessibility teaching [13, 14] show an under-researched field largely characterised by small, opportunistic studies and individual reflections on teaching, mainly in Higher Education. These studies draw considerably on models and approaches that are culturally embedded in Computer Science disciplines where much of the teaching is taking place. Examples include Universal Design and Inclusive Design [15], User-centred Design [16, 17], Design for All [18] and engineering life-cycles [19]. With a strong emphasis on curricula and course design, the literature also highlights how accessibility is often presented in separate, optional components [20], despite strategies to integrate accessibility more broadly across the curriculum (e.g., [21]).

1.2 Pedagogic contexts

This paper draws from key stages in 'Teaching Accessibility in the Digital Skill Set' (2019-2024), a research study investigating the teaching and learning of digital accessibility. The research design uses participatory methods that foster dialogue between educators, learners and researchers in ways that educate and transform one another. Here, we report findings from expert panel research with educators. We focus particularly on accounts of the socio-structural aspects of learning: how context and environment influence, facilitate and constrain teaching and training practices and capacity building. We do this because 'what works' and 'best practice' discourses can only work at a technical level. They rely upon causal assumptions about education as a mechanical process [22]. Education is complex and requires a more sensitised understanding of the multiple issues in play across different contexts. In this research, workplace and academic contexts are interrelated to consider how accessibility as a shared endeavour is taught in different disciplines and across professional roles – to elaborate accessibility pedagogy and find ways forward.

1.3 Researching accessibility pedagogy

This qualitative research uses 'expert panel method' [23] to understand and elicit different perspectives on teaching and bring them into dialogue to build new pedagogic knowledge [24]. As pedagogy often develops in implicit and unreflected ways, it can be difficult for teachers to identify and share, particularly in emergent fields where pedagogy is 'hard to know' [25] and developed through trial-and-error, rather being informed by theory or research. The research design seeks to stimulate reflection and discussion within a shared-interest community, for mutual benefit. Expert panel method seeks to respect participants' agency as producers of knowledge, rather than research subjects, in accord with inclusive and democratizing research principles [26].

1.3.1 Expert panel method. We ran two panels with digital accessibility education experts from Australia, Austria, Brazil, Canada, France, Germany, India, Japan, Spain, Sweden, UK and USA, representing both Higher Education (Panel 1, n=14) and workplace settings (Panel 2, n=16): experienced digital accessibility educators and champions who 'set the cultural tone' through pedagogic expertise and leadership [27] in teaching accessibility in academic programs and workplace training. Each panel consisted of individual semi-structured interviews. Next, following a first analysis of the data by researchers, panellists were invited as a group to engage over 4-6 weeks in an accessible online forum presenting emergent themes and interview data. The responses and interactions around the analysis constituted a second wave of data collection, establishing the credibility of analytic themes through participant validation and deepening qualitative insight. In this way, expert panel method surfaces pedagogic knowledge, and the value placed upon it, making it open to reflection, to enable shared discourse and collaborative problem-solving [24]. Quoted panellists are indicated as academic (-A) and workplace (-W) experts.

2 Expert Perspectives on Building Capacity

2.1 Contextual Challenges

Experts reflected on how contexts shape what is possible in managing and sustaining accessibility teaching and training practices. By focussing on these socio-structural dynamics – the patterns of institutional relationships – we can identify key the contextual challenges of building capacity in accessibility.

2.1.1 Industry and academia are disconnected. Many academic experts expressed hope that their graduates will go into the workplace motivated to use their knowledge and skills to promote accessibility and influence practice. However, there was consensus in both panels that not enough accessibility teaching was taking place in Higher Education, with concerns over a persistent mismatch, or 'chicken and egg' problem. As one academic noted, *'if industry asked for it, then instructors would do it.'* (KS-A)

Several academic experts suggested accessibility can be overlooked in workplace settings, voicing concerns over standards and levels of competency in accessibility practice. One expert with significant experience in both sectors (AJ-W) highlighted the lack of research-informed professional practice, observing how academia could contribute in this area. Workplace experts' perceptions of teaching in universities and colleges also varied, with significant national and regional differences. Accessibility was described as virtually '*non-existent*' in Japanese universities (MU-W). The consensus view was that more formal education is required, including in schools: *'the challenge is how do we teach people accessibility way before they get to becoming developers and designers?'* (SK-W)

2.1.2 Colleagues and communities do not engage with accessibility. Digital accessibility educators constitute a relatively small community. Experts described examples in which they and colleagues are raising awareness of accessibility and seeking to

influence and motivate others to embed it in their teaching and training and enable a 'step-change': *'fundamentally … we need to make [sure] those skills are common and acknowledged in many different roles.'* (AJ-W) One academic described the difficulty of convincing teacher students to engage with the topic: '*They think, 'Oh! Databases and graphics. This is what I teach my students later on. But accessibility, what shall that be good for?''* (GW-A)

Disciplinary and role-based cultures in academia and the workplace persist, resulting in inconsistencies in how accessibility is valued and appropriated across curricula and in different job roles. This limits endeavours to position accessibility as a core value and competency, where it is considered at the forefront of design and development stages or embedded throughout across a programme. *'Accessibility is not a stage, part of development, part of any process. It's embedded throughout the entire process from beginning to end. It's more of a mindset than a particular technical skill to develop and build on.'* (JC-W)

Many experts teach across different roles and disciplines, and described how disciplines influence the teaching of accessibility, particularly drawing on fundamental differences between human-centred approaches prevalent in HCI and more technology-focussed fields. Several academic experts also described promoting and teaching digital accessibility beyond the Computer Sciences, in neighbouring Social Science and Humanities disciplines, as well as modelling accessibility through institution-wide service roles such as advising on the procurement of learning resources.

2.1.3 Accessibility capacity relies on individual 'heroes'. Panellists indicated that the levels, distribution and influence of accessibility expertise can vary considerably across roles, faculties, and institutions. As one academic suggested, '*so much of accessibility at university level relies on the hero model. There has to be somebody that brings it there. There has to be somebody that valorises it. Not always, but commonly.*' (CP-A) Here, individuals are championing accessibility single-handedly in their teams and departments. These roles may not be formally recognised or rewarded, requiring huge personal effort (*'fight'*) to achieve accessibility gains at an organizational level: '*You need to teach the students, the organisation, the academics to build content that is usable. And then the university to purchase and build digital systems that are accessible by default. So, there's three or four … very long, difficult battles.'* (JB-A)

As several experts noted, this is a vulnerable model: *'if there's no passion for it, as soon as you turn your back on it for a second, it'll be shut down and folded.'* (JB-A) Therefore, accessibility is precarious and potentially unsustainable, raising concerns over the retention of expertise when individuals move on, especially when they are engaged in delivering teaching and training: *'It's hard to sustain because the moment a different instructor takes over a course, there's a risk that that gets lost.*' (AK-A)

In the workplace, if there is no company mandate to embed accessibility on a consistent basis, responsibility is frequently delegated to *'the one go-to person…that has to put out fires.'* (SH-W) *'As much as we all say 'let's embed accessibility in organisations'* ... individual *'employees sometimes face the brunt of that.'* (SK-W)

2.2 Towards accessibility as a shared endeavour

Exploring the impact of contextual challenges on accessibility education exposes structural and cultural gaps that limit how learners can engage with accessibility and take it forward into professional practice. Experts also shared perspectives on how to address those challenges. Through attention to strategic and structural elements of accessibility education, we create a foundation for adopting accessibility as a core value and competency across roles and disciplines and moving forward with accessibility as a shared endeavour.

2.2.1 Accessibility is embedded throughout. Educators emphasised methods to embed accessibility, recognizing that *'…for it to be useful and effective, it has to be integrated into how technologists are educated.'* (SR-W) Accessibility was integral across their teaching: *'…it was dissonant for me to teach something like design, but not talk about accessibility at all.'* (KS-A) Integrating accessibility means moving away from treating it as a *'separate, little specialised thing'* (SR-W) that is the responsibility of an *'accessibility hero'* or specialist team, to a model that is more robust. One model is a *'centre of excellence'* approach where, with institutional support and recognition, educators can enlist the help of others, including user groups, colleagues, and peers: *'…it's not seen as an optional extra, it's embedded in everything we do.'* (AW-A)

In academia, accessibility is often confined to subspecialities like HCI or Usability Engineering. Several educators emphasised that accessibility should be an interdisciplinary topic, included beyond the realm of computing-related disciplines: *'I'd like to see it distributed more across the curriculum.'* (SL-A) But educators shared concerns about imposing accessibility teaching, noting that *'People might just do it begrudgingly*' (KS-A), and recognised the challenge of upskilling: *'…if they don't know enough … it's really hard to get them up to speed.'* (KS-A)

2.2.2 Accessibility is core to professionalism. The need for ownership of accessibility as a core competency and professional responsibility was discussed to help learners *'Understand the nature of their responsibility as makers and as designers.'* (AK-A) For some, it's a matter of redirecting well-meaning efforts toward something more solid: *'That's their job, that's their responsibility to make it right. That's not something to have a good conscience or karma points.'* (AA-W) One approach is to emphasize the consequences of accessibility barriers. *'I make them go and look at the things that they've built and discover all of the defects … and recognise … that every single one of those defects has a consequence on somebody's experience.'* (AK-A)

Presenting accessibility from an organizational perspective can make professional expectations clear, where learners *'…think about how accessibility is managed in their organisation and consider whose responsibility is what….'* (TC-A) The most effective path to establishing expectations may vary by role. *'…our user-centred design professions … tend to see that as a moral imperative. …some of our developers definitely feel … like that's them doing a good job.'* (DC-W)

2.2.3 Accessibility is cross-role and interdisciplinary. Addressing role-based training was highlighted as a critical

concern. Some educators support the approach of teaching specialized roles and responsibilities in order to deliver targeted content. *'…all of our training is role-based because I don't want to waste anybody's time.'* (JH-W) Others see value in teaching different roles together. *'If possible, we love to mix the roles and get QA, design and development all in the room at the same time, so they understand what their individual responsibilities are and how they overlap and how they can work together.'* (BG-W) These approaches reflect and adapt to different workplace structures, where some teams are homogenous, for example, UX, design, or developer teams, while others are interdisciplinary, with different roles working together collaboratively. Building skills and knowledge across workplace roles is supported when accessibility is taught across academic disciplines.

There was consensus on the need for effective communication on accessibility, for example, to delegate tasks and identify blocks to workflow. Without close connection between roles, communication is difficult. *'A lot of times the designers are so distanced from the coders that … good communication doesn't happen.'* (PB-W) Making sure professionals can communicate accessibility concepts is a focus of training across roles. *'…if we don't explain the 'why', our customers can't explain it (or) implement it well because they don't understand why they're solving that problem.'* (SK-W) Effective communication was fostered though 'champions network' workplace programs to *'keep the conversation going… It keeps people working in very horizontal ways and outside of their silos.*' (GW-W) Teaching multiple roles together also fosters a shared commitment rather than encouraging *'a little island of someone that's into accessibility.'* (SH-W) As one expert noted '*accessibility is not … something you do on a specific corner in isolation. You need to engage with other disciplines – design, usability, development – to succeed.*' (DM-W)

2.2.4 Accessibility is aligned with professional practices. Academic educators recognized the need for accessibility education to align with professional practices, bringing in first-person practical perspectives and modelling varied professional practices and methodologies. By engaging experienced accessibility professionals in their teaching, to guest lecture, facilitate classes, and provide ongoing mentoring, academics are establishing direct links with industry. Some academics teach as part of an internship or apprenticeship, where learners engage with accessibility in a professional context: *'by the end of the unit they've become the advocate in their particular team or their part of the company.'* (RE-A) Others described developing 'real-world' assignment briefs and client-based projects, with opportunities for learners to work collaboratively with real clients and, in some cases, user communities, with learners *'working directly with people in the community and trying to find solutions for communities.'* (AK-A) In the workplace, educators are providing on-the-job training, building accessibility knowledge and skills through work projects and peer learning: '*we are a build organisation, we build skill sets.'* (SK-W)

2.2.5 Accessibility is broad-ranging and inclusive. The technology profession has a strong leaning toward informal self-directed learning, evident in thriving online forums, camps, and hackathons. Workplace experts acknowledged the validity of these as opportunities and communities of practice in which accessibility can be learnt: *'Computer Science… that's not where we're seeing a lot of folks learning web development … We're seeing it at the boot camps. That's where we really need to focus.'* (BG-W)

However, several educators expressed concerns over the reliability of Internet-based informal resources, and how best to harness them – *'…curating the Internet'* (DC-W) – and ensuring they are accessible: *'…it might sound obvious, but as trainers, we need to make sure that every piece of training we produce is actually accessible to everybody.*' (DM-W)

3 Building Accessibility Pedagogy and Shared Responsibility

In this paper we consider the socio-structural conditions of accessibility education from the perspective of expert educators. We find that academic and workplace contexts constrain capacity building when accessibility is structured as an individualised and specialist practice. To secure and scale capacity building, accessibility must be recognised and prioritised as a shared endeavour for both educators and practitioners, as it is in leading centres of excellence. We suggest the following priorities.

3.1.1 Embedding and integrating accessibility. Experts identified how individualised modes of accessibility practice and accessibility teaching are vulnerable to failure. There is a clear need for a community-level response, through the establishing of champions networks and other communities of practice that support teachers, learners, practitioners, and user-advocates. In this way, educators can act as *'local change agents'* [17] to leverage their situated knowledge and embedded understanding of the specific context to integrate accessibility [28, 21].

3.1.2 Professional socialisation. Experts in both workplace and academic sectors identified pedagogy that can instigate a closer relationship between professional practices and formal education. Some centre on professional socialisation, with a deliberate focus on making learners *'competent members of particular professional communities'* [22]. One approach is to connect learners with professionals, accessibility communities and activities that cross professional roles (e.g., [8], [29]). Other approaches include creating experiential opportunities that can replicate industry practices and real-world professional dynamics.

3.1.3 Harnessing informal learning. Accessibility professionals' learning journeys are often informal. Conferences, bootcamps, MeetUps, social media and online resources are 'predominant' sites of learning for professionals [30]. Informal learning is a known and effective pedagogic tool for learning development [31] that expert educators can actively harness to enrich their learners' formal studies and training programmes.

3.1.4 Introducing interdisciplinary and cross-role perspectives. Interdisciplinary learning increases empathy for ethical and social issues, develops critical abilities, and enables students to tolerate ambiguity and accommodate, synthesise and integrate diverse perspectives [32]. Such abilities are essential to the core work of accessibility professionals. Accessibility

education and training that features cross-role and interdisciplinary components allow learners to gain oversight of accessibility as a shared endeavour and provides the opportunity to gain and practice communication competencies that are crucial in the workplace.

3.1.5 Cross-sector communities of practice. Previous research [8] has called for more engagement with pedagogy through educator networks and forums. Here, experts also highlighted the need to broker vital cross-sector connections. Strong connections between the workplace and academia allow educators to develop and extend their pedagogical repertoire by drawing on wider teaching experiences and investigating how pedagogy iterates in different contexts, with different learners. Teaching that is effective for one group may not necessarily be effective for another [33]. However, building communities of practice to extend and advance educator and learner insights will help to establish knowledge that cannot be achieved individually through trial-and-error.

4 Conclusion

The conditions in which accessibility is taught and practiced have huge implications for accessibility pedagogy – what is possible and what is practical. Previous contextual work has focussed on delivery models [34] and the state of the art [17]. We have sought to highlight socio-structural conditions that configure teaching within higher education and the workplace. These conditions can drive individualised approaches to accessibility. Counternarratives of success suggest that for accessibility to succeed it must be understood as a shared endeavour, in both practice and in teaching.

Interrelating insights from different contexts presents new opportunities to build pedagogic knowledge and see new commonalities. Further, by recognising accessibility as a shared endeavour, interdisciplinary competencies gain visibility. We see communication skills highlighted. Continuing research incorporating learner- and user- perspectives in dialogues around teaching and capacity building will be an important next step, suggesting new frontiers for accessibility as a collaborative and transformational practice.

ACKNOWLEDGMENTS

This study is funded by UK Research and Innovation Future Leaders Fellowship MR/S01571X/1. We thank all our expert participants for their generous contributions. Academic Panel: Justin Brown, Tim Coughlan, Richard Eskins, André Friere, Amy Ko, Stephanie Ludi, Klaus Miesenberger, Helen Petrie, Cynthia Putnam, Kristen Shinohara, Annalu Waller, Gerhard Weber, Gill Whitney and Gottfried Zimmerman. Workplace Panel: Armony Altiner, Paul Bohman, David Caldwell, Joe Chidzik, Billy Gregory, Jonathan Hassell, Scott Hollier, Abi James, Shilpi Kapoor, Susanna Laurin, Daniel Montalvo, Sharron Rush, Holly Schnell, Jared Smith, Makoto Ueki, Gareth Ford Williams.

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