HORIZON2020 FRAMEWORK PROGRAMME

ICT – 21 -2014

Advanced digital gaming/gamification technologies

ProsocialLearn

Gamification of Prosocial Learning

for Increased Youth Inclusion and Academic Achievement

D2.1 (V2)

User Requirements

Document Control Page

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Title	D2.1 User requirements V2
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Abstract	The document describes the requirements for the gamification of prosocial learning. A conceptual framework is defined that is derived from multidisciplinary perspectives (pedagogy, psychology, teaching practitioners, game designers) of prosociality as the basis for understanding the technical and operational requirements for creating games to teach prosocial skills in schools. The conceptual framework provides the theoretical foundation for technical work developing a platform for prosocial gaming and innovation in the delivery of such games to schools
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List of Abbreviations

Abbreviation	Description
AMES	Adolescent Measure of Empathy and Sympathy
BDT	Basis, Domain and Target
BEIS	Brief Emotional Intelligence Scale
CEAQ	Children's Empathic Attitude Questionnaire
EI	Emotional Intelligence
EQ	Emotional Quotient
IQ	Intelligent Quotient
JRPG	Japanese Role Playing
MMORPG	Massively Multiplayer Online Playing Game
MOBA	Multiplayer Online Battle Area
NPC	Non Player Character
PLO	Prosocial Learning Objective
RPG	Role Playing Game

Executive summary

The ProsocialLearn project is investigating how to create and deliver digital games for children (7-10 yrs) within educational systems that support learning of prosocial skills. The approach combines prosocial pedagogies with advanced ICT technologies and cloud delivery models to create attractive and exciting learning opportunities for children based on digital games.

The report defines the user requirements for the gamification of prosocial learning and skill development based on the theoretical understanding of prosociality and its application to the goal of increased youth inclusion and academic achievement. The report is the second version of the user requirements building on the first version delivered Mar-15 and factoring in lessons learnt during the period Apr-15 to Apr-16 to provide a sound and feasible baseline for delivering educational innovation.

Key findings

Children that exhibit prosocial behaviour have increased probability of achieving academically and being socially included. Digital games provide a unique opportunity to help children explore, engage and acquire social skills by interacting with their peers with support and direction from teaching practitioners.

Prosociality is a complex topic studied widely by multiple disciplines such as psychology and education. Psychologists consider prosociality in terms of domains (e.g. trust, empathy, compassion, fairness, etc.) whilst educationalists tend to consider specific skills-based approaches (e.g. helping, communicating, etc.). Some concepts and theories are abstract and fuzzy, and are not suitable for gamification due to either technology or operational constraints. In contrast, game technologies can offer new ways to enhance learning about prosociality through mixed virtual and real-world situations (e.g. group games played around a table) and by delivering insight to teachers on student performance through automatic observation of emotional and engagement affect. Educational innovations must be delivered within the lifetime of the project by balancing technology benefits against pedagogical and operational constraints.

A Prosocial Conceptual Framework is defined as the means to communicate key concepts and theories necessary to for the gamification of prosocial learning in schools. The framework provides developers (game, game technology, platform) and teaching practitioners clear direction on how to work together to deliver the ProsocialLearn Platform and Prosocial Games.
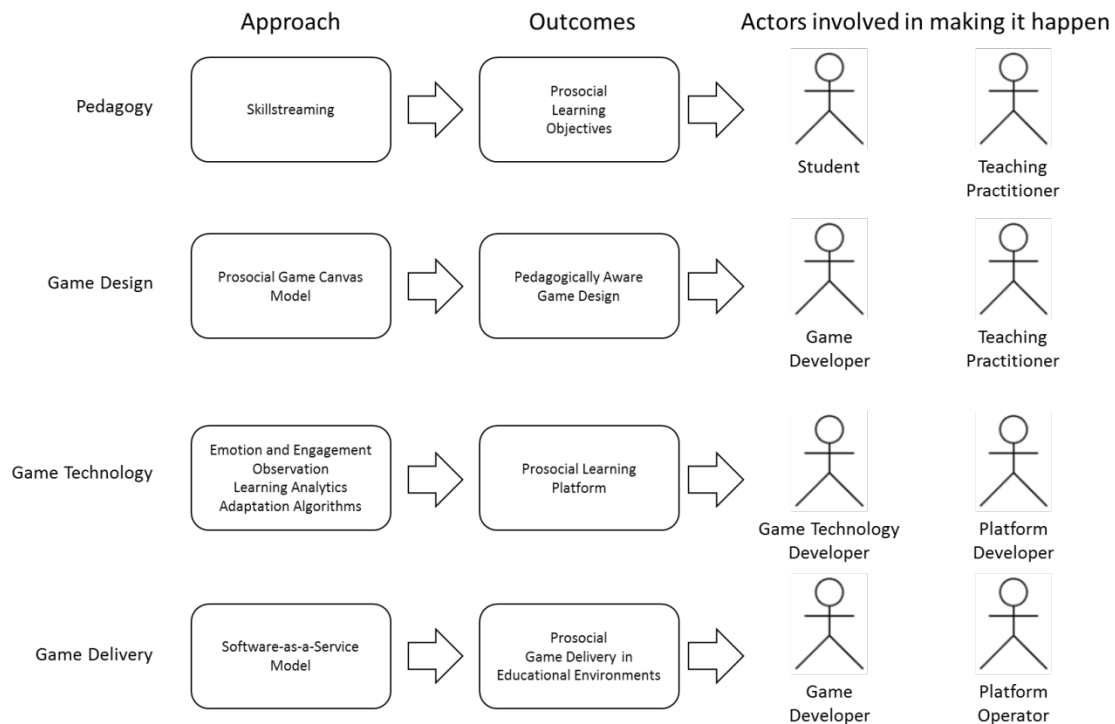
Figure 1: Conceptual Framework for gamification of prosocial learning

The pedagogical approach will be based on Skillstreaming for teaching prosocial skills. 43 skills have been identified as potential candidates that can benefit from gamification. Prosocial skills are selected in preference to psychological prosocial domains as skills are more specific, can be implemented in game mechanics and can be measured through learning analytics processes. Games will be designed using a Prosocial Game Canvas Model that considers all aspects necessary to put games into lessons, programmes and curricula such as preparation, context, scaffolding and debriefing. This addresses the fact that games alone are insufficient to teach children prosociality and that unless games are supported by other activities to model and generalise the experience in real-life situations the impact on learning will be reduced. Game technologies will focus on measuring prosociality through a combination of game interaction and player affect (emotion and engagement), and analysing the data to deliver insights to teachers for offline feedback or real-time adaptation of the game. Games may be delivered through a Software-as-a-Service model to ensure overcome many of the barriers for adoption of ICT technologies within school environments. Future work will elaborate key aspects of the conceptual framework as the project works towards delivering a platform and set of games for learning prosociality in schools.

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1 Introduction

This section provides detailed information about the purpose, scope and structure of the document as well as the intended audience of the document.

1.1 Purpose of the document

Acquiring skills for social and emotional well-being is important for inclusive societies and academic achievement. Studies have demonstrated the beneficial link between prosocial behaviours and improved results in curriculum topics. The ProsocialLearn project is investigating how to create and deliver digital games for children (7-10 yrs) within educational systems that support learning of prosocial skills. The approach combines prosocial pedagogies with advanced ICT technologies and cloud delivery models to create attractive and exciting learning opportunities for children based on digital games.

This document defines the user requirements for the project based on the theoretical understanding of prosociality and its application to the goal of increased youth inclusion and academic achievement. The document is part of a series of deliverables investigating methodologies, system architecture and evaluation techniques for the use of digital games to teach prosocial skills. It aims to provide the foundation theories and assumptions for the development and the distribution of a platform used to create prosocial digital games and teaching innovations within the education sector.
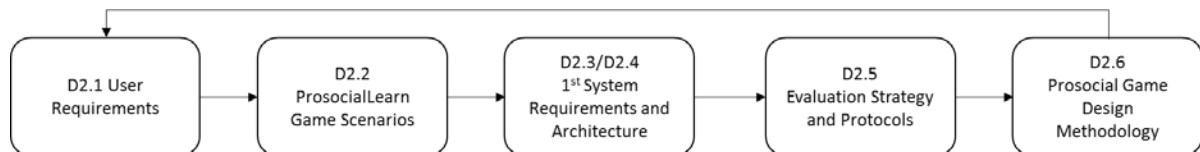
Figure 2: ProsocialLearn document series on the gamification of prosocial learning

1.2 Scope and Audience of the document

The dissemination level of this document is public. This document is the second version of the D2.1 User Requirements. This version includes a pedagogical perspective on teaching prosociality, a technical and operational feasibility assessment and the definition of a conceptual framework that brings the concepts and theories together in way that allows the project to scope research, development and innovation activities. This revision is driven primarily from D2.6 Prosocial Game Design Methodology which brought together the lessons learnt from the first 12 months of the project and identified the need to increase the emphasis on pedagogical concerns when considering the gamification of prosocial learning.

We consider multidisciplinary perspectives (educationalists, psychologists, teaching practitioners and game designers) necessary to understand how child development can benefit through gamification of learning prosocial skills. Different methodologies, including conversations, workshops, and questionnaires, have been used to understand each discipline (i.e. methodologies, theories and concepts), to establish an appropriate language of communication, and propose a framework of discovery and innovation.

We discuss the concept of prosociality and the fundamental assumptions driving the work in relation to its impact on academic performance and social inclusion. We then explore a series of multidisciplinary perspectives. The pedagogical view describes approaches for teaching social skills within educational settings, whilst the psychological view explores individual and interpersonal

constructs related to prosocial behaviour. Teaching practitioners are engaged to provide views on social values and ICT technologies in schools. Game designers provide an initial feasibility assessment of the requirements in relation to technological constraints as a way of scoping technological developments in way that maximises the potential benefits to students for the gamification of prosocial learning. Finally we bring everything together into a high-level conceptual framework to orient future project developments and responsibilities.

The security requirements were originally planned for D2.1 are now documented as part of the platform architecture in D2.3 and D2.4.

1.3   Structure of the document

The document contains the following sections:

Section 1: Introduction – an introductory section, i.e. this present section, which describes the main purpose of the document.

Section 2: Prosociality, Academic Achievement and Social Inclusion- Review of the literature on the importance of prosociality on academic achievement and social inclusion, and the importance of the gaming element, emphasizing the rationale for this project.

Section 3: Multidisciplinary views on prosocial learning – Five subsections to summarise the various literature on prosocial learning. The first section presents the various perspectives, the second and third sections define the pedagogical view and some bases to teach prosociality, the fourth section develops the psychological view on prosociality, while the fifth section summarises the results from our survey conducted on European teachers on their views on prosociality.

Section 4: Feasibility Assessment for Gamification of Prosocial Learning – Discussion of the feasibility of designing games and observing prosocial skills within such games. This section finishes with our new Prosocial game design canvas model.

Section 5: Summary of ProsocialLearn Conceptual Framework – Development of our new framework that provides the means to communicate key concepts and theories necessary to learn prosociality through digital games in schools

Section 6: Conclusion – this section presents the conclusion of the document.

2   How prosociality increases academic achievement and social inclusion

Providing opportunities for all children to acquire skills for social and emotional well-being is important for inclusive societies, academic achievement and employability. Social exclusion is a key priority in European social policy, and both the Europe 2020 strategy (http://ec.europa.eu/social/main.jsp?catId=751) and the Digital Agenda for Europe (European Commission, 2014) aim to ensure greater social cohesion and employment.

Prosociality can be defined in multiple ways (Penner et al, 2005), with the simplest definition explaining it as the behaviour of helping others. Prosocial acts include helping, sharing, donating and cooperating with others, as well as conforming to socially acceptable behaviour. Prosocial actions may be motivated by empathy and concern for the welfare and rights of others, as well as for egoistic or practical concerns, such as one's social status or reputation, hope for direct or indirect reciprocity, or adherence to one's personal values of fairness. ProsocialLearn's definition of prosociality is in accordance with the Oxford English Dictionary:

"Of, relating to, or designating something, esp. behaviour, which is positive, helpful, and intended to promote social acceptance and friendship; (Social Psychol.) relating to or designating behaviour which adheres, sometimes in a rigid or conventional manner, to the moral standards accepted by the established social group (contrasted with asocial or antisocial behaviours or responses)"

Considerable evidence suggests that prosociality is central to the well-being of social groups (DeRosier, Kupersmidt, & Patterson, 1994; Hymel et. al., 1990). Reflecting the priorities included in the European Social Policy, research has shown that children who help others have more positive relationships and interactions with their peers, therefore increasing social inclusion. Social rejection has been linked with absenteeism (e.g., DeRosier, Kupersmidt, & Patterson, 1994; Hymel, Rubin, Rowden, & LeMare, 1990), grade retention, and adjustment difficulties during the transition to middle school (Coie, Lochman, Terry, & Hyman, 1992), making it an important focus to improve children's academic achievement. Studies have also demonstrated the direct beneficial link between prosocial behaviours and improved results in curriculum topics and academic achievements (Caprara et al., 2000, Clarke et al., 2015, Flook et al., 2005) such that pupils with lower prosociality are at risk for developing lower academic self-concepts (Flook et al., 2005) and disengaging from classroom activities (Buhs & Ladd, 2001). Particularly, empathy has been found to predict children's school achievements such as academic self-efficacy and achievement tests (Bandura, Caprara, Barbaranelli, Pastorelli, & Regalia, 2001; Caprara et al., 2000; Johnson, Beebe, Mortimer, & Snyder, 1998; Wentzel, 2003; Wise & Cramer, 1988). Children's ability to trust (Imber, 1973) and use of self-compassion (Neff, Hsieh, Dejitterat, 2005) have also been positively associated with academic achievement. Therefore, by improving prosociality, we could improve both social inclusion and academic achievement.

Despite the supportive effect of prosociality on academic achievement and social inclusion, limited research has been done in this domain. This is partly due to the fact that prosociality in itself is a complex concept. Research is slowly emerging regarding the importance of social and emotional learning (related to prosociality) on academic achievement. According to the CASEL website (Collaborative for Academic, Social, and Emotional Learning), which is a reference in social and emotional learning (SEL), "SEL programming is based on the understanding that the best learning emerges in the context of supportive relationships that make learning challenging, engaging, and meaningful." They define SEL as the process through which children learn how to understand and regulate their emotions, establish and maintain positive relationships and set and achieve goals for

better academic success and general happiness. One aim of this report is to demonstrate that teaching prosociality can improve academic achievement and social inclusion by drawing a parallel between prosociality and the CASEL framework.

A second aim is to demonstrate how the added game elements can support the creation of digital games that will be engaging for children to practice and improve prosociality in a school context. Granic et al (2014) argue that much of the research on digital (video) gaming in psychology has focused on the negative aspects of play i.e. on antisocial behaviours. To provide more balance in the argument, and evidence base, they present substantial evidence in a number of domains that illustrates the positive benefits of digital games on positive behaviours. Specifically, digital games that specifically support cooperative behaviours have been demonstrated to improve prosocial behaviours both within and beyond game contexts (see Granic et al., 2014 for a summary). More generally, Granic et al (2014) highlight the beneficial social and motivational effects of gaming, as well as cognitive benefits. For example, research has shown that children learn better when the concept to be learnt is taught through play, such as through the use of digital games. For example, research has shown that frequent digital game play might enhance cognitive skills such as inductive reasoning (Greenfield, Camaioni, Ercolani, Weiss, Lauber, & Perucchini, 1994; Pillay, 2002), spatial visualisation (Okagaki & Frensch, 1994), visual selective attention (Boot, Kramer, Simons, Fabiani, & Gratton, 2008; Green & Bavelier, 2003, 2006a, 2006b, 2007; Karle, Watter, & Shedden, 2010), and memory (Boot et al., 2008); all these skills being essential for good academic learning. More generally, there is strong evidence that digital games improve learning outcomes compared to non-game conditions (including traditional learning methods) in classroom environments from primary through to secondary stages of schooling (Clark et al, 2015). There is also good emerging evidence of the benefits of digital games for supporting social inclusion more widely (Stewart et al., 2013).

Some of the challenges identified by Granic et al., (2014) for research in prosocial gaming are the need to consider how games are used in situ, in collaboration with other users, and over longer periods of time. ProSocialLearn will aim to address this challenge through conducting a series of short and longitudinal studies in classroom contexts. ProsocialLearn, therefore, aims to establish evidence that digital games can be used to teach prosociality which may increase the potential for improving social inclusion and academic performance. Our ultimate aim is to demonstrate that we can develop video games that will teach children prosocial skills to help them become more socially included via greater social acceptance and friendship from peers, and to be better learners.
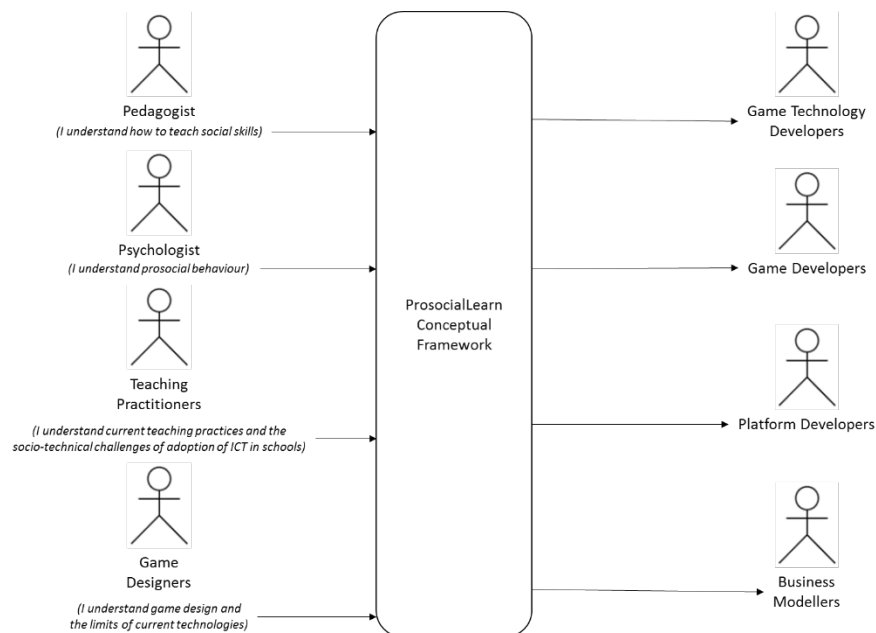
3 Multidisciplinary views on prosocial learning through digital games

3.1 Perspectives on prosocial learning

Games, particularly games that involve a group of players offer a dynamic approach for developing and refining fundamental life skills for children. We advocate that prosocial skill acquisition through digital games has the potential to help individuals develop positive interpersonal relationships and can therefore be considered as a key contributor to maintaining social inclusion (Granic et al., 2014; Stewart et al., 2013). However, current digital games targeting the education sector are low quality and fail to capture the imagination of players, significantly reducing their effectiveness. It is clear that traditional game designers know how to produce engaging stories and game content but they are lacking evidence about how digital games, game mechanics, and associated pedagogies can be used to create serious games in ways that deliver beneficial outcomes for children. In addition, serious uptake in the formal education sector depends on significant innovation in practices of formal schooling, and in the procurement and certification systems for education products. Many of the barriers are related to acceptance of digital games by schools and children (training of teachers, perceived role of teachers and learning opportunities, ensuring consistency and effectiveness, fit to curriculum, etc.).

These concerns, and many more, require multidisciplinary conversations between different stakeholders to work towards effective solutions for teaching prosociality within educational institutions. Game technology developers (e.g. sensor analytics), game developers, platform developers, and business modellers require a conceptual framework that allows them to communicate their ideas effectively to the education sector but which also provides a consistent and coherent structure for technical developments. Figure 3 shows the relationship between multidisciplinary stakeholders contributing to the development of ProsocialLearn' s conceptual framework:

- Educationalists provide theories and evidence for teaching social skills within educational settings
- Psychologists provide theories and evidence for understanding prosocial behaviours
- Teaching Practitioners provide understanding of current working practices and the socio-technical challenges for adopting advanced ICT solutions within schools.
- Games Designers provide understanding on how games are designed and the constraints of current gaming technologies

Figure 3: Multidisciplinary contributors to ProsocialLearn' s Conceptual Framework

3.2 Pedagogical approach to teaching prosociality

From a pedagogical perspective we are concerned with how to teach skills to children within schools. The project specifically adopts a social-constructivist, child-centred approach to learning and the conceptualisation of prosocial skills within the context of the classroom. Such approaches draw upon Vygotskian concepts of mediation, social activity and interaction. Specifically, this social-constructivist account of learning emphasizes the importance of language and other symbolic artefacts (drawings, maps, images, art) as mediational tools that shape and support cognitive processes within the context of social activities and interactions [note that had Vygotsky been writing today rather than in the 1920's he would undoubtedly have included technology as examples of mediational tools]. Crucially, the incorporation of such mediational tools into human action do more than simply make a task quicker or easier; instead, their use results in qualitative transformations in concepts and understanding (Rowe & Wertsch, 2004). The importance of mediational tools also lies in their reproduction and transmission of culture and meaning; in other words, mediational tools are given meaning within their specific cultural contexts of use, and children's understanding of this meaning is scaffolded through their social interactions with others (e.g. peer-peer, teacher-child, parent-child). Thus, social interaction as mediated through activities incorporating mediational tools is the primary engine of learning; children do not learn by simply being told what to do. In ProSocialLearn, the digital games are the mediational tools through which children can experience and negotiate meaning about the core skills that come under the umbrella of prosociality. Given the central roles of social activity and interaction in this pedagogical approach, children's interactions with each other, and with teachers, are essential aspects that need to be designed in to the use of the games. This could be via game mechanics within the games and / or via scaffolding learning processes that take place around the technology; both aspects are crucial for successful technology-enhanced learning (Crook, 1991).

Next we consider which prosocial skills are relevant for the project and how such skills may be embedded in teaching and learning activities.

3.2.1 Defining the prosocial skill set

The Collaborative for Academic, Social, and Emotional Learning (CASEL) (Zins et al 2004, Bridgeland et al 2013) and Skillstreaming (McGinnis and Goldstein, 1997) offer practitioners systematic approaches to teaching social skills. Figure 4 from CASEL 2003 demonstrates the role of social and emotional learning (that comprises prosociality) in academic development and social inclusion. The CASEL framework offers five social and emotional learning competencies:

- **Self-awareness:** the ability to accurately recognise one's own emotions and thoughts and their influence on our behaviour. This includes accurately assessing one's strengths and limitations, and possessing a well-grounded sense of confidence and optimism.
- **Self-management:** the ability to regulate one's emotions, thoughts, and behaviours effectively in different situations. This includes managing stress, controlling impulses, motivating oneself, and setting and working towards achieving personal and academic goals.
- **Social awareness:** the ability to take the perspective of, and empathise with, others from diverse backgrounds and cultures, to understand social and ethical norms for behaviour and to recognise family, school and community resources and support.
- **Relationship skills:** the ability to establish and maintain healthy and rewarding relationships with diverse individuals and groups. This includes communicating clearly, listening actively, cooperating, resisting inappropriate social pressure, negotiating conflict constructively, and seeking and offering help when needed.
- **Responsible decision making:** the ability to make constructive and respectful choices about personal behaviour and social interactions based on consideration of ethical standards, safety concerns, social norms, the realistic evaluation of consequences of various actions, and the well-being of self and others.
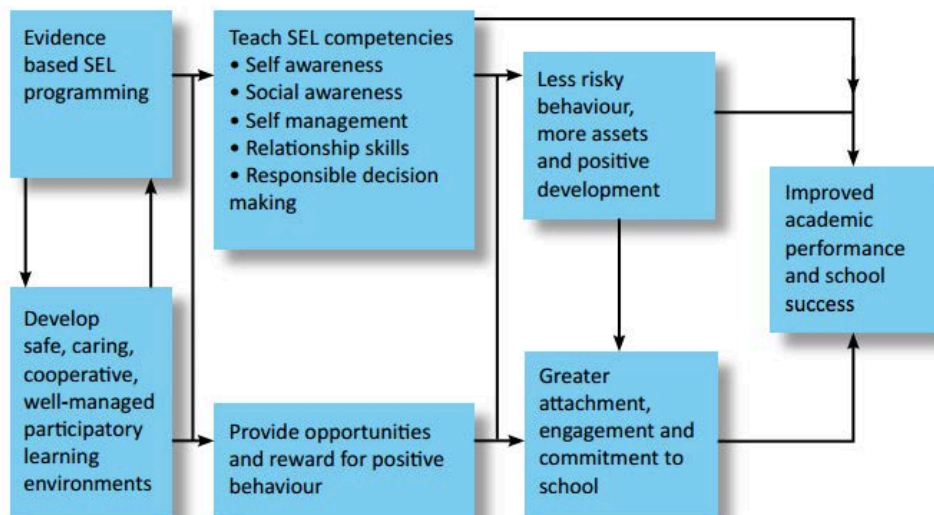

Figure 4: The role of Social and emotional learning in academic achievement. From Clarke and Barry, The Link between Social and Emotional Learning and Academic Achievement[1].

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[1] http://www.partnershipforchildren.org.uk/uploads/AcademicAchievement.pdf.pdf

Goldstein and McGinnis (McGinnis, 2011) and Reddy (Reddy, 2012) have developed a skills based approach to prosocial learning. Although slightly different, these two approaches are based on skills and follow a four or five-part training approach— preparatory work, modelling, role-playing, performance feedback, and generalisation—to teach essential prosocial skills to children.

We identify an initial set of 43 skills selected from Reddy (Reddy, 2012) that are organised in three classes: skills for friendship, skills for feelings, and skills for collaboration. The skills are selected based on those we consider most relevant or appropriate for applying to digital game-based learning, for example, we believe the skill may be readily operationalised or measured through sensor observation and monitoring tools. The list of skills is not exhaustive, but provides a strong basis for applying the skill-based approach. The project will use these as examples to engage teacher communities to contribute to this list and add or modify these skills so it corresponds more closely with teacher's expectations in their classroom.

Table 1: ProsocialLearn Skills grouped in three main categories (from Reddy, 2012)

Classification	Prosocial Skills
Skills for friendship	Communicating with others, Using Nice Talk, Introducing Self to Others, Introducing Others, Joining in a Conversation, Joining a Play Group, Sharing About Oneself, Sharing Your Things With Others, Learning About Others, Being an Active Listener, Giving Compliments, Receiving Compliments, Respecting Others, Respect for Others' Personal Space, Not Interrupting Others
Skills for feelings	Self-Control, Identifying Feelings and Emotions, Expressing Feelings and Emotions, Understanding Social Cues, Showing Concern for Others' Feelings, Dealing With Stress, Dealing With Anxiety, Dealing with your angry feelings, Dealing With Another Person's Angry Feelings, Dealing With Rejection, Dealing With Being Left Out, Dealing With Boredom
Skills for collaboration	Setting Goals and Obtaining them, Solving everyday problems, Solving a Problem as a Group, Following directions, Paying Attention, Staying on Task, Working Independently, Cooperation, Taking Turns, Being a good sport, Being Patient, Being assertive, Saying No, Accepting No, Asking for Help, Helping Others

The difficulty associated with each skill has been further categorised into three levels: basic, intermediate and advanced. Basic means that this skill needs to be acquired before children can move on and learn more difficult skills, as it is needed in other skills (e.g. 'using nice talk'). Intermediate means that this skill is a more difficult skill and requires some basic skills to be mastered. For instance, 'learning about others' means that a child is able to go and talk to people nicely (using 'nice talk' such as, approaching the person in a friendly way (not running into them or getting in their face), standing at an arm's length distance from the person, smiling at them and using a low tone voice), is willing to ask questions about others and knows how to ask questions. This requires more than one skill and is therefore intermediate. Finally, advanced means that this skill is harder to master and contains more than a step. For instance, 'dealing with stress' requires to first acknowledge that you are feeling stressed, then finding how you could be less stressed and finally take actions for dealing with it.

The mapping of skills into the three categories is primarily with the aim of simplifying access to market. Game developers and teachers are not necessarily prosocial experts and hence by providing a simple set of categories that everyone can understand we deliver a user-friendly way to engage our audience. Whilst the 3 categories provide a good spread between CASEL, critically they support the project's main objective of delivering games that provide prosocial skills necessary for positive relationships (Skills for friendship), team working (Skills for Cooperation) and emotional intelligence (Skills for Feelings).

3.3 How to teach prosocial skills

Goldstein and McGinnis suggest training the skills in four main steps: modelling, role-playing, performance feedback, and generalisation. In addition, the model accounts for setting up the stage such as preparing the group, the rules etc. We summarise their work and their implications below, in 5 stages: (1) setting the stage, (2) modelling, (3) role play, (3) feedback and (4) generalisation outside the school environment. Finally, we present our own model: the canvas model, bringing everything together.

3.3.1 Setting the stage: creating and establishing groups for play inventions

3.3.1.1 Group format and size

Three formats can be used for supporting learning via this model: (1) structured or unstructured (routine or not), (2) closed or open group (same children from beginning to the end or not), and (3) time limited or ongoing (e.g. one hour per week for the whole year or more flexible). For our types of games, it can be up to the teacher to decide what sort of group he/she wants for each particular activity.

The group size can vary tremendously from the whole classroom to only three children per group and mostly depends on the group's goals and setting. Reddy (2012) recommends three to six children per group if the children are aged eight or younger and group sizes of six to eight for older children.

McGinnis (2011) also recommends that each session lasts between 25 and 40 minutes, leaving 5-10 minutes at the end of the day to recap the skills as well if feasible. Of course, these practical considerations are also very much to be determined by the teachers within their own contexts of use. McGinnis (2011) also recommends three sessions per week so it is frequent enough for a series of skills to be taught but far enough apart for the students to have opportunities to complete their home assignments. Again, this is something that will be determined by teachers in terms of what is feasible and appropriate for their learners in their classrooms. We understand that 25-40 minutes 3 times per week for a year might be unachievable for many classrooms. Therefore, these are just guidelines and we should expect schools to adapt their lessons to their timetable and the skills of the children in their classroom. For a more realistic approach, we could expect teachers to teach these skills once a week for around 15-30 minutes for the duration of the academic year.

3.3.1.2 Group agenda

This agenda will help structure the type of work to be conducted and should remain flexible to adapt to the children's needs. Each session should be structured so that there is a clear routine that has some predictability (e.g. always starting with the teachers explaining something, then asking the children their point of view, then playing the video-games, then feedback, debriefing and generalisation of the skills outside the school context). Depending on the age group, children could also for instance start each session by sitting around the teacher, saying their name, discussing the activities of the session, and then trying things out.

3.3.1.3 Group goal and rules

According to Reddy, *'the practitioners should establish group goals before the first group session and link them to a positive reward system that is implemented during all sessions'* (Reddy, 2012, p. 32).

These rules can be negotiated and agreed between the group at the start of the session. This is a good strategy because it also involves children thinking about why rules are important. Each goal and rule should be written to focus on the things to DO (e.g. wait your turn to talk) rather than the things not to do (e.g. do not interrupt) i.e. based on ethical principles of positive reinforcement that rewards desired behaviour but aims to extinguish non-desired behaviours by ignoring them. They should also be reinforced during each group session by verbal feedback (e.g. 'well done Tom for waiting your turn to speak'). Finally, they should be written in a simple, written language, for instance on a whiteboard in front of the group.

3.3.1.4 Student selection, grouping and preparation

Teachers will always give careful thought to the grouping of children for specific activities and ProsocialLearn games will be no different to this. Teachers will have particular curriculum goals to achieve that are general to the class, and they will also have children with Individual Education Plans (IEPS) for whom specific activities may be especially beneficial. In line with a child-centred constructivist approach to learning, the teacher will also plan carefully how activities will be scaffolded and supported. This may mean pairing or grouping children according to similar skills or abilities, or grouping less and more skilled children together. The grouping will depend, in part, on the educational objectives of the game and how these intersect with the educational objectives of the class, and of individuals within the class. Sometimes, grouping friends together will be more important for task completion and at other times children might be paired with others they would not usually work with. Collaborative technologies can promote teachers to think 'outside the box' when it comes to groupings, with valuable prosocial outcomes (Parsons et al., 2015).

3.3.2 Modelling

There are many different types of modelling and McGinnis (2011) defines three main types, happening through teaching or via every day interactions. Observational learning refers to the fact that children will imitate naturally a behaviour that is performed in front of them (particularly if the person doing the behaviour has the right characteristics defined below). Inhibitory or disinhibitory learning refers to how a child will perform more or less of an action following a history of punishment or negative reaction attached to this behaviour. This happens a lot through interactions with other children. For example, if a generous child sees that a non-generous child gets praised for his/her actions, the generous child might inhibit his/her generous action in the hope of being praised too. Finally, behavioural facilitation happens when a child imitates actions of others that seem to work (for instance, a child observes his brother dealing with a problem and succeeding, the child will later try this behaviour). Although modelling can happen automatically, it happens particularly when the situation enhances the learning. McGinnis (2011) cites a situation where learning by modelling is enhanced such as when the model is highly skilled, of high social status, friendly and helpful, describes the behaviour in a clear and detailed manner, presents behaviour from least to most difficult with as little irrelevant details as possible. McGinnis (2011) also mentions that modelling works best if the model is of roughly same age, sex and SES as the person learning, though there are varying views as to whether such homogeneity is desirable or feasible. Embracing diversity rather than homogeneity is likely to be particularly important in a context where social inclusion is a central aim of the project. Supporting social inclusion through enabling children from diverse backgrounds to

work together can be a very powerful method for changing attitude, friendships, and practices (Aronson & Patnoe, 2011). ProsocialLearn, therefore, places no suggested constraints on who the learning partner may be, but recognises that peer-peer interactions will be essential. Indeed, whoever the learning partner, there will need to be engagement with the activity, repeats of the same activity or similar skill in a different activity, and use of the skill in other situations.

3.3.3   Role Play

This stage is one of the most important steps for learning of new skills to occur and happens when individuals are asked to demonstrate specific behaviours that have been modelled earlier. Although Reddy did not mention video-games, we suggest a new role-play approach with their use. We are for instance suggesting to use the games to show a video and ask the students to discuss the concept defined in the video (e.g. a video is about a child being bullied and the teacher could ask the children to say what happened and that the lesson today is on bullying etc.). The games could be used to show different perspectives (e.g. in this scenario the perspective of the child bullying and the perspective of the child being bullied) and different context (choosing avatars that represent the children involved, so they can identify with the situation). Virtual reality games might be very useful here. This part of the project will be defined in more detail in D2.6.

3.3.4   Feedback

Formative feedback or assessment is an essential part of any learning and is feedback designed to provide indications to students and to teachers about progress. In their seminal review of the research literature on assessment in schools, Black and Wiliam (1998) acknowledged that '…the term formative assessment does not have a tightly defined and widely accepted meaning' (pp.7-8), but suggested that it includes '…all those activities undertaken by teachers, and/or by their students, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged' (pp.7-8). The purpose, then, is not to provide a mark or grade to indicate achievement, but to provide opportunities where judgements about understanding and progress are made, formally or informally, and often '…in the course of events' (Yorke, 2003; p. 479). Consequently, there should be plenty of opportunities for formative feedback and assessment through the games, either designed in via game mechanics (i.e. reward mechanisms) and / or via peer or teacher comments and responses.

Feedback can take many different forms, and is a prominent feature in which gamification plays an important role, most often through providing positive reinforcement. For example, direct feedback through the game can show players very clearly how many points they are scoring, how many correct responses or answers they have given, and how well they are progressing in the game, according to the learning objectives. Game mechanics or design can also provide corrective feedback e.g. constraining children's actions or choice, such that they cannot progress in a game unless they collaborate with each other (for example). Teachers can also provide ongoing encouragement through verbal feedback related to the game objectives and on-task behaviours. Children also give informal feedback to each other during activities e.g. to approve or not of someone's actions or decision. Consequently, there are many ways in which feedback can be provided, both within and around the game, and so there are good opportunities to reflect diversity in this regard.

McGinnis suggests that feedback should follow the following 8 steps to be most effective:

1. Reinforcement should happen only after role-plays that followed the behavioural steps modelled, or meet the learning objectives of the game.
2. Reinforcement should happen at the earliest opportunity after role-play.

3. Reinforcement should be aimed at both players, if involved in successful progress.
4. Praise should be as varied as possible by using a different tone, targeting specific behaviour.
5. Sufficient role playing activity should be provided, so that all children have an opportunity to show competence and to receive positive feedback.
6. The amount of praise should be consistent with the quality of the role play.
7. When the behaviour is not enacted properly, no reinforcement or feedback should be given.
8. Improvement over time, and with repetition, should be noticed and reinforced.

3.3.5 Generalisation

In order to generalise the skills learnt in the classroom the caregiver has a role in sustaining and generalising the skills in a different environment. The extension of activities beyond the specific learning context is an **essential** part of the learning process that should not be overlooked, as this provides a basis for skills and understanding to become more embedded in everyday situations, including playtimes and breaks at school as well as beyond school. This means that children should be given ample opportunities to perform the new learnt skills at home, in the playground or any environment. This aspect of evaluation was very much emphasised by Granic et al (2014) in their state of the art review on the positive benefits of digital games; there is currently a lack of research that looks beyond the in-game experience to demonstrate generalised learning effects and this is an area that ProsocialLearn aims to tackle.

For support the process of generalisation to other contexts, children can be given homework with a specific skill to practice and / or extension activities that build upon the skill and children's understanding of it. Below is an example of a homework sheet from McGinnis' book (McGinnis, 2011), though there are many ways in which such extension activities could be deployed.

Figure 2: Sample Homework Report I

Skill 32: Dealing with Another's Anger

Name _____Chloe_____ Date ___November 15____

SKILL STEPS

1. Listen to what the person has to say.

2. Think about your choices:

   a. Keep listening.

   b. Ask why the person is angry.

   c. Give the person an idea to fix the problem.

   d. Walk away for now.

3. Act out your best choice.

FILL IN NOW

With whom will I try this? _____My brother._____

When? ___After school._____

FILL IN AFTER YOU PRACTICE THE SKILL

What happened? ___He was mad cause he was grounded. I listened. I asked him_

___if he wanted to watch TV with me. He didn't hit me._____

How did I do?   ☺   😐   ☹

Why did I circle this? ___I listened. I made a good choice._____

Figure 5: McGinnis' Homeworksheet

3.4   Psychological view on prosocial behaviour

Prosociality is an abstract concept that is conceptualised, investigated and applied within many disciplines. Psychology has shown that prosociality can be understood using core domains (Eisenberg & Mussen, 1989) such as empathy, trust, fairness, generosity, cooperation, emotional intelligence and compassion. According to the OED, prosocial domains can be defined as:

- **Empathy**: (orig. Psychol). The ability to understand and appreciate another person's feelings, experience, etc.
- **Trust**: Firm belief in the reliability, truth, or ability of someone or something; confidence or faith in a person or thing, or in an attribute of a person or thing
- **Fairness**: 6. Honesty; impartiality, equitableness, justness; fair dealing.
- **Generosity**: 2 b. Readiness to give more of something, esp. money, than is necessary or expected; liberality, munificence.
- **Cooperation**: 1. The action of co-operating, i.e. of working together towards the same end, purpose, or effect; joint operation.

- **Compassion**: a. The feeling or emotion, when a person is moved by the suffering or distress of another, and by the desire to relieve it; pity that inclines one to spare or to succour. Const. on (of obs.).

Domains are complex psychological and overlapping constructs open to interpretation and debate. For example, emotions play a key role in respect to empathy and compassion, whilst fairness and generosity are closely linked through equity. In addition to domains, contextual factors of individuals and their social groups can be shown to influence prosocial behaviour, such as for instance sex, class membership, age, cardinal position, attachment style, parenting style, teacher-student relationship, temperament and personality. However, in general, research findings are inconsistent and therefore it is difficult to use such contextual factors in the definition of a conceptual model for gamification of prosocial learning. See Appendix C for more discussion on contextual factors.

In the following sections we discuss the core domains most relevant to children in the target age group (7-10) in respect to social inclusion and academic achievement.

3.4.1   Empathy

OED definition: "orig. Psychol. The ability to understand and appreciate another person's feelings, experience, etc."

Empathy is one of the core domains of prosocial behaviour as research has positively linked children's empathy with general prosocial behaviour in childhood (Batson, 1991; Eisenberg, Fabes, Schaller, & Miller, 1989; Zahn-Waxler, Robinson, & Emde, 1992). Empathy develops in children as a shift from self-concern to more empathic, other-oriented approach. Particularly, around the age of 7-10, children's cognitive maturity allows for a more sophisticated perspective-taking approach and acquire greater awareness of another person's needs.

Empathy has been shown to have a direct role in children's school success. For instance, some researchers have found positive correlations between empathy and reading skills, language and mental development, or general intelligence level (Carlo, Hausmann, Christiansen, & Randall, 2003; Cassidy, Werner, Rourke, Zubernis, & Balaraman, 2003). Furthermore, empathy has been found to predict children's school achievements such as academic self-efficacy and achievement tests (Bandura, Caprara, Barbaranelli, Pastorelli, & Regalia, 2001; Caprara et al., 2000; Johnson, Beebe, Mortimer, & Snyder, 1998; Wentzel, 2003; Wise & Cramer, 1988). This relation has moreover been found over time with Caprara and colleagues (2000) showing that early prosocial behaviour in third grade (around 8 years old) predicted higher academic achievement in eighth grade (around 13 years old), even after accounting for variation in early academic achievement.

Empathy may also play an indirect role in academic achievement, through social skills. For instance, empathic children tend to be popular and sociable with their peers, and tend to have supportive peer relationships (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Clark & Ladd, 2000; Denham et al., 2003; Graziano, Keane, & Calkins, 2007; LaFontana & Cillessen, 2002; Lansford et al., 2006; Robinson, Zahn-Waxler, & Emde, 1994; Sebanc, 2003; Warden & Mackinnon, 2003; Young, Fox, & Zahn-Waxler, 1999). These children are also more likely to cooperate in class and exhibit appropriate classroom behaviours and may be well liked by teachers. In turn, these students may receive more help from teachers and from their peers and may therefore be more engaged in school activities, increasing their academic performances (Coie & Dodge, 1988; Wentzel, 1993).

Likewise, existing research reveals negative relationships between empathy and aggression or externalizing problems (Diener & Kim, 2004; Hastings, Zahn Waxler, Robinson, Usher, & Bridges,

2000; Hughes, White, Sharpen, & Dunn, 2000; Strayer & Roberts, 2004). Because disruptive children are thought to spend less time on task (Arnold et al., 1999; NICHD Early Childcare Research Network, 2004; Ramsey, Patterson, & Walker, 1990), do less homework (Dishion, Loeber, Stouthamer-Loeber, & Patterson, 1984), and may receive less instruction from teachers (Coie & Dodge, 1998; Pianta, La Paro, Payne, Cox, & Bradley, 2002), it is easy to understand why these children may be less successful academically. In conclusion, empathy has a large influence on social inclusion and academic achievement.

3.4.2 Trust

OED definition "Firm belief in the reliability, truth, or ability of someone or something; confidence or faith in a person or thing, or in an attribute of a person or thing"

Trust is a fundamental quality for a society to function as a whole (O'Hara, 2004; Uslander, 2002; Volker, 2002; Warren, 1999). Rotenberg and al (2010). Trust is important for forming positive relationships and therefore helps social inclusion. The Basis, Domain and Target (BDT) framework provides a point of view on why interpersonal trust is crucial for children's social skills and academic achievement. For instance, if a child believes that the persons in his social world (parents, teachers, policeman, doctors etc.) are deceptive, manipulative, and do not keep their promises or confidential information, the child might withdraw from social contact and fail to attain social skills, close relationships, academic achievement, and medical treatment for illnesses.

Consistent with these conclusions, children's trust beliefs have been found to be positively associated with helping others (Rotenberg, Fox, Green, Ruderman, Slater, Stevens, and Carlo, 2005), academic achievement (Imber, 1973), low loneliness (Rotenberg, MacDonald, and King, 2004), and low depression (Lester and Gatto, 1990).
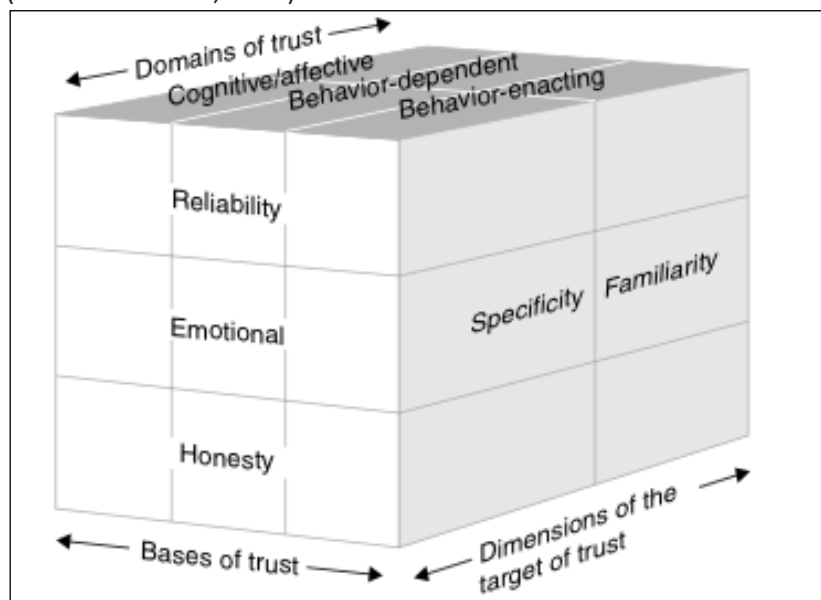
Figure 6: The bases x domains x target dimensions interpersonal trust framework. From Rotenberg and al. (2010)

However, it is important to note that too much trust can have negative consequences. Rotenberg, Boulton, and Fox (2005) carried out a longitudinal study with children initially of 9 years of age. They found that children with very low trust beliefs and those with very high beliefs both violated peer

norms of trust (by being cynical or naïve, respectively), had lower self-perceived social acceptance, and were more excluded by peers and less preferred than the children with the middle range of trust beliefs. Furthermore, the researchers found that those forms of peer rejection resulted in increases in internalized maladjustment (such as loneliness, depressive symptoms, and anxiety). Even if children with very high trust beliefs were less disadvantaged than children with very low trust beliefs, this shows that too much trust (being naïve) can have harmful consequences. Therefore, it seems that trust is important for forming positive relationships and supporting social inclusion.

3.4.3 Fairness

OED definition: "6. Honesty; impartiality, equitableness, justness; fair dealing."

Initial studies on this topic suggested that children's ability to distribute goods in a fair and equal manner did not arise until mid-childhood (Arsenio & Gold, 2006; Blake & Rand, 2010; Fehr, Bernhard, & Rockenbach, 2008; Lane & Coon, 1972). These studies used tasks such as the one used in Fehr et al. 2008 in which children received a candy and were asked to choose whether their anonymous partner received zero candies or one candy. Under these conditions, children younger than 7–8 years of age did not reliably prefer the egalitarian allocation (1:1) whereas they did around that age and after. However, emerging evidence seems to suggest that these paradigms may have underestimated young children's abilities, given limitations in the ecological validity of these experiments. Therefore, and to directly address whether young children can demonstrate an awareness of the norms of the fair distribution of goods, Olson and Spelke (2008) developed a third-party task. In this task, very young children (3 ½ years old) were asked to help a doll distribute toys to other dolls (recipient). With such setting, the majority of children chose to distribute the toys equally among the recipients. More recent studies have also confirmed that the development of fairness appears early in childhood. For instance, LoBue, Nishida, Chiong, DeLoache, & Haidt (2011) demonstrated that 3- to 5-year-olds react negatively when stickers are distributed unequally between themselves and another child; while Warneken, Lohse, Melis, & Tomasello (2011) demonstrated that 3-year-old children tend to share equally with another child following the completion of a collaborative task. Therefore, by the age of 7-10, most children will have the ability to share fairly among peers. However, not all children do share equally and fairly so supporting them to do so might have positive repercussions within their social environment.

3.4.4 Generosity

OED definition "2 b. Readiness to give more of something, esp. money, than is necessary or expected; liberality, munificence."

Research has shown that children as young as eight months are willing to share toys with family members, peers, and even complete strangers (Hay, 1979; Hay & Murray, 1982; Rheingold, Hay &West, 1976). More research has shown that between the ages of two and four, children start sharing resources with others voluntarily (Brownell, Svetlova & Nichols, 2009), even when the resources are easily monopolisable (Warneken, Lohse, Melis & Tomasello, 2011; Benenson, Pascoe & Radmore, 2007). Some other research however, found that using a different paradigm looking at resource allocation, children under 7 were mostly not giving altruistically or even equally. They found that egalitarian tendencies became predominant only when children reach about 6 or 7 years of age (Fehr, Bernhard, & Rockenbach, 2008; Moore, 2009). Therefore, and regardless of which study or paradigm is used, it seems that children in the age group of 7-10 years old have the ability to be generous.

3.4.5   Cooperation

OED definition "1. The action of co-operating, i.e. of working together towards the same end, purpose, or effect; joint operation."

Commonly, cooperation is described as competent social behaviour that causes many positive consequences. On the other side of the spectrum lies competition, which is commonly viewed as harmful and leading to negative consequences for children's psychosocial development. Despite this common understanding, children are repeatedly encouraged to be competitive in school or in their sportive activity. Moreover, although collaboration might seem better than competition at a first glance, research has shown that both cooperation and competition can be positive. Stanne, Johnson, and Johnson (1999)'s meta-analysis on the circumstances in which cooperation and competition are useful, found that the effect of cooperation and competition on performance is strongly influenced by the structure of the task. For instance, when an activity requires interdependence, cooperation seems to be the most useful for performance. However, if interdependence is low and the competing parties cannot interfere with each other's performance, outcomes or rewards, then competition seems to be more advantageous. Therefore, when competition is structured appropriately (i.e. not too much emphasis on winning, an equal opportunity to win for 'opponents', and an ability to estimate performance relative to one's opponent), it has the same effect on performance as cooperation and can be even more powerful as it increases motivation.

To summarise, competitive contexts can increase the desire to do well, give a sense of excitement and can promote intrinsic motivation (Epstein & Harackiewicz, 1992). Therefore, competition can have a positive effect on academic achievement because it provides an exciting challenge and increases the motivation for an individual to do well. Moreover, the positive feedback that is received at the end of a competition can also increase intrinsic motivation (Tauer & Harackiewicz, 1999), increasing again academic performances. However, competition can also be damaging, particularly where competition is a zero-sum game, where one's achievement is detrimental to others, in terms of social inclusion in case of hypercompetitiveness (Tassi, Schneider, & Richard, 2001). Cooperation on the other hand is often shown as increasing academic achievement and better relationship with peers (Roseth, Johnson, and Johnson (2008). Therefore, a mix of personal development and shared goals would be helpful to increase motivation in games and teaching cooperative skills.

3.4.6   Compassion

OED definition: "The feeling or emotion, when a person is moved by the suffering or distress of another, and by the desire to relieve it; pity that inclines one to spare or to succour. Const. on (of obs.)."

A large amount of research has shown that practising compassion plays a key role in helping children to become considerate and optimistic adults. Because engagement, caring, optimism and happiness have indirectly been related to social inclusion and academic achievement, we suggest that compassion might help academic achievement and social inclusion but more research would need to confirm this. Another form of compassion has however been directly linked to academic achievement: self-compassion, or being kind to one self in case of failure. When someone feels compassion for another human being who has made a mistake, the person feeling compassion is taking an open-minded and non-judgmental attitude towards the second person (as opposed to an attitude of harsh criticism or severe judgment) (Neff et al, 2005). In the same way, self-compassion involves being open to and aware of one's own suffering, offering kindness towards oneself, taking a

non-judgmental attitude towards one's failures, and framing one's own experience in light of the common human experience (Neff, 2003).

Although no research linking compassion to academic achievement has been conducted on the age group of interest here (7-10 years old), we report studies conducted among undergraduates with the beliefs that if these skills are important for academic abilities and social inclusion later in life, it seems logical to try and develop them as early as possible.

In particular, two studies examined the relationship between self-compassion, academic achievement goals, and coping with perceived academic failure among undergraduates (Neff, Hsieh, Dejitterat, 2005). These studies define self-compassion as being kind to oneself in instances of failure, perceiving one's experiences as part of the larger human experience, and holding painful feelings in mind. Study 1 found that   self-compassion was positively associated with mastery goals (more academically adaptive; mastering a subject) and negatively associated with performance goals (less academically adaptive; being the best) (see http://www.wou.edu/~girodm/100/mastery_vs_performance_goals.pdf for a summary on these two types of goals). Study 2 confirmed these findings among students who perceived their recent grade as a failure, with results also indicating that self-compassion was positively associated with emotion-focused coping strategies and negatively associated with avoidance-oriented strategies. These two studies therefore show that experiencing self-compassion is positively linked to academic achievement.

3.4.7   Contextual Factors

Table 2 summarises the findings from the Contextual Factors that might influence prosocial learning. Generally, research findings are inconsistent and therefore it is difficult to create a personal profile for each child playing the games.

We suggest that researchers could measure any or all the variables listed below, when collecting the data during the longitudinal studies to show the impact of the digital games in prosocial learning as such data will be immensely valuable for the research sphere on prosociality. However, for time constraint reason, we understand this might not be possible. Indeed, teachers and children will already have a lot of activities to do related to this project and we do not want to over load them with questionnaires that might not be relevant.

Therefore, we suggest that some of the questions within each questionnaire could be implemented within the video games to learn more about the children's trait such as personality and temperament. For instance, by asking the children 'I like to compete with others' (response with a likert scale) after a competitive game. This item is part of the personality questionnaire, so with more questions fitting each games/situation, we could have all a large part of our questionnaire answered. Moreover, these questions could be used to calibrate sensors between stated and observed measures. Indeed, sensors would give information about observed measured (smiling, frowning etc.) that we could use to compare with the children's answer on these questions ('I usually get angry' from the personality questionnaire vs sensors measuring angry expression).

Table 2: Summary of the contextual factors influencing prosociality

Variables	Effect on prosociality
Temperament	Inconsistent
Personality	Agreeableness

Attachment Style	Secure attachment
Age	Not explored in 7-10 age group
Gender	Inconsistent
SES	Inconsistent (low SES more generous but also more behavioural problems)
Culture	Not within Europe
Family	Inconsistent
Beneficiary	Yes: children should help different groups

3.5 Teaching practitioners' views on prosocial learning

3.5.1 Engaging European teachers

Teaching practitioners offer important insights into current teaching practices and potential challenges in deploying games for teaching social skills within school curricula. We conducted a survey of schools within different European countries to capture viewpoints. Teachers in the UK (3 reports), Italy (4 reports), Spain (17 reports), Turkey (5 reports), FYROM (5 reports) and Greece (25 reports) completed the questionnaire presented in Appendix B, which was translated into and completed in the teachers' native tongues. Each report was completed by a different teacher, sometimes from the same school and sometimes from different schools around the country. This 23-item questionnaire is divided into five sections: school values (A) helping and cooperating (B), games in learning (C), devices and software (D), and communities, platforms and sources of information (E). Section A addresses school-wide policies and the instruction of kindness and compassion in the classroom. In section B, teachers rate various prosocial constructs on their importance to academic achievement and social integration. Section C asks teachers about ways they use play in the classroom to facilitate learning general academic subjects as well as prosocial skills. In section D, teachers have the opportunity to discuss ways that technology is already implemented in the classroom and greater school as well as ways they foresee its future use. Finally, section E allows teachers to explain how they learn about new educational technologies available. With the exception of the two rating items in section B, all items were in an open answer format. The detailed country specific results are included in Appendix B with a discussion across all regions given in the next section.

3.5.2 Summary of results

These surveys come from very small numbers and so it is not possible to make general observations or draw strong conclusions; rather the findings serve as an important reminder that different skills, and understanding of concepts, may be valued differently by teachers in different countries. In terms of school values, cultural differences are limited, but crucial. On the continent, respect for others and the environment were key features identified by the teachers surveyed, whereas in the UK, communication was deemed most important (though the number of teachers from the UK was very small and representing only two schools). The teachers from Turkey, FYROM, Italy, Spain, and Greece all put a heavy emphasis on intercultural relations as well, something that the teachers from the UK did not seem to emphasize. However, the methods to encourage these values are similar across all

surveyed groups: school assemblies are extremely popular, not least because they are mandated for some (in the UK, for example). The continental teachers from the survey reported that they engage in approximately 40 minutes of prosocial instruction per week as well, compared to 20 minutes reported by the UK teachers. That said, this does of course depend on how prosociality is defined and understood and nearly all teachers integrate prosocial learning objectives into their academic instruction; math will require cooperation, for example, or reading comprehension exercises might require students to discern the emotions of a character.

Cooperation rated highly within the top three facets of prosociality related to academic achievement across all the teachers surveyed, with the exception of the teachers in Turkey, where cooperation was rated as least important. Fairness also factored in the top four for all of the teachers, with the exception of the teachers from FYROM who preferred trust, empathy (or understanding emotion in others). Compassion was rated either in the middle range or top for the continental teachers, while the UK teachers rated compassion as least important.

Cooperation was a key value, shared across the teachers in different European countries. However, it was also the most commonly addressed concern in basic play; nearly all teachers surveyed mentioned group work as an important part of teaching values. Empathy was also highly valued by most teachers. This value is less addressed in current prosocial training programs existing in schools, and would therefore be an ideal game focus. Due to its seeming universality as a value, games focused on empathy would only require translating to become useful in a variety of countries. Game companies can thus safely focus on cooperation and empathy in all games at least to a certain degree.

Getting teachers to use games in the classroom should not be too difficult a task, as with the exception of one Turkish teacher, all teachers reported using games of some form regularly. On the mainland, teachers also seem enthusiastic about the development of new digital games. In the UK, things are a bit trickier, as it has many internet safety policies relating to digital games in the classroom, which may constrain their use. If games were to be approved by the education department as part of the curriculum, however, it would be easier for teachers to use them. Most schools had access to computers, so PC-based games would be ideal. However, FYROM and Turkey have government projects to provide their students with tablet computers; mobile games may be worth exploring as well. Smartphone editions of games do not seem feasible at this stage, as most countries have at least one or two teachers reporting smartphones being banned in the classroom. Wii-like or Kinect functionality via Smartboards may also be a possibility, as many teachers reported having access to these devices.

When publicizing these games for teachers, there are a few crucial target areas. First and foremost are governmental education departments. In a growing number of countries such as UK, Germany the use of computers in the classroom is governed by statutory requirements regarding child safety, privacy and data protection. However, all of the schools represented in this short survey had at least one teacher or more who reported keeping up to date on technology and digital media in the classroom via school and government-run seminars and courses. Another popular method is eTwinning, in which European teachers learn from one another. If the prosocial games were to be publicized via www.etwinning.net, they would likely rapidly spread in popularity and usage. Teaching magazines and journals are also popular with a number of teachers across Europe; having a team write up an article about Prosocial Learn to publish in one of these outlets would be an effective publicity tool. Finally, although no specific groups were mentioned, publicizing via Twitter and Facebook would also reach a number of teachers.

3.5.3 Barriers to adoption within education sector

Serious uptake in the formal education sector depends on significant innovation in practices of formal schooling, and in the procurement and certification systems for education products. Much of the barriers are related to acceptance of digital games by schools and children.

Training of intermediaries: confidence in using the game and the exposure of ICT tools in the learning procedure, which includes having had time to read the manual, understand how the game relates to the curriculum goals, and an understanding of how learning will be assessed (Sandford 2006). Also, teachers don't yet know how to use games as the basis for teaching in schools.

Perceived Role and Learning Opportunities: the perception that games can only be used to serve traditional, leisure purposes has to be broken (Karpalos et al., 2001), while teachers' belief that they also need to have a certain degree of familiarity with games will need to be overcome. Perception that the game is taking over from the teacher and incompatibility with teaching practices needs to be addressed.

Fit to curriculum: the formal educational system has to adhere to knowledge and procedures required for external exams. Therefore, games that align to the curriculum appear to have a wider take up than those that are pedagogically sound and engaging but have no clear relationship with the curriculum. A rigid and content-driven curriculum is one of the primary negative factors in bringing gamified applications to schools, even if the learning objectives of the game are perfectly aligned with the school curriculum. Well-established institutional procedures will also need to be handled, in order to account for the use of a Serious Game. Organization of time and space in schools, methods of collaboration and 'best practice' perceptions in lesson planning are factors that may bring severe barriers in the adoption of a game as part of the school curriculum. Teachers should be motivated to use the concept of engagement in Serious Games and methods such as relaxation, cognitive strategies, etc. and their integration in the school curriculum.

Scheduling and Assessment: Games that develop more critical skills are harder to analyse, assess, and integrate into lessons, given the time needed for the teacher to learn and the time it takes to play. This contrasts with leisure games, where time constraints are not usually an issue.

Localisation of Content: Learning needs to be tailored to the individual needs and contexts of schools. Creating a single game that can be deployed on a European scale for education purposes is not straightforward and, as indicated above cultural homogeneity should not be assumed.

Cost: technical infrastructure, licences, and sufficient access, can be costly. In addition, IT support is often limited within schools, making the deployment of innovative technology-enhanced learning more challenging.

Fragmentation of the Education Market: the education market consists for many 1000's of fragmented schools. This makes linking supply of games to demand from schools a challenge for companies offering games to schools.

Drawing the attention of stakeholders and end-users to gamified applications has followed conventional roadmaps, is usually a challenging mission, requiring substantial amounts of advertising that companies are not always willing to invest. Although the picture is changing in the area of educational serious games, entering the schools is a challenging path: small companies need to compete with larger players in the field; consequently, SMEs return to leisure games and, when it comes to Serious Games, they tend to work on specific, on demand, small-scale projects.

4   Feasibility Assessment for Gamification of Prosocial Learning

In the most general terms ProsocialLearn must support the creation and delivery of digital games aiming to teach children aged 7-10 years prosocial skills in educational environments. From a high level the gamification of prosocial learning must incorporate:

- Design of gameplay situations that allow players to explore and learn in accordance with prosocial objectives;
- Observations of individual behaviour and collective interaction;
- Assessment of performance in respect to learning objectives using such observations; and
- Opportunities for feedback, positive reinforcement, re-direction and adaption according to the individual needs of the students.

In this section we explore the multidisciplinary perspectives on prosocial learning as the basis for defining a conceptual framework for technical and pedagogical innovation. In defining the framework we assess:

- Technical feasibility: assessment of technical expertise and capabilities necessary to achieve the desired outcomes of teaching children prosocial skills; and
- Operational feasibility: assessment of the degree to which prosocial learning fits in with the existing educational environments.

4.1   Technical Feasibility

Learning through digital games requires fundamental technical capabilities to support pedagogical processes. It is clear that not all concepts, theories and approaches described by the disciplines above can be implemented considering technical and project resourcing constraints. We therefore have to scope the technical work appropriately and focus on areas where gamification of prosocial learning is not only feasible but delivers the most benefit to children within educational environments. The different perspectives on prosocial learning presents significant technological challenges. In the following sections we discuss the feasibility of designing games and also observing prosocial skills within such games.

4.1.1   Game design assessment

Game design is about creating the goals, rules, and challenges necessary to produces desirable interactions among its players for prosocial learning. The games need to provide situations for children to explore and learn about prosocial behaviour in an age appropriate and inclusive way.

The pedagogical view of teaching prosocial skills lends itself well to game design narratives. The specific nature of each skill means that designers can incorporate opportunities to use the skills. An initial assessment of how prosocial skills can be incorporated into game designs is given in Table 3. This table is a series of suggestions and is not exhaustive, further deliverables in WP2, i.e. D2.6 Prosocial Game Design Methodology and deliverables in WP4, i.e. D4.3 1st Prosocial Game Mechanics will explore this in much more detail.

Table 3: Initial assessment of prosocial skill game design examples

Prosocial Skill	Game mechanics and examples
Skills for friendship	

Communicating with others	An opportunity for the players to interact with each other and exchange information such as giving directions in a labyrinth game
Using Nice Talk	Players have to discuss opinions or give directions using a soft voice, low tone and keeping an arm's length distance between players, or the other players won't listen to them
Introducing Self to Others	At the beginning of a game, each player has to introduce him/herself to the other players in socially appropriate ways e.g. hello, my name is…
Introducing Others	Players have to introduce other players by saying something about them so the game can start e.g. by stating their name
Joining in a Conversation	Player has to find a socially appropriate way to enter a conversation, without interrupting the others e.g. by contributing something relevant about a topic being discussed
Joining a Play Group	Player has to join other children already playing e.g. by asking 'Can I join in?'
Sharing About Oneself	Players are asked to reveal information about themselves that the other players may not already know.
Sharing Your Things With Others	Using resources or points within the game in a collaborative way by distributing them amongst the group.
Learning About Others	Player has to ask questions about others in order to be able to complete a task successfully (e.g. to determine who hid the diamonds in a Cluedo type game)
Being an Active Listener	Listening to what other people have to say to make decisions during the game
Giving Compliments	Player can earn points when giving verbal praise and compliments to other players e.g. 'you did that really well!'
Receiving Compliments	Scenario where other players give someone compliments and the player has to decide what is true and what isn't
Respecting Others	Collaborative game where all players listen to the other players' ideas before agreeing on a shared course of action
Respect for Others' Personal Space	Keeping distance between players. Each player can draw their own circle around their avatar
Not Interrupting Others	Option to have an on/off sound button over the avatar of players
Skills for Feelings	
Self-Control	Delay of gratification type of game where a larger reward is given to the player if s/he can wait
Identifying Feelings and Emotions	Emotional narratives ; opportunity to input protagonist's feelings in discussions
Expressing Feelings and Emotions	Emotional narratives; opportunity to input protagonist's feelings in discussions
Understanding Social Cues	Determining the emotions and actions of other players/characters by observing social cues and responding appropriately

Showing Concern for Others' Feelings	Pet simulation, animal in distress Console another player
Dealing With Stress	Solve a puzzle in limited time; create challenges too difficult to solve
Dealing With Anxiety	Solve a puzzle in limited time; create challenges too difficult to solve
Dealing with your angry feelings	Backstory to put the character in an angry mood and ask him/her to solve problems. Reflection after the game on what strategy was used, what worked and what didn't.
Dealing With Another Person's Angry Feelings	Backstory of a friend who is angry and two players are asked to solve a problem together in order to help their friend be less angry
Dealing With Rejection	Backstory; player excluded from a game
Dealing With Being Left Out	Backstory; player excluded from a game
Dealing With Boredom	Game where there's no much distraction around and the other players are not available so the child has to come up with something fun to do with whatever is available in the room.
Skills for Collaboration	
Setting Goals and Obtaining them	Difficult task that needs planning together in order to complete it successfully
Solving everyday problems	Scenario where the player has a list of things to do and has to decide which on to do first , with competing urgent items to be sorted
Solving a Problem as a Group	One team plays together against another team to solve an enigma. This involves both cooperation within group, and adds a competition component to make the game more attractive.
Following directions	A labyrinth game where one player has eyes closed and must follow directions from another player (example Path of Truth game developed by CERTH, a partner of the ProsocialLearn community)
Paying Attention	Game where patterns have to be remembered despite constant distraction from other players/flashing items on the screen or sound
Staying on Task	Game where patterns have to be remembered despite constant distraction from other players/flashing items on the screen or sound
Working Independently	Solving a problem independently to gain points for the group
Cooperation	Working together as a team to defeat a monster or rival guild
Taking Turns	One player is prevented from playing and has to pass his turn
Being a good sport	Feedback after having lost a game
Being Patient	Competing against another team and having a tortoise in front of one of the team that is preventing them from going fast
Being assertive	A player has to stand for their point of view
Saying No	Player has to defend his treasure and say no to other cute animal asking for some of it
Accepting No	Player is told s/he cannot play the next game

Asking for Help	The team is stuck and can use some of their points to ask the guide for help
Helping Others	Using some of owns points/treasure to help someone who needs them to go to the next level.

The view of the relationship between core domains and game design considerations based on psychological literature is summarised in Table 4. We will prioritise areas where we have found evidence for a link between a core domain and its positive affect on academic achievement and social inclusion in our target age group. Therefore, game design that incorporates aspects of empathy, trust and cooperation should be the priorities for future developments. Analysing prosocial domains, we can propose example games rules and goals to enable the promotion and practice of prosocial behaviours, which are also shown in Table 4.

Table 4: Summary of psychological domains in relation to gamification of prosocial learning

Core domains	Evidence for links with academic	Evidence for links with social inclusion?	Game Design Consideration
Empathy	YES: Direct; Indirect through social skills	YES: popularity and sociability and supportive peer relationships	*Correct identification of emotions*: planning how best to interact with characters based on their emotional state, such as waiting for a better time in the game to approach an angry character; *Describe the cause and effect of emotions*: the protagonist may have to determine why the villain of the story is acting out, say a difficult relationship with a family member, being a victim of bullying, or the death of a pet; *Responding appropriately to others' emotions*: choosing the appropriate response from a series of options in-game when communicating with a sad/happy/angry character, based on said character's emotional state;
Trust	YES: Better academic performances in reading, arithmetic, language arts, and science	YES: Helping others and low loneliness	*Cooperation*, where players need to trust each other and work together to achieve goals *Characters with emotional depth* and backstories that give clues to their trustworthiness *Delegation of tasks* (assessment of reliability), selecting team members (assessment of reliability), or selecting "witnesses" (assessment of honesty)
Fairness	More research is needed but we suggest YES	More research is needed but we suggest YES	*Connections between student unfairness and unfavourable outcomes*: a text box appearing on the screen after an unfair interaction saying something to the effect of "Uh oh! That wasn't very nice. [Insert character] refuses to give you [insert key item]", or whatever the case may be in-game; *Opportunities to act fairly* after being treated unfairly, e.g. decisions about sharing resources

			Fairness is required for advancement of the narrative or completion of optional quests: giving two guards equal amounts of gold in order to be granted permission to enter a city;
Generosity	More research is needed but psychologists suggest YES	More research is needed but suggest YES	*Opportunities for generosity in-game* (i.e. having characters that require goods that are valuable to the player, such as gold or healing items)
			Creating immediate bonuses easily connectible to the generous action (i.e. a text box opening saying "Wow! [Insert character name] opened the gates to [insert name of secret area] since you gave him/her [insert valuable object]!")
			Instances in which the player is the recipient of generosity (i.e. wealthy allies in a resource management game giving the player bonuses to start out, or a character giving supplies to the player as opposed to the player having to purchase them)
Cooperation	YES, also competition to increase motivation	YES	Either gameplay that involves at least two players, or co-op modes in single player games
			Competition between player and game, as opposed to between players
			Inability to hinder teammates for children under 7
			High levels of interdependence in-game (i.e. players cannot progress unless they cooperate)

4.1.2 Observation assessment

The psychological concepts of domains are useful to explain the different types of prosocial behaviours that children need in order to be successful learners and be socially included, but integrating such high-level abstractions into computer systems through game mechanics and sensor observation and analysis processes is difficult. Developing generalizable mathematical models for each domain is not feasible considering that psychology is not a hard science and we cannot reduce concepts of 'interaction with friends' or 'compassion' down to a number or series of algorithms to be programmed. By contrast, the pedagogical view as defined by CASEL and Skillstreaming provides a more concrete set of desirable behaviours defined as skills that could be modelled more easily.

Reviewing the discussion on prosociality we conclude that the emotional affect experienced by individuals from social interaction is closely linked to prosociality. People who experience positive emotional responses to situations tend to exhibit positive helping behaviours. In addition, we also consider the role of "Engagement" in relation to prosociality. Engagement is a key aspect of Compassion, and although Compassion as a construct is too complex to observe, the concept of Engagement is highly relevant to the nature of game design, student feedback and adaptation. As such the platform provides capabilities to automatically acquire and classify player emotion and engagement in relation to game play events. We therefore define three fundamental types of observations most relevant to providing insight into prosocial skills:

1. Game interaction: what actions did a child make during game play situations?

2. Emotional affect: what was the child's emotional response to their actions and the actions of others?

3. Engagement effect: how immersed, focused and involved the child is in the game play situations?

A series of multi-modal observation channels must be established from input sensors connected to player devices including microphones, cameras and keyboard. Using sensing and classification techniques emotion from voice, facial expression and body language must be acquired to provide a temporal emotional state. For instance, if the skill to be learnt is 'using nice talk', a sensor analysing the tone of the voice could be valuable in picking up if a child is shouting or interrupting other children. The algorithm could then create a pop up window giving feedback to the children for instance by saying 'uh oh, I heard that many people are talking at the same time/not using a nice voice, remember that today we are learning how to wait your turn before speaking/using nice talk. Would you want to start again?'

Table 5: Initial assessment of prosocial skill observations

SENSORS

	Face	**Body**	**Voice**
Skills for FRIENDSHIP			
Using Nice Talk	smile	distance	emotion: low tone
Introducing Self to Others	look, smile	walk towards and calm	speech: wait to be looked at, name (tell and ask), name detection
Introducing Others	look at each person	gesture towards the party being introduced	speech: name one person while looking at the other, name detection
Joining in a Conversation	look, smile	walk away if ignored	speech: wait for pause, turn taking via unvoiced
Joining a Play Group	watch group	stand nearby, engage similar activity	emotion: positive comment, speech: ask to join
Sharing About Oneself	look	try to "fill" the space occupied, large movements, upright stance	speech: ask to share something, wait for response, then share
Sharing Your Things With Others	look at item and other person in assurance of giving it to them	extend hands towards others, possibly holding item, gesture towards item	not sure this is detectable
Learning About Others	look open eyes, raise eyebrows	head nod	speech: ask question, wait for response end, ask another question
Being an Active Listener	eye contact	nod head, quiet hands & feet	speech: don't make any noise
Giving Compliments	eye contact	face target	speech: compliment, don't interrupt, thank person, give a compliment back, speech and unvoiced detection
Receiving Compliments			

Respecting Others	smile, look at	maintaining an upright stance, bowing, hugging	not sure this is detectable
Respect for Others' Personal Space	smile, look at	space between two people	not sure this is detectable
Not Interrupting Others	wait to smile	face target	speech: ask permission to engage conversation
Skills for FEELINGS			
Self-Control	change in facial expression	change in body response	emotion: change in voice, shift in valance arousal space to neutral location
Identifying Feelings and Emotions	look at face	look at body	speech: ask if the target is happy/sad/etc. emotion detection
Expressing Feelings and Emotions	look at face, make eye contact, change in facial expression	gesture at your chest (heart, gently hit chest etc.)	emotion: helping doing it better if shouts etc.
Understanding Social Cues	look at face/body	head nod	talk to target if they look like they want to talk, not sure this is detectable perhaps via appropriate emotions on both sides
Showing Concern for Others' Feelings	eyebrows up, eyes widen	contracted body, similar to fear, appear as small and insignificant as possible (not drawing attention to the fact you have a secret)	emotion: using the right tone of voice
Dealing With Stress	recognise stress and see changes in facial expression after regulation	recognise stress and see changes in body expression after regulation	emotion: recognise stress and see changes invoice tone (high pitched to low pitched) after regulation
Dealing With Anxiety			emotion: detect anger and then return to normality
Dealing with your angry feelings	Brow lowerer, Jaw drop	track 'the Turtle' movements	
Dealing With Another Person's Angry Feelings	eye contact	return later if target wants space	speech: ask what is causing anger, ask if help is possible
Dealing With Rejection	look at each person	walk away	voice: ask target to play, respond or ask someone else, emotion: stay neutral
Dealing With Being Left Out	eyebrows down	arms crossed, more determined body posture	emotion: stay neutral, speech: detect appropriate speech
Dealing With Boredom	open eyes, tension of facial muscles	noticeable, quick and repeated movements with the hands/legs (tapping table, happy feet etc.)	emotion: stay neutral, speech: detect appropriate speech

Skills for COLLABORATION			
Solving a Problem as a Group	gaze shifts towards participant speaking, happy expression when problem is being solved	head nod/shake in agreement/disagreement, hi-5 and other similar congratulations movements upon solution reached	speech: detect collaborative communication
Following directions	look	follow instructions, nothing else	speech: repeat given instructions out loud, recognise complementary speech
Paying Attention	look	follow instructions, nothing else	speech: don't say anything, non-voice detection
Working Independently	more serious look on face (close proximity to being angry)	depends on the work	not sure we can detect this
Taking Turns	look at everybody	change in body response	speech: wait for turn to talk, finish and let next person talk, unvoiced detection
Being Patient	do not open mouth, looking at the thing you are waiting for	quiet hands & feet	speech: wait for turn to talk
Being assertive			emotion: tone of voice
Saying No	lip syncing 'N' 'O' detection, close eyes and make gesture of indifference	head gesture of indifference, possibly with hands raised ("whatever")	emotion: tone of voice
Asking for Help	look at others, lip-syncing 'H' 'E' 'L' 'P' 'M' 'E' detection	pleading gesture (hands together)	emotion: tone of voice
Helping Others	look	leaning towards that person	speech: asking if other needs help

4.2   Operational feasibility

A key goal is to enhance learning experiences for students within educational environments. Through gamification, teaching and learning outcomes must be improved in contrast to what could be achieved through traditional approaches. The skills approach, compared to the domain-based approach, describes practical social interactions that children need in their everyday lives. Using prosocial skills has numerous advantages:

1. From a gaming perspective, it is easier to teach each skill as a game rather than teaching a whole domain as skills can be more clearly defined and, therefore, programmed. Examples of games are: games for making and keeping friends, games for identifying and expressing emotions, games for cooperation, and games for sharing, each having a variety of skills to learn from.
2. The specificity of skills, rather than wider domains, also makes it easier for teachers because skills can be observed and taught more directly. Talking about fairness or trust can be too vague a concept and teachers and researchers might have a different understanding of what each domain involves. However, using a skill such as 'taking turns' or 'not interrupting others' is a lot easier to understand and apply.

4.2.1 Addressing barriers to adoption

The assessment of operational feasibility includes measures that must be put in place to overcome the barriers to adoption within schools. Each barrier identified in Section 1.1.1 is assessed to determine the action that must be taken.

Table 6: Addressing the operational barriers to adoption within schools

Barrier to Adoption	Operational Assessment
Training of intermediaries	The multidisciplinary approach and workshops must provide training opportunities for teachers in prosocal gaming and lesson design, and establish ambassadors through European regions.
Perceived Role and Learning Opportunities	Short and longitudinal studies must create a community of teaching professionals who will act as champions within the sector for introducing gamification into schools and curricula. We will aim to establish a network of champions through working closely with teachers in schools, and developing innovative gaming solutions that are robust, intuitive, and easy to use.
Ensuring consistency and effectiveness	Games must be personalised and adaptable to individual needs allowing learning objectives to be delivered in different ways depending on the profiles of students
Fit to curriculum	The short and longitudinal studies within schools must collect evidence for the effectiveness of prosocial skill in respect to school curricula and certification procedures. The relationships that we establish with teachers will be important for establishing how and where the games can be embedded in the usual classroom curricula.
Scheduling and assessment	Feedback must be provided to teachers on student performance over multiple games and game sessions allowing mid and long term performance to be assessed in the context of well-defined learning objectives.
Localisation of content	The architecture must allow for localisation of prosocal games (e.g. language) in a way that builds on the core prosocial concepts to allow for seamless deliver to different European regions.
Cost	Adopt a *Software-as-a-Service* delivery model for schools removing the need to invest in infrastructure, and IT staff to support ICT as part of teaching activities
Fragmentation of the Education Market	Link supply from the leisure games sector to demand from schools through a single platform offering access for games offering social skills therefore reducing the risk for leisure games developers by offering market access and knowledge.
Drawing the attention of stakeholders and end-users to gamified	Provide a platform that scales with the potential to address a wide gamut of cases including portability to mobile devices in order to address a large amount of end users. Undertake significant communication activities to promote the results of the project including to policy makers and educators maximising the potential for gamification to be incorporated into school curricula.
Drawing the attention	Build on the creativity and innovative capacity of leisure games

of children using serious games companies to ensure games are exciting and engaging for children.

4.2.2 Initial game canvas model for games in educational settings

The games alone are insufficient to teach children social skills and they need to be incorporated into lesson plans. Based on the recommendations of the Skillstreaming and group play intervention we have created a prosocial game canvas model. This model will be elaborated in relation to game-based pedagogies as part of deliverable D2.6 Prosocial Game Design Methodology and should ideally be used by game designers to create games teaching prosocial skills. In general terms the process will include design of activities for:

- Step 1: Preparation

- Step 2: Procedures

    o 2.1: context and support to be in place

    o 2.2: Creating scaffolding

    o 2.3: Learning the skills by creating a goal, rules, actions and feedback around each skill.

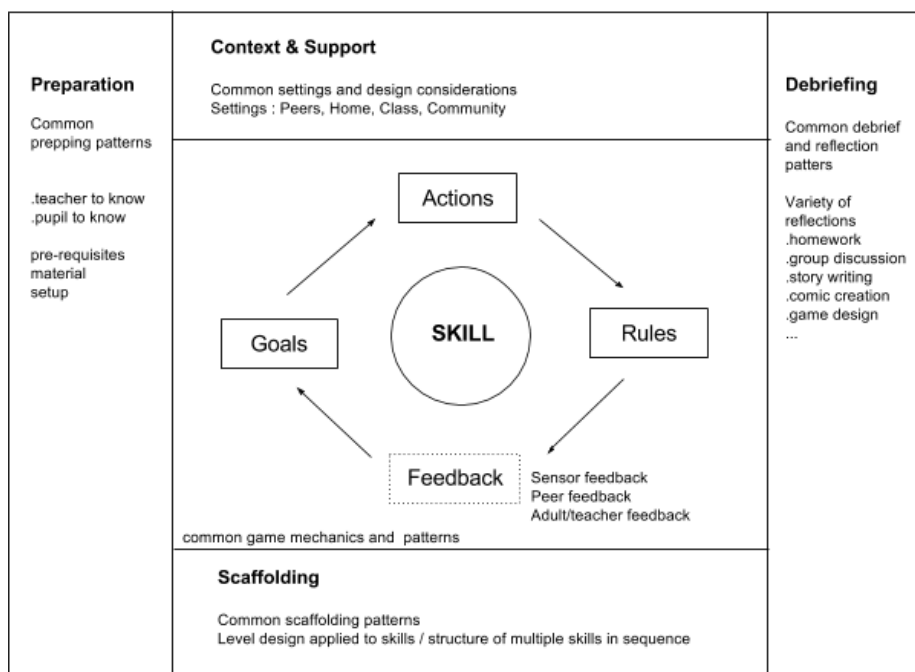- Step 3: Debriefing: Homework, group discussion, story writing etc.,

Figure 7: Prosocial game design canvas model

5 Summary of ProsocialLearn Conceptual Framework

The ProsocialLearn conceptual framework provides the means to communicate key concepts and theories necessary to learn prosociality through digital games in schools. The framework considers the requirements of key beneficiaries: students and teachers. The framework provides developers (game, game technology, platform) and teaching practitioners clear direction on how to work together to deliver the ProsocialLearn Platform, Prosocial Games and education innovations. The framework is shown in Figure 8 and considers four main aspects:

- How to teach prosociality to children?
- How to design games to teach prosociality to children?
- How key enabling game technologies can improve learning?
- How to deliver games to schools?
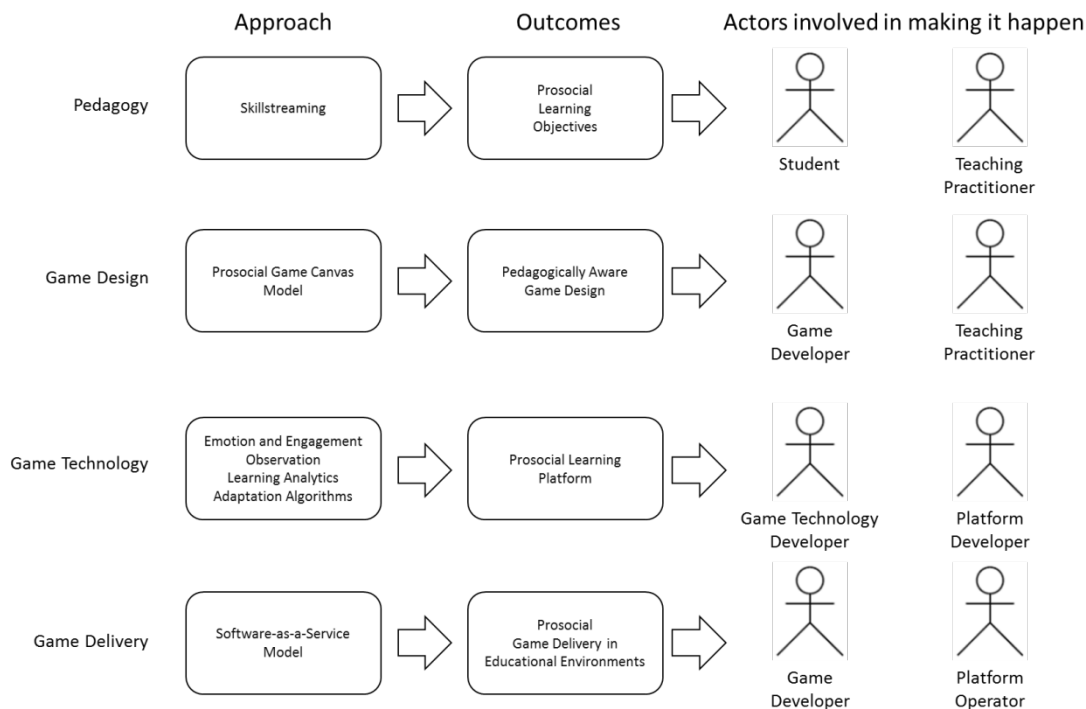
Figure 8: Conceptual Framework for gamification of prosocial learning

For each aspect of the conceptual framework we define an approach to be adopted by the project with associated outcomes that will be further refined by subsequent project activities. Key actors responsible for future work are identified, as summarised below.

5.1 How can prosociality be taught to children?

- *Prosociality shall be taught based on the Skillstreaming approach*

Teaching Practitioner communities and students will be engaged through workshops to refine the prosocial skill set as reported in D7.2: Experiment planning and community management.

5.2 How can games be designed to teach prosociality to children?

- *Games will be designed using a game design canvas model that explicitly considers how to incorporate games into lessons, programmes, curricula and school environments.*

Game Developers and Teaching Practitioners will work together to produce a Prosocial Game design methodology as reported in D2.6, D4.3 and D4.4.

5.3   How can key enabling game technologies can improve learning?

- *Prosocial skills will be selected where there is some existing evidence of learning benefits from the use of game technologies;*
- *Prosocial skills will be measured through game interactions and combined with observations of emotional affect and engagement to provide insights into a child's prosocial behaviour;*
- *Prosocial behaviour will be analysed by teachers allowing them to decide appropriate offline feedback and debriefing with children;*
- *Prosocial behaviour will be analysed by algorithms to automatically adapt the game to the needs of individual students.*

Game Technology Developers and Platform Developers will work together to define the system requirements and architecture as defined in D2.3/D2.4. Short studies in schools will be used to verify and validate technologies as reported in D7.4: Results of small experimental studies. Longitudinal studies will be used to verify and validate the gamification of prosocial learning as reported in D7.5: Validation activities in operating school conditions.

5.4   How can the games be delivered to schools?

- *Software-as-a-Service model will be used for the delivery of games to educational institutions ensuring an efficient, cost effective and technically viable way to roll out ProsocialLearn at scale to schools.*

Game Developers and Platform Operators will work together to define a deployment and operation model for game delivery as reported in D5.3: Platform Operations Report.

6 Conclusions

This report summarises: (1) evidence to show how prosociality can improve academic achievement and increase social inclusion of children and young people, (2) a framework for developing a multidisciplinary approach on prosocial learning through digital games, and (3) our ProsocialLearn Conceptual Framework with a focus on prosocial skills.

It is clear that prosociality is linked to social inclusion and academic achievement. However, definitions of prosociality are less clear and change depending on which approach we take. This report developed two main approaches, namely a pedagogical perspective based on CASEL, the skill streaming approach, and the evidence from teachers; and a psychological approach, based on theory and experimental evidence. Both approaches are complimentary of each other and helped us develop our own ProsocialLearn Conceptual Framework. Using this framework, we developed a set of 43 skills and presented a methodology to assess these skills using videos games, voice and video sensors. We also assessed the feasibility for the gamification of ProsocialLearn, with an emphasis on technical and operational feasibility within schools and classrooms. Taken together, this report suggests that our framework is promising and provides a good basis upon which to develop prosocial games to teach children prosocial skills and ultimately improve social inclusion and academic achievement.

7 References

Ainsworth, M.D.S. (1989). Attachments beyond infancy. American Psychologist, 44, 709–716

Arnold, D. H., Ortiz, C., Curry, J. C., Stowe, R. M., Goldstein, N. E., Fisher, P. H., et al. (1999). Promoting academic success and preventing disruptive behavior disorders through community partnership. Journal of Community Psychology, 27, 589-598.

Aronson, E. & Patnoe, S. (2011). *Cooperation in the classroom: the Jigsaw Method* (3rd edition). Pinter & Martin Ltd.

Arsenio, W. F., & Gold, J. (2006). The effects of social injustice and inequality on children's moral judgments and behavior: Towards a theoretical model. Cognitive Development, 21, 388–400.

Bachorowski JA, Owren MJ. 2001. Not all laughs are alike: Voiced but not unvoiced laughter readily elicits positive affect. Psychol. Sci. 12(3):252–57

Bandura, A., Caprara, G. V., Barbaranelli, C., Pastorelli, C., & Regalia, C. (2001). Sociocognitive self-regulatory mechanisms governing transgressive behavior. Journal of Personality and Social Psychology, 80, 125-135

Barefoot , J. C. , Maynard , K. E. , Beckham , J. C. , Brammett , B. H. , Hooker , K. , and Siegler , I. C. (1998). Trust, health and longevity. Journal of Behavioural Medicine , 21 , 517 –526.

Baron-Cohen, S. *Reading the mind in the eyes test (revised, adult)*. Retrieved from https://www.questionwritertracker.com/quiz/61/Z4MK3TKB.html

Barry H. Schneider, Joyce Benenson, Márta Fülöp, Mihaly Berkics, and Mónika Sándor, 2011. In *The Wiley-Blackwell Handbook of Childhood Social Development, Second Edition.* Blackwell Publishing Ltd

Bar-Tal, D., Raviv, A., & Goldberg, M. (1982). Helping behavior among preschool children: An observational study. Child Development, 53, 396-402.

Bartlett, M. S., Hager, J. C., Ekman, P., & Sejnowski, T. J. (1999). Measuring facial expressions by computer image analysis. *Psychophysiology*, *36*(2), 253-263.

Batson, C. D. (1991). The altruism question: Toward a social psychological anwser. Hillsdale, NJ: Erlbaum

Benenson JF, Pascoe J, Radmore N (2007) Children's altruistic behavior in the dictator game. Evol Hum Behav 28: 186–175. doi: 10.1016/j.evolhumbehav.2006.10.003.

Benson, P. L., Dehority, J., Garman, L., Hanson, E., Hochschwender, M., Lebold, C, Rohr, R., & Sullivan J. (1980). Interpersonal correlates of nonspontaneous helping behavior. Journal of Social Psychology, 110, 87-95

Berkowitz, L. (1968). Responsibility, reciprocity, and social distance in help giving: An experimental investigation of English social class differences. Journal of Experimental Social Psychology, 4, 46-63

Berkowitz, L., & Daniels, L. R. (1963). Responsibility and dependency. Journal of Abnormal and Social Psychology, 66, 429-436

Berman, P. W. (1980). Are women more responsive than men to the young? A review of developmental and situational variables. Psychological Bulletin, 88, 668-695.

Blake PR, Rand DG (2010) Currency value moderates equity preference among young children. Evol Hum Behav 31: 210-218.10.1016/j.evolhumbehav.2009.06.012

Block, J. H. (1973). Conceptions of sex role: Some cross-cultural and longitudinal perspectives. American Psychologist, 28, 512-526.

Bohlin , G. , Hagekull , B. , & Rydell , A. (2000). Attachment and social functioning: A longitudinal study from infancy to middle childhood . Social Development , 9 , 24 – 39 .

Boot, W. R., Kramer, A. F., Simons, D. J., Fabiani, M., & Gratton, G. (2008). The effects of video game playing on attention, memory, and executive control. Acta Psychologica, 129, 387–398

Booth - LaForce , C. L. , & Kerns , K. A. (2008). Child - parent attachment relationships, peer relationships, and peer - group functioning . In K. H. Rubin , W. M. Bukowski , & B. Laursen (Eds.), Handbook of peer interactions, relationships, and groups (pp. 490 – 507). New York : Guilford Press .

Bowlby, J. (1969/1982). Attachment and loss: Vol. 1. Loss. New York: Basic Books

Bowlby, J. (1973). Attachment and loss: Vol. 2. Separation: Anxiety and anger. New York: Basic Books.

Bretherton, I., & Munholland, K. (1999). IWMs in attachment relationships. In J. Cassidy & P.R. Shaver (Eds.), Handbook of attachment (pp. 89–114). New York: Milford Press

Brownell C, Svetlova M, Nichols S (2009) To share or not to share: When do toddlers respond to another's needs? Infancy 14: 117–130. doi: 10.1080/ 15250000802569868.

Buhs, E. S., & Ladd, G. W. (2001). Peer rejection as an antecedent of young children's school adjustment: An examination of mediating processes . Developmental Psychology, 37(4), 550-560 .

Busato, V. V., Prins, F. J., Elshout, J. J., & Hamaker, C. (2000). Intellectual ability, learning style, achievement motivation and academic success of psychology students in higher education. Personality and Individual Differences, 29, 1057–1068

Caprara, G. V., Barbaranelli, C., Pastorelli, C., Bandura, A., & Zimbardo, P. G. (2000). Prosocial foundations of children's academic achievement. Psychological Science, 11, 302-306.

Carlo, G., Hausmann, A., Christiansen, S., & Randall, B. A. (2003). Sociocognitive and behavioral correlates of a measure of prosocial tendencies for adolescents. Journal of Early Adolescence, 23, 107-134

Carney, D.R., Cuddy, A.J.C., & Yap, A.J. (2010). Power posing: Brief nonverbal displays affect neuroendocrine levels and risk tolerance. *Psychological Science*, 1-6. doi: 10.1177/0956797610383437

Caspi, A. (1998). Personality development across the life course. In W. Damon & N. Eisenberg (Eds.), Handbook of child psychology: Vol. 3. Social, emotional, and personality development (5th ed., pp. 311–388). New York: Wiley.

Cassidy, K. W., Werner, R. S., Rourke, M., Zubernis, L. S., & Balaraman, G. (2003). The relationship between psychological understanding and positive social behaviors. Social Development, 12, 198-221

Chamorro-Premuzic, T., & Furnham, A. (2003). Personality traits and academic exam performance. European Journal of Personality, 17, 237–250

Chamorro-Premuzic, T., & Furnham, A. (2005). Personality and intellectual competence. New Jersey: Lawrence Erlbaum Associates

Clark, D. B., Tanner-Smith, E. E., & Killingsworth, S. S. (2015). Digital games, design, and learning a systematic review and meta-analysis. *Review of Educational Research*, doi: 0034654315582065.

Clark, K. E., & Ladd, G. W. (2000). Connectedness and autonomy support in parent-child relationships: Links to children's socioemotional orientation and peer relationships. Developmental Psychology, 36, 485-498.

Coie, J. D., & Dodge, K. A. (1988). Multiple sources of data on social behavior and social status in the school: A cross-age comparison. Child Development, 59, 815-829

Coie, J. D., & Dodge, K. A. (1998). Aggression and antisocial behavior. In Eisenberg, N. (Ed.), Handbook of child psychology, Vol. 3, social, emotional and personality development (5th ed., pp. 779-862). New York: Wiley.

Crook, C. (1991). Computers in the zone of proximal development: implications for evaluation. *Computers & Education*, *17*(1), 81-91.

Davies, K.W., Lane, A.M., Devonport, T.J., & Scott, J.A. (2010). Validity and reliability of a brief emotional intelligence scale (BEIS-10). *Journal of Individual Differences*, *31*(4), 198-208. doi: 10.1027/1614-0001/a000028

Denham, S. A., Blair, K. A., DeMulder, E., Levitas, J., Sawyer, K., Auerbach Major, S., et al.(2003). Preschool emotional competence: Pathway to social competence. Child Development, 74, 238-256.

DePalma, D. J. (1974). Effects of social class, moral orientation and severity of punishment of boys' moral responses to transgression and generosity. Developmental Psychology, 10, 890-900.

DeRosier, M. E., Kupersmidt, J. B. and Patterson, C. J. (1994), Children's Academic and Behavioral Adjustment as a Function of the Chronicity and Proximity of Peer Rejection. Child Development, 65: 1799–1813. doi: 10.1111/j.1467-8624.1994.tb00850.x

Diener, M. L., & Kim, D. Y. (2004). Maternal and child predictors of preschool children's social competence. Journal of Applied Developmental Psychology, 25, 3-24.

Dishion, T. J., Loeber, R., Stouthamer-Loeber, M., & Patterson, G. R. (1984). Skill deficits and male adolescent delinquency. Journal of Abnormal Child Psychology, 12, 37-53.

Dreman, S. B., & Greenbaum, C. W. (1973). Altruism or reciprocity: Sharing behavior in Israeli kindergarten children. Child Development, 44, 61-68.

Dunn, J., & Munn, P. (1986). Siblings and the development of prosocial behaviors. International Journal of Behavioral Development, 9, 265-28

Eagly, A. H., & Crowley, M. (1986). Gender and helping behavior: A meta-analytic review of the social psychological literature. Psychological Bulletin, 100, 283-308

Ehrler, D. J., Evans, J. G., McGhee, R. L (1999). Extending the Big-Five theory into childhood: A preliminary investigation into the relationship between Big-Five personality traits and behavior problems in children. Psychology in the Schools, 36, 451-458.

Eisenberg & Mussen (Editors), 1989. The Roots of Prosocial Behavior in Children, 1989.

Eisenberg N, Fabes RA, Miller PA, Fultz J. 1989. Relation of sympathy and personal distress to prosocial behavior: a multimethod study. J. Personal. Soc. Psychol. 57(1):55–66

Eisenberg, N., Fabes, R. A., Schaller, M., & Miller, P. A. (1989). Sympathy and personal distress: Development, gender differences, and interrelations of indexes. In Eisenberg, N. (Ed.), New directions in child development: Vol. 44. Empathy and related emotional responses (pp. 107-126). San Franciso: Jossey-Bass.

Ekman, P. & Friesen, W. V. (1986). A new pan-cultural facial expression of emotion. *Motivation and Emotion*, *10*(2), 159-168.

Ekman, P. (2003). "*Would You Lie To Me?*" The Observer. Retrieved from http://www.theguardian.com/uk/2003/apr/27/ukcrime9

Epstein , J. A. , & Harackiewicz , J. M. (1992). Winning is not enough: The effects of competition and achievement orientation on intrinsic interest . Personality and Social Psychology Bulletin , 18 , 128 – 138 .

F ü l ö p , M. (2004). Competition as a culturally constructed concept . In C. Baillie , E. Dunn , & Y. Zheng (Eds.), Travelling facts: The social construction, distribution, and accumulation of knowledge (pp. 124 – 148). Frankfurt : Campus Verlag .

F ü l ö p , M. , Ross , A. , Pergar Kuscer , M. , & Razdevsek Pucko , C. (2007). Competition and cooperation in schools: An English, Hungarian and Slovenian comparison . In F. Salili & R. Hoosain (Eds.), Research in multicultural education and international perspective: Vol. 6. Culture, motivation and learning: A multicultural perspective (pp. 235 – 284). Greenwich, CT : Information Age .

Fehr E, Bernhard H, Rockenbach B (2008) Egalitarianism in young children. Nature 454: 1079-1084.10.1038/nature07155 PubMed: 18756249 [PubMed]

Feinberg M, Willer R, Keltner D. 2012. Flustered and faithful: embarrassment as a signal of prosociality. J. Personal. Soc. Psychol. 102(1):81–97

Friedrich, L. K., & Stein, A. H. (1973). Aggressive and prosocial television programs and the natural behavior of preschool children. Monographs of the Society for Research in Child Development, 38 (4, Serial No. 151), 1-64

Funk, J., Fox, C., Chan, M., & Curtiss, K. (2008). The development of the children's empathic attitudes questionnaire using classical and Rasch analyses. *Journal of Applied Developmental Psychology*, *29*, 187-196. doi: 10.1016/j.appdev.2008.02.005

Furnham, A., Chamorro-Premuzic, T., & McDougall, F. (2003). Personality, cognitive ability, and beliefs about intelligence as predictors of academic performance. Learning and Individual Differences, 14, 47–64

Gelfand, D. M., Hartmann, D. P., Cromer, C. C, Smith, C. L., & Page, B. C. (1975). The effects of instructional prompts and praise on children's donation rates. Child Development, 46, 980-983

Gilliom , M. , Shaw , D. S. , Beck , J. E. , Schonberg , M. A. , & Lukon , J. L. (2002). Anger regulation in disadvantaged preschool boys: Strategies, antecedents, and the development of self - control . Developmental Psychology , 38 , 222 – 235 .

Gonzaga GC, Keltner D, Londahl EA, Smith MD. 2001. Love and the commitment problem in romantic relations and friendship. J. Personal. Soc. Psychol. 81(2):247–62

Gonzaga GC, Turner RA, Keltner D, Campos B, Altemus M. 2006. Romantic love and sexual desire in close relationships. Emotion 6(2):163–79

Granic, I., Lobel, A., & Engels, R. C. (2014). The benefits of playing video games. *American Psychologist*, *69*(1), 66.

Granot , D. , & Mayseless , O. (2001). Attachment security and adjustment to school in middle childhood . International Journal of Behavioral Development , 25 , 530 – 541 .

Graves , N. B. , & Graves , T. D. (1984). Preferences for cooperative, competitive and individualistic learning . Cooperative Learning , 5 , 19 – 20 .

Graziano, W. G. & Ward, D. (1992). Probing the Big Five in adolescence: Personality and adjustment during a developmental transition. Journal of Personality, 60, 425-439.

Graziano, W. G., Keane, S. P., & Calkins, S. D. (2007). Cardiac vagal regulation and early peer status. Child Development, 78, 264-278.

Green, C. S., & Bavelier, D. (2003). Action video game modifies visual selective attention. Nature,423 (6939), 534-538.

Green, C. S., & Bavelier, D. (2006). Effect of action video games on spatial distribution of visuospatial attention. Journal of Experimental Psychology. Human Perception and Performance, 32, 1465–1478.

Green,C. S.,& Bavelier, D. (2006). Enumeration versus multiple object tracking: the case of action video game players. Cognition,101, 217–245

Greenfield, P.M., DeWinstanley, P., Kilpatrick, H., & Kaye, D. (1994).Action video games and informal education: Effects on strategies for dividing visual attention. Journal of Applied Developmental Psychology 15 105-123

H. Hill Goldsmith, Arnold H. Buss, Robert Plomin, Mary Klevjord Rothbart, Alexander Thomas, Stella Chess, Robert A. Hinde and Robert B. McCall Child Development Vol. 58, No. 2 (Apr., 1987), pp. 505-529

Handlon, B. J., & Gross, P. (1959). The development of sharing behavior. Journal of Abnormal and Social Psychology, 59, 425-428.

Harris , P. L. (2007). Trust . Developmental Science , 10 , 135 –138.

Hastings, P. D., Zahn, Waxler C., Robinson, J., Usher, B., & Bridges, D. (2000). The development of concern for others in children with behavior problems. Developmental Psychology, 36, 531-546.

Hay DF (1979) Cooperative interactions and sharing between very young children and their parents. Dev Psychol 15: 647–653. doi: 10.1037/0012- 1649.15.6.647.

Hay DF, Murray P (1982) Giving and requesting: Social facilitation of infants' offers to adults. Infant Behav Dev 5: 301–310. doi: 10.1016/S0163-6383(82)80039-8.

Holmes , J. G. and Rempel , J. K. (1989). Trust in close relationships. In C. Hendrick (ed.), Review of personality and social relationships: Vol. X (pp. 187– 219). Newbury Park, CA : Sage .

Hughes, C., White, A., Sharpen, J., & Dunn, J. (2000). Antisocial, angry, and unsympathetic: "Hard-to-manage" preschoolers' peer problems and possible cognitive influences. Journal of Child Psychology and Psychiatry and Allied Disciplines, 41, 169-179.

Hung, D.D., & Kim, H. (1996). *Modeling Six Universal Emotions*. Retrieved from http://www.nbb.cornell.edu/neurobio/land/oldstudentprojects/cs490-95to96/hjkim/emotions.html

Imber , S. C. (1973). Relationship of trust to academic performance . Journal of Personality and Social Psychology , 28 , 145 –150.

John D. Coie, John E. Lochman, Robert Terry, and Clarine Hyman. 1992 Predicting Early Adolescent Disorder From Childhood Aggression and Peer. Journal of Consulting and Clinical Psychology, Vol. 60, No. 5, 783-792

John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), Handbook of personality: Theory and research (2nd ed., pp. 102–138). New York, NY: Guilford Press

John, O. P., Caspi, A., Robins, R. W., Moffitt, T. E., & Stouthamer-Loeber, M. (1994). The "Little Five": Exploring the nomological network of the five-factor model of personality in adolescent boys. Child Development, 65, 160-178.

Johnson, M. K., Beebe, T., Mortimer, J. T., & Snyder, M. (1998). Volunteerism in adolescence: A process perspective. Journal of Research on Adolescence, 8, 309-332

Kagan , S. , & Madsen , M. C. (1971). Cooperation and competition of Mexican, Mexican - American, and Anglo - American children of two ages under four instructional sets . Developmental Psychology , 5 , 32 – 39

Kappe, R., & van der Flier, H. (2009). Using multiple and specific criteria to assess the predictive validity of the Big Five personality factors on academic performance. Journal of Research in Personality, 44, 142-145. doi:10.1016/j.jrp.2009.11.002

Karle, J. W., Watter, S., & Shedden, J. M. (2010). Task switching in video game players: Benefits of selective attention but not resistance to proactive interference. Acta Psychologica,134 , 70 –78

Keltner, D. & Ekman, P. (2000). *Facial Expression of Emotion*. In Lewis, M. & Haviland-Jones, J. (Eds.), *Handbook of emotions*, 2nd edition (pp. 236-249). New York: Guilford Publications, Inc.

Keltner, D. & Ekman, P. (2003). *Intoduction: Expression of Emotion*. In Davidson, R. J., Scherer, K. R., & Goldsmith H. H. (Eds.), *Handbook of Affective Sciences* (pp. 411-414). New York: Oxford University Press.

Kerns , K. A. , Abraham , M. M. , Schlegelmilch , A. , & Morgan , T. A. (2007). Mother - child attachment in later middle childhood: Assessment approaches and associations with mood and emotion regulation . Attachment and Human Development , 9 , 33 – 53 .

Knight, G. P., Kagan, S., & Buriel, R. (1982). Perceived parental practices and prosocial development. Journal of Genetic Psychology, 141, 57-65.

Kogan A, Saslow LR, Impett EA, Oveis C, Keltner D, et al. 2011. Thin-slicing study of the oxytocin receptor (OXTR) gene and the evaluation and expression of the prosocial disposition. Proc. Natl. Acad. Sci. USA 108(48):19189–92

LaFontana, K. M., & Cillessen, A. H. N. (2002). Children's perceptions of popular and unpopular peers: A multimethod assessment. Developmental Psychology, 38, 635-647

Laible , D. J. , & Thompson , R. A. (1998). Attachment and emotional understanding in preschool children . Developmental Psychology , 34 , 1038 – 1045 .

Lane, I. M., & Coon, R. C. (1972). Reward allocation in preschool children. Child Development, 43, 1382–1389.

Lansford, J. E., Putallaz, M., Grimes, C. L., Schiro-Osman, K. A., Kupersmidt, J. B., & Coie, J. D. (2006). Perceptions of friendship quality and observed behaviors with friends: How do sociometrically rejected, average, and popular girls differ? Merrill-Palmer Quarterly,52, 694-720.

Latane, B., & Nida, S. (1981). Ten years of research on group size and helping. Psychological Bulletin, 89, 308-324.

Lee, E.H., & Schnall, S. (2014). The influence of social power on weight perception. *Journal of Experimental Psychology: General*, 1-7. doi: 10.1037/a0035699

Lester , D. and Gatto , J. L. (1990). Interpersonal trust, depression, and suicidal ideation in teenagers . Psychological Reports , 67 , 786 .

Lewis , D. and Weigert , A. (1985). Trust as social reality . Social Forces , 63 , 967 –983.

Lieberman , M. , Doyle , A. B. , & Markiewicz , D. (1999). Developmental patterns in security of attachment to mother and father in late childhood and early adolescence: Associations with peer relations . Child Development , 70 , 202 – 213 .

Lisa Flook and Rena L. Repetti 2005. Classroom Social Experiences as Predictors of Academic Performance University of California, Developmental Psychology,Vol. 41, No. 2, 319 –327

LoBue, V., Nishida, T., Chiong, C., DeLoache, J. S., & Haidt, J. (2011). When getting something good is bad: Even three-year-olds react to inequality. Social Development, 20, 154–170.

Lutkenhaus , P. , Grossmann , K. E. , & Grossmann , K. (1985). Infant - mother attachment at 12 months and style of interaction with a stranger at 3 years . Child Development , 56 ,1538 – 1542 .

Mayer, J.D., Salovey, P., & Caruso, D. (2000). Models of emotional intelligence. In R.J. Sternberg (ed.): Handbook of human intelligence (pp. 396-420). New York: Cambridge University Press.

McClintock , C. G. , & Moskowitz , J. M. (1976). Children ' s preferences for individualistic, competitive and cooperative outcomes . Journal of Personality and Social Psychology , 34 , 543 – 555 .

McClintock , C. G. , Moskowitz , J. M. , & McClintock , E. (1977). Variations in preferences for individualistic, competitive and cooperative outcomes as a function of age, game class and nursery school children . Child Development , 48 , 1080 – 1085 .

McGinnis, E. (2011). *Skillstreaming the Elementary School Child: A guide for teaching Prosocial Skills*.

Moore C (2009) Fairness in children's resource allocation depends on the recipient. Psychol Sci 20: 944–948. doi: 10.1111/j.1467-9280.2009.02378.x.

Musgrave-Marquart, D., Bromley, S. P., & Dalley, M. B. (1997). Personality, academic attrition, and substance abuse as predictors of academic 90 achievement in college students. Journal of Social Behavior & Personality, 12, 501-511.

Neff KD, Hsieh Y-P, Dejitterat K. Self-compassion, Achievement Goals, and Coping with Academic Failure. Self and Identity. 2005;4:263–287.

Neff, K. The Development and Validation of a Scale to Measure Self-Compassion. 2003. Self and Identity, 2: 223–250.

Nelson, L., & Madsen, M. C. (1969). Cooperation and competition in four-year-olds as a function of reward contingency and subculture. Developmental Psychology, 1, 340-344

NICHD Early Child Care Research Network (2002). The interaction of child care and family risk in relation to child development at 24 and 36 months. Applied Developmental Science, 6, 144-156.

O' Hara , K. (2004). Trust: From Socrates to spin . Cambridge: Icon Books .

O'Sullivan, M. & Ekman, P. (2004). *The wizards of deception detection*. In Granhag, P. & Strömwall, L. (Eds.), *The detection of deception in forensic contexts* (pp. 269–286). Cambridge, England: Cambridge University Press.

Okagaki, L., & Frensch, P. (1994). Effects of video game playing on measures of spatial performance: Gender effects in late adolescence. Journal of Applied Developmental Psychology, 15, 33– 58.

Olson, K. R., & Spelke, E. S. (2008). Foundations of cooperation in young children. Cognition, 108, 222–231.

Owens , L. , & Barnes , J. (1982). The relationships between cooperative, competitive, and individualized learning preferences and student ' s perceptions of classroom learning atmosphere . American Educational Research Journal , 19 , 182 – 200 .

Park , K. A. , & Waters , E. (1989). Security of attachment and preschool friendships . Child Development , 60 , 1076 – 1081 .

Parsons, S., Guldberg, K. Porayska-Pomsta, K. & Lee, R. (2015) Digital stories as a method for evidence-based practice and knowledge co-creation in technology-enhanced learning for children with autism. *International Journal of Research & Method in Education*, 38(3), 247-271.

Paul Ekman Group. (2014). *Journal articles*. Retrieved from http://www.paulekman.com/journal-articles/

Paunonen, S. V., & Ashton, M. C. (2001). Big Five factors and facets and the prediction of behavior. Journal of Personality and Social Psychology, 81, 524–539

Payne, F. D. (1980). Children's prosocial conduct in structural situations and as viewed by others: Consistency, convergence and relationships with person variables. Child Development, 51, 1252-1259.

Peterson, L. (1983). Role of donor competence, donor age, and peer presence on helping on an emergency. Development Psychology, 19, 873-880

Petrides, K. V. & Furnham, A. (2000). On the dimensional structure of emotional intelligence. Personality and Individual Differences, 29, 313-320.

Petrides, K. V. & Furnham, A. (2001). Trait emotional intelligence: Psychometric investigation with reference to established trait taxonomies. European Journal of Personality, 15, 425-448.

Pianta, R. C., La, Paro K. M., Payne, C., Cox, M. J., & Bradley, R. (2002). The relation of kindergarten classroom environment to teacher, family, and school characteristics and child outcomes. The Elementary School Journal, 102, 225-238.

Piff, Paul K.; Kraus, Michael W.; Côté, Stéphane; Cheng, Bonnie Hayden; Keltner, Dacher. (2010). Having less, giving more: The influence of social class on prosocial behavior. Journal of Personality and Social Psychology, Vol 99(5), 771-784. http://dx.doi.org/10.1037/a0020092

Pillay, H. (2002). An investigation of the cognitive processes engaged in by recreational computer game players: Implications for skills of the future. Journal of Research on Technology in Education, 34, 336–350

Piotrowska PJ, Stride CB, Maughan B, Goodman R, McCaw L & Rowe R (2015) Income gradients within child and adolescent antisocial behaviours. *British Journal of Psychiatry*

Ramsey, E., Patterson, G. R., & Walker, H. M. (1990). Generalization of the antisocial trait from home to school settings. Journal of Applied Developmental Psychology, 11, 209-223.

Raviv, A., & Bar-Tal, D. (1981). Demographic correlates of adolescents' helping behavior. Journal of Youth and Adolescence, 10, 45-53.

Raviv, A., Bar-Tal, D., Ayalon, H., & Raviv, A. (1980). Perception of giving and receiving help by group members. Representative Research in Social Psychology, 11, 140-151.

Reddy, L. (2012). *Group Play Interventions for Children*. American Psychological Association, Washington, DC.

Reid, C., Davis, H., Horlin, C., Anderson, M., Baughman, N., & Campbell, C. (2013). The kids' empathic development scale (KEDS): A multi-dimensional measure of empathy in primary school-aged children. *Journal of Developmental Psychology*, *31*, 231-256.   doi: 10.1111/bjdp.12002

Rheingold HL, Hay DF, West MJ (1976) Sharing in the second year of life.

Ribal, J. E. (1963). Social character and meaning of selfishness and altruism. Sociology and Social Research, 47, 311-321

Ricky Finzi-Dottan. (2012) . Attachment Style Classification Questionnaire for Latency Age Children . Measurement Instrument Database for the Social Science. Retrieved from www.midss.ie

Robinson, J. L., Zahn, Waxler C., & Emde, R. N. (1994). Patterns of development in early empathic behavior: Environmental and child constitutional influences. Social Development, 3, 125-145.

Rochat P, Dias MDG (2009) Fairness in distributive justice by 3-and 5-year-olds across seven cultures. J Cross Cultur Psychol 40: 416-442.10.1177/0022022109332844

Rode, J. C., Mooney, C. H., Arthaud-Day, M. L., Near, J. P., Baldwin, T. T., Rubin, R. S. and Bommer, W. H. (2007), Emotional intelligence and individual performance: evidence of direct and moderated effects. J. Organiz. Behav., 28: 399–421. doi: 10.1002/job.429

Rosenberg, E. L. & Ekman, P. (1993). *Facial Expression and Emotion*. Neuroscience year: Supplement 3 to the Encyclopedia of Neuroscience, 51-52.

Roseth , C. J. , Johnson , D. W. , & Johnson , R. T. (2008). Promoting early adolescents' achievement and peer relationships: the effects of cooperative, competitive, and individualistic goal structures . Psychological Bulletin , 134 , 223 – 246 .

Rotenberg , K. J. , Boulton , M. J. , and Fox , C. L. (2005). Cross-sectional and longitudinal relations among children's trust beliefs, psychological maladjustment and social relationships: Are very high as well as very low trusting children at risk? Journal of Abnormal Child Psychology , 33 , 595 –610.

Rotenberg , K. J. , Fox , C. , Green , S. , Ruderman , L. , Slater , K. , Stevens , K. , and Carlo, G. (2005). Construction and validation of a children's interpersonal trust belief scale . British Journal of Developmental Psychology , 23 , 271 –292.

Rotenberg , K. J. , MacDonald , K. J. and King , E. V. (2004). The relationship between loneliness and interpersonal trust during middle childhood . Journal of Genetic Psychology , 165 , 233 –249.

Rotenberg, K. J., 2010. Interpersonal Trust During Childhood and Adolescence. Cambridge University Press.

Rothbart MK, Sheese BE. Temperament and emotion regulation. In: Gross J, editor. Handbook of emotion regulation. New York, NY: Guilford Press; 2007. pp. 331–350.

Rothbart, M. K. & Bates, J. E. (1998). Temperament. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), Handbook of child psychology. Vol. 3. Social, emotional and personality development (5th ed., pp. 105-176). New York: Wiley

Rothbart, M. K. (1981). Measurement of Temperament in Infancy. Child Development, 52, 569–578.

Rotter, J. B. (1980). Interpersonal trust, trustworthiness and gullibility . American Psychologist , 35 , 1 –7.

Rowe, S.M. & Wertsch, J.V. (2004). Vygotsky's model of cognitive development. Chapter in Goswami, U. (2004) (Ed) Blackwell Handbook of Childhood Cognitive Development. Oxford: Blackwell, pp. 538-554.

Rubin, M.M. (1999). Emotional intelligence and its role in mitigating aggression: a correlational study of the relationship between emotional intelligence and aggression in urban adolescents. Unpublished Dissertation, Immaculata College, Immaculata, Pennsylvania.

Ryckman , R. M. , Libby , C. R. , van den Borne , B. , Gold , J. A. , & Lindner , M. A. (1997). Values of hypercompetitive and personal development competitive individuals . Journal of Personality Assessment , 69 , 271 – 283

Sawyer, J. (1966). The altruism scale: A measure of cooperative, individualistic and competitive interpersonal orientation. American Journal of Sociology, 71, 407-416

Schopler, J., & Matthews, M. W. (1965). The influence of the perceived causal locus of partner's dependence on the use of interpersonal power. Journal of Personality and Social Psychology, 2, 609-612.

Sebanc, A. M. (2003). The friendship features of preschool children: Links with prosocial behavior and aggression. Social Development,12, 249-268.

Seifer, R., Sameroff, A. J., Barrett, L. C., & Krafchuk, E. (1994). Infant temperament measured by multiple observations and mother report. Child Development, 65(5), 1478–90.

Shelley Hymel, Kenneth H. Rubin, Lynda Rowden, and Lucy LeMare. 1990 Children's Peer Relationships: Longitudinal Prediction of Internalizing and Externalizing Problems from Middle to Late Childhood. Child Development, , 61, 2004-2021.

Shigetomi, C. C, Hartmann, D. P., & Gelfand, D. M. (1981). Sex differences in children's altruistic behaviors and reputations for helpfulness. Developmental Psychology, 17, 434-437.

Simonds, J. & Rothbart, M. K. (2004, October). The Temperament in Middle Childhood Questionnaire (TMCQ): A computerized self-report measure of temperament for ages 7- 10. Poster session presented at the Occasional Temperament Conference, Athens, GA.

Smith &Hart (Editors), 2011. The Wiley-Blackwell Handbook of Childhood Social Development Second Edition

Sroufe , L. A. , Egeland , B. , & Carlson , E. A. (1999). One social world: The integrated development of parent - child and peer relationships . In W. A. Collins & B. Laursen (Eds.), Minnesota Symposia on Child Psychology: Vol. 30. Relationships as developmental contexts: Festschrift in honor of Willard W. Hartup (pp. 241 – 261). Mahwah, NJ : Erlbaum .

Sroufe , L. A. , Schork , E. , Motti , F. , Lawroski , N. , & LaFreniere , P. (1984). The role of affect in social competence . In C. Izard , J. Kagan , & R. Zajonc (Eds.), Emotions, cognition, and behaviour (pp. 289 – 319). Oxford : Oxford University Press .

Stanne , M. , Johnson , D. , & Johnson , R. (1999). Does competition enhance or inhibit motor performance: A meta - analysis . Psychological Bulletin , 125 , 133 – 154 .

Staub, E. (1970). A child in distress: The influence of age and number of witnesses on children's attempts to help. Journal of Personality and Social Psychology, 14, 130-140.

Staub, E. (1971a). Helping a person in distress: The influence of implicit and explicit rules of conduct on children and adults. Journal of Personality and Social Psychology, 17, 137-145.

Staub, E. (1971b). A child in distress: The influence of nurturance and modeling on children's attempts to help. Developmental Psychology, 5, 124-132

Stewart, J., Bleumers, L., Van Looy, J., Mariln, I., All, A., Schurmans, D., Willaert, K., De Grove, F., Jacobs, A., & Misuraca, G. (2013) *The potential of digital games for empowerment and social inclusion of groups at risk of social and economic exclusion: Evidence and opportunity for policy*. JRC Scientific and Policy Reports, European Commission, Report EUR25900. Available from: http://www.most.ie/webreports/2014/oct2014/Potential%20of%20digital%20games%20for%20empowerment%20and%20social%20inclusions%202013.pdf

Strayer, J., & Roberts, W. (1989). Children's empathy and role taking: Child and parental factors, and relations to prosocial behavior. Journal of Applied Developmental Psychology, 10, 227-239.

Strein , W. (1986). Sex and age differences in preschool children ' s cooperative behaviour: Partial support for the Knight/Kagan hypothesis . Psychological Reports , 58 , 915 – 921 .

Summers, M. (1987, April). Imitation, dominance, agonism and prosocial behavior: A meta-analysis of sibling behavior. Paper presented at the biennial meeting of the Society for Research in Child Development, Baltimore.

Svetlana H., Emotional Intelligence and Academic Achievement In Higher Education, Pepperdine University, (2007)

Tassi , F. , Schneider , B. H. , & Richard , J. F. (2001). Competitive behavior at school in relation to social competence and incompetence in middle childhood . International Journal of Social Psychology , 14 , 165 – 184 .

Tauer , J. , & Harackiewicz , J. (1999). Winning isn ' t everything: Competition, achievement orientation, and intrinsic motivation . Journal of Experimental Social Psychology , 35 , 209 – 238 .

Toda , M. , Shinotsuka , H. , McClintock , C. G. , & Stech , F. J. (1978). Development of competitive behavior as a function of culture, age, and social comparison . Journal of Personality and Social Psychology , 36 , 825 – 839 .

Ugurel-Semin, R. (1952). Moral behavior and moral judgment of children. Journal of Abnormal and Social Psychology, 47, 463-474.

Uslander , E. M. (2002). The moral foundations of trust. Cambridge University

van der Mark, I. L., van Ijzendoorn, M. H., & Bakermans Kranenburg, M. J. (2002). Development of empathy in girls during the second year of life: Associations with parenting, attachment, and temperament. Social Development, 11, 451-468.

Volker , B. (2002). The politics of social networks: Interpersonal trust and institutional change in post-communist East Germany

Vossen, H.G.M., Piotrowski, J.T., & Valkenburg, P.M. (2015). Development of the adolescent measure of empathy and sympathy (AMES). *Personality and Individual Differences*, *74*, 66-71. doi: 10.1016/j.paid.2014.09.040

Warden, D., & Mackinnon, S. (2003). Prosocial children, bullies and victims: An investigation of their sociometric status, empathy and social problem-solving strategies. British Journal of Developmental Psychology, 21, 367-385

Warneken F, Lohse K, Melis AP, Tomasello M (2011) Young children share the spoils after collaboration. Psychol Sci 22: 267–273. doi: 10.1177/ 0956797610395392.

Warren , M. (ed.) (1999). Democracy and trust . New York and Cambridge : Cambridge University Press .

Wentzel, K. R. (1993). Does being good make the grade? Social behavior and academic competence in middle school. Journal of Educational Psychology, 85, 357-364.

Wentzel, K. R. (2003). Sociometric status and adjustment in middle school: A longitudinal study. Journal of Early Adolescence, 23, 5-28.

Whiting, B. B., & Whiting, J. W. M. (1975). Children of six cultures: A psychocultural analysis. Cambridge, MA: Harvard University Press.

Winne, P. H., & Perry, N. E. (2000). Measuring Self Regulated Learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), Handbook of Self Regulation (pp. 531–566). San Diego, CA: Academic Press.

Wise, P. S., & Cramer, S. H. (1988). Correlates of empathy and cognitive style in early adolescence. Psychological Reports, 63, 179-192.

Yap, A.J., Wazlawek, A.S., Lucas, B.J., Cuddy, A.J.C., & Carney, D.R. (2013). The ergonomics of dishonesty: The effect of incidental posture on stealing, cheating, and traffic violations. *Psychological Science*, *24*(11), 2281-2289. doi: 10.1177/0956797613492425

Yarrow, M. R., & Waxier, C. Z. (1976). Dimensions and correlates of prosocial behavior in young children. Child Development, 47, 118-125.

Young, S. K., Fox, N. A., & Zahn-Waxler, C. (1999). The relations between temperament and empathy in 2-year-olds. Developmental Psychology, 35, 1189-1197.

Zahn-Waxler, C., Robinson, J. L., & Emde, R. N. (1992). The development of empathy in twins. Developmental Psychology, 28, 1038-1047.

Appendix A - ProsocialLearn Skill Set

This appendix includes detailed descriptions of the initial set of ProsocialLearn skills in our conceptual framework. Most of the descriptions below have been taken from Reddy's Group Play Interventions for Children (Reddy, 2012).

A. **Skills for friendship**

1. Communicating with others

2. Using nice talk

"Friendship and positive-adult relationships are developed through positive conversational exchanges that reflect the ability to cooperate in play, resolve conflicts and explore feelings and shared experiences. Children who use prosocial skills such as nice talk are more likely to report that they enjoy making and maintaining friendship" (Reddy, 2012, p.58). Therefore, this skill is categorised as 'basic' and corresponds to the relationship skills competency of the CASEL.

3. Introducing self to others

Being able to look at and walk towards the person; wait until the other person look at you, tell the person your name, pause and listen to see if she/he tells you their name and ask 'what's your name?' if they don't and finish by saying 'nice to meet you'. We categorise this skill as basic and within relationship skills from the CASEL.

4. Introducing others

Introducing a person to someone else requires looking at other people, say the name of one person and tell him or her the other person's name, once for each person (e.g.: 'Kam, this is Lilia; Lilia, this is Kam') and say something about these people (e.g.: Both of you like chocolate'). We categorise this skill as basic and within relationship skills from the CASEL.

5. Joining in a conversation

To join a conversation, children have to learn how to look at the people having the conversation and smile, wait for the people to stop talking, talk about something that is similar to what the group is talking about and, if ignored, walk away and do something else. We categorise this skill as basic and within relationship skills from the CASEL.

6. Joining a play group

To join a play group, children can for instance stand near a group and watch the activity, make a positive comment about the game and then ask to join the group. We categorise this skill as basic and within relationship skills from the CASEL.

7. Sharing about oneself

Sharing about oneself can increase children's sense of well-being and attachment with others as it increases emotional security and buffer against negative affect (Jellesma et al., 2008). In order to share something personal about oneself, children must trust that the other person is not going to

laugh and was therefore categorised in the domain of TRUST and in the self-awareness and relationship skills CASEL framework. We also categorised this skill as intermediate as it requires the child to know how to approach people, use nice talk and have basic communication skills.

8. Sharing your things with others

9. Learning about others

Learning about others is an intermediate skill as the child has to use basic skills to start an interaction with another child and belongs to relationship skills of the CASEL. To do so, the child has to think about what he/she wants to know about the other child, ask the question, listen to the answer, wait until the other person has finished talking and ask more questions if wanted.

10. Being an active listener

The use of active listening helps to establish trusting and positive relationships (Duhamel & Tabot, 2004). Children who are active listeners are motivated to ask appropriate questions and to offer empathetic statements towards others (McNaughton et al., 2008). Therefore, it belongs to the EMATHY domain and the relationship skills from the CASEL.

11. Giving compliments

Giving compliment requires EMPATHY and GENEROSITY. It fits under the relationship skills from the CASEL and is considered of intermediate level.

12. Receiving compliments

Receiving compliments requires EMPATHY and self-compassion.

13. Respecting others

Being respectful to others can increase security within friendship and mutual trust (Frei & Shaver, 2002). Many skills can be included under this skill as it requires children to be attentive, empathetic, sympathetic, kind and supportive towards others. It can take the form of not laughing at a child who is having difficulties, talking to that child and showing him/her that it is ok to be different or telling others not to make fun of him/her. We have classified it as advanced skill, under the domain of EMPATHY and COMPASSION and the social awareness and responsible decision making for the CASEL.

14. Respecting other's personal space

"Personal space relates to an individual's representation of the self and the self in relation to others (Horner, 1983). Being aware of one's personal space relies heavily on an ability to regulate behaviours and emotions. Individuals tend to seek an optimal distance during interactions, and when this space has been compromised, discomfort or dissatisfaction occurs."(Reddy, 2012, p70). We categorise this skill as basic and within social awareness from the CASEL. This skill does not match any domain specifically but can be used as a first step for COOPERATION with others.

15. Not interrupting others

Basic conversational skill that teaches children that a conversation is a turn-taking activity that includes listening, attention and respect for others. We categorise this skill as basic and within relationship skills from the CASEL. This skill does not match any domain specifically but can be used as a first step for COOPERATION with others.

B. Skills for feelings

16. Self Control

17. Identifying feelings and emotions

This is the first step towards a better regulation of feelings and emotions. Identifying feelings means being able to know when you are feeling sad or down and is a pre-requisite before being able to do something about it. It is an intermediate skill that involve EMPATHY and self-awareness, as well as social awareness when it is about identifying feelings in others.

18. Expressing feelings and emotions

This skill happens after a child has identified his/her feelings and emotions and is about deciding whether he/she would like to share this emotion with someone else and can be part of the emotion regulation process. For instance, a child has to learn that it is ok to be upset but that it is not ok to shout in the classroom. It is an intermediate skill that involve EMPATHY and self-management.

19. Understanding social cues

Observing others to determine how they are feelings is the first step before deciding what to do with this observation (such as showing concerns for others). It teaches how to get information from facial expression and body movement to infer about someone's emotional state. It is a basic skill that involve EMPATHY and social awareness.

20. Showing concerns for other's feelings

Once the child has identified that a child needs help, showing concern teaches how to approach this child and show concern for his/her feelings. It is an intermediate skill that involve EMPATHY, COMPASSION and social awareness.

21. Dealing with stress

Dealing with stress is an advanced skill that teaches children how to identify stress, finding strategies to feel less stressed and take actions towards it. Such strategy can be to take a few moments and take three deep, slow breaths and relax parts of the body. It is a more specific skill within the skill that teaches how to regulate emotions. It involves EMPATHY, (self-) COMPASSION, self-awareness and self-management.

22. Dealing with Anxiety

23. Dealing with your angry feelings

Dealing with angry feelings is once again a more specific skill within the skill that teaches how to regulate emotions. It is an advanced skill that teaches children how to identify anger, finding strategies to let go the anger and take actions towards it. Such strategy can be to do the turtle: hold

legs firmly against chest, take three slow, deep breaths and slowly release legs from chest. It involves EMPATHY, (self-) COMPASSION, self-awareness and self-management.

24. Dealing with another person's angry feelings

Coping with someone else's anger is an advanced skill that requires first to identify that someone is feeling angry, think about what to do such as asking the person whether she/he feels like talking about it, listen to the person, asking whether she/he need help and/or come back later if she/he needs help, and finally take actions towards it. It involves EMPATHY, COMPASSION and self-management.

25. Dealing with rejection

Once again, this skill can teach a specific emotion regulation strategy that arises in the specific context of being rejected. It can happen when a child wants to play with someone, asks if he/she can join the play and the other child says no. The skill can teach the child to think about what to do such as walking away or doing something fun instead and do it. It is an intermediate skill that involve self-management and also EMPATHY to a certain extend.

26. Dealing with being left out

First, the child has to think about why she/he feels left out and whether this is accurate or not. Then, the child should think about what action he/she can do to join the group (skill 5) and what to do if the group says that they don't want to play with him/her (skill 23). This skill is an intermediate skill that involve self-management and also EMPATHY to a certain extend.

27. Dealing with boredom

"Feeling bored is a common experience for most school-age children and can be attributed to many factors. For example, children may verbalise that they are feeling bored when they feel lonely, discouraged, confused, overwhelmed, or ambivalent about an activity or disappointed by the outcome of play activities." (Reddy, 2012, p.84). This skill should teach children to make a list of activities to do if bored, pick one and do it. It is an intermediate skill that involve self-management and also EMPATHY to a certain extend.

C. Skills for collaboration

28. Setting Goals and Obtaining them

29. Solving Everyday problems

30. Solving a problem as a group

This skill teaches children to work efficiently to define a task and share the responsibility and knowledge to accomplish the goal. It is a master skill that requires many of the other skills defined below such as following approved directions (26), paying attention to what others are saying (27) and taking turn (29). It is an advanced skill that belongs to the domain of COOPERATION and the relationship skills competency. This skill can teach for instance to listen to what each member of the group has to say, wait until it's your turn to talk and say what you think, decide as a group what the

problem is, what the possible solutions are and what the best choice would be and act on it, as a group.

    31. Following directions

The skill teaches the child to look at the person who is asking him/her to follow directions, stop what he/she is doing and listen to what was said, repeat the directions out loud or to himself/herself (at least at the beginning) and follow the directions. It is a primary skill that belongs to the domain of COOPERATION and the relationship skills competency.

    32. Paying attention

This is a basic skill that belongs to the domain of COOPERATION and the relationship skills competency. It involves the child to learn how to stop the current task to actively listen and pay attention.

    33. Staying on Task

    34. Working independently

Even in collaborative work, being able to work independently can be useful for successful collaboration. This is a basic skill that belongs to the domain of COOPERATION and self-management competency.

    35. Cooperation

    36. Taking turns

Taking turns is important in collaborative work and this skill should teach the child to look around when it's his/her turn to talk, think about what he/she will say or do, wait to make sure no one else is talking and finish what he/she is saying/doing before it's someone else's turn. This is a basic skill that belongs to the domain of COOPERATION and relationship skills competency.

    37. Being a good sport

    38. Being patient

Being patient is important for collaboration when it's not all about one child and the child has to learn to wait his/her turn etc. This is a basic skill that belongs to the domain of COOPERATION and self-management competency.

    39. Being assertive

    40. Saying no

In collaborative work, it is important to learn how and when to say no. This is a basic skill that belongs to the domain of COOPERATION, relationship skills and self-management competencies.

    41. Accepting no

In collaborative work, it is important to learn how and when to accept no. This is a basic skill that belongs to the domain of COOPERATION, relationship skills and self-management competencies.

42. Asking for help

The first stage for this skill is to teach the child to identify he/she needs help, think about who to ask and what to say and take action. This intermediate skill belongs to self-awareness and relationship skills competencies in the CASEL.

43. Helping others

This skill teaches children to understand what the problem is, decide if someone needs help, ask whether the person needs help and help if the answer is yes. This intermediate skill belongs to the domain of COMPASSION, COOPERATION, social-awareness and relationship skills competencies in the CASEL.

Appendix B – Teaching Practitioners Questionnaire and Results

Questionnaire Objective

Thank you for agreeing to partake in this survey. Our primary aim is to understand how we can develop games that will help your students achieve better academic success and integrate better socially with their peers. Your responses will help us prioritize which skills to focus on in our game design.

The purpose is to understand what established social values exist within schools and how they form part of school life. We will integrate this information with a scientific model of "helping and cooperating". This will help us improve communication with schools, to prioritise project requirements according to school values and to ensure relevance of technological solutions in relation to current teaching activities.

A. School Values

Do you have a common set of school values that guide culture and student behaviour (e.g. respect for others, truthfulness, being kind to others, etc.)? If so please provide them:

What benefits to students do you see from a culture based on school values?

What initiatives are taken to encourage and promote school values?

Do you teach school values as skills to be acquired through learning objectives? If so
  - Can you provide an example lesson plan?
  - What proportion of teaching time is allocated to such lessons? (<1 hr a week, 1-2 hrs a week, >2 hrs a week)
  - How long is a typical lesson (<30mins, 30-60mins >60mins)

Do you have specific policies for behaviour management that link to school values? if so please provide the policy

B. Helping and cooperating

In this section, we would like to learn your opinion about how much specific skills related to being kind and cooperative can help your students (a) do better academically and (b) integrate socially with their peers.

Please rank from 1 to 8 the following skills/traits in how much you think they help students **achieve academically.** Skills/traits on top (1) should be **most important,** while skills/traits on the bottom (8) should be least important.
  _ Understanding the emotions of others
  _ Being trusting of people
  _ Acting fairly
  _ Feeling compassion when witnessing suffering
  _ Being giving and generous
  _ Following expectations of society
  _ Being cooperative with others
  _ Having concern about how others feel

Please rank from 1 to 8 the following skills/traits in how much you think they help students **integrate socially with their peers.** Skills/traits on top (1) should be **most important,** while skills/traits on the bottom (8) should be least important.

_ Understanding the emotions of others
_ Being trusting of people
_ Acting fairly
_ Feeling compassion when witnessing suffering
_ Being giving and generous
_ Following expectations of society
_ Being cooperative with others
_ Having concern about how others feel

B1. What percentage of your students do you think would benefit from learning activities that foster traits and behaviors related to being kind and cooperative?

Has the level of kindness cooperativeness among your students been a concern for you so far?

B2. Are there learning activities or learning units about kindness and cooperation in your curriculum and in your practice? If yes, please describe briefly

C. Games in Learning

C1. Do you use games or playful activities for teaching and learning? If yes, please describe briefly

C2. Have you ever used games that are related to the concepts of kindness and cooperation? If yes, please describe briefly

C3. Have you ever used digital games for learning? If yes, how was your experience, positive or negative? If no, what potential possibilities and problems do you foresee in using them?

D. Devices and software

D1. Do you use software in your class? If yes, how do you access this software?

D2. Do you use portable devices such as tablets or smartphones in the learning process? If yes, please describe briefly. If no, do you anticipate using them in the coming years?

D3. Do you think it is feasible for students/pupils to bring their own devices (tablets or smartphones) for classroom use? Please explain your position (school's position or national regulations)

D4. Do you personally use a tablet and/or a smartphone? Do you use apps? Are there apps that you find useful for your work?

E. Communities, Platforms and Sources of Information

E1. How do you learn about new teaching approaches or new programmes available for your school?

E2. How do you learn about available software or apps related to your teaching?

E3. Are there online sources of information and educational material that you find particularly useful for your work? Do you participate in online teaching communities? Please describe briefly

E4. Do you have policies for ICT Computing and Acceptable Use? If so please provide links

Results

UK

Despite the low number of reports (3 teachers in two different schools), school values seemed to vary across UK schools and teachers, but one constant theme was effective communication. Students are encouraged to use communication skills to resolve conflict and deepen relationships. For the most part, prosocial behaviour and school values are reinforced on the school level via assemblies and in some cases, reward schemes like badges. Typically, in-class lessons about kindness or compassion last approximately 20 minutes, although teachers remark that prosocial behaviours are generally not mandatory and may be taught on a case-by-case basis as opposed to being a statutory curriculum. The Personal, Social and Health Education curriculum (PSHE) is a non-statutory subject, that allows teacher the flexibility to tackle a wide range issues. Empathy and cooperation received the highest rankings for association with both academic achievement and social integration. For academic achievement, these were followed by playing/acting fairly and obedience to social norms. In social integration's case, the next two were trust and concern for others' feelings. In all ratings, compassion when seeing someone else suffer was among the least valued options. Teachers report that students would universally benefit from specific education in these areas, but that generally there are only a few particular students that cause problems in the area of kindness or cooperation.

Teachers use a variety of play forms to encourage social norms, including but not limited to roleplaying social scenarios either in person or via puppets, storytelling, board games, or "circle time," a period in which pupils are seated in a large circle and must take turns sharing verbally or physically sharing an item. Use of digital media is, however, limited, but growing. Some teachers have used Espresso and IWB as technological resources, but they lament that they are outdated and "a bit dodgy." For the most part, teachers seem to stick to traditional children's games to encourage prosocial behaviour in the classroom.

In terms of physical hardware, teachers seem to have more access to technology than students, although 2013 report by Office for National Statistics noted that 97% of households with children have internet connection and more recent report of 2015 puts a figure of over 80% of UK primary school children having access to tablets and PCs at home. All students seemed to have access to at least a basic desktop computer in the classroom, but only one of three reports mentioned anything beyond that (ipads, laptops, and interactive whiteboard). Use of devices, particularly anything that could connect to the internet, is highly policed in UK schools and strict regulations are enforced that would prevent any outside technology (i.e. personal devices such as smartphones) from getting in.

That said, teachers are also largely dependent on the school for their own technological education, and depending on the school the amount of resources varies. Only one teacher (out of three) reported using anything outside of school-organized means in their teaching; most were strictly attending teacher events (INSET training) or exclusively using school-provided software (Espresso, 2simple, etc.). All teachers' schools had accessible ICT regulations, and one report said that their school had a dedicated ICT coordinator. The annual British Education and Training Technology (BETT) trade show which represents the suppliers of software and technology in schools had over 500 companies exhibiting software and technologies specifically made for primary school in 2015.

The British Educational Suppliers Association (BESA) forecast UK schools to spend €833 million (£596 m) on ICT kit in 2014/15, a 10% increase on the previous year. Whilst adoption of tablets in the

United States has grown the fastest, doubling in only one year between 2013 to 2014. The trend is starting to pick up in the UK as more ICT managers are choosing tablets over PCs.

Italy.

In Italy, the main school values that emerged were respect of others and social integration, particularly when it comes to foreign students and different religious backgrounds. Teachers also emphasize growing as a "global citizen," saying that their schools' tolerance and respect policies allow students to take their learning outside of the classroom and into the real world. Schools also have a variety of ways to promote these values, including workshops for parents, school-level interdisciplinary projects and basic lessons in class. Although most teachers report that these values are more encouraged than directly taught, a few reported programs such as eTwinning and various citizenship and environmental science courses that encourage global citizenship and respect for others. These lessons typically last from 30 to 60 minutes. Many schools also have specific policies in which students must replace any damaged property; one school even has a community service program for those who break school rules.

In terms of ratings, Italian teachers report that fairness and cooperation are the most crucial prosocial traits for academic achievement, followed by generosity and understanding emotion. Compassion for suffering was rated least important. The same pattern emerged for academic achievement, with fairness being rated highest, followed by cooperation, concern for others, and understanding others' emotions. The least important for social inclusion was following society's expectations. Teachers believed that at least some students would benefit from direct instruction in these prosocial behaviours, with percentages potentially affected ranging from 35% to 80%. Teachers also report that morality and prosociality are mostly relegated to religious curriculums in terms of direct instruction.

Italian teachers strongly emphasize group and pair work as opportunities for play in learning, although movies, songs, and traditional games are also incorporated. Prosocial behaviours are implied through the cooperation required to participate in said games. All Italian teachers also reported using digital media in learning; it was a positive experience in all cases. These teachers also had access to technology for teaching, including smart boards, computers, and free downloaded software. Half the teachers also had access to either tablets or some other form of mobile device. Currently, some students may loan tablets from the school, but personal devices brought from home are not permitted. Teachers, however, use a variety of apps on tablets and smartphones to transport documents from home, and as direct teaching material (Edmodo, Issuu, Stepmap, etc.) in addition to using their regular laptops.

Teachers in Italy have a wide variety of resources available for integrating technology and learning about new teaching methods. They report using general internet enquiries, books, colleagues, journals, newsletters and online or offline courses to learn about digital media and their profession. They make use of the BBC website, eTwinning events and YouTube regularly. However, contrary to their British counterparts, schools do not seem to have specific policies in place regarding use of digital media and technology in the classroom. The only rule to which teachers referred was the prohibition of students' smartphones in class.

Spain.

Like their Italian counterparts, Spain's schools heavily emphasize respect for others in their school values, although they add in the concept of brotherhood and solidarity to this. Again, personal development is cited as a major benefit of these values, in addition to living together in greater

harmony as a society. Almost all teachers reported some kind of school-wide initiatives for encouraging school values in children. Most of these took the form of regular assemblies, peer tutoring sessions, and group activities, although one school reported incorporating mindfulness training into their curriculum. Teachers are also careful to incorporate group work into their academic lessons in order to solidify the need to work together; oftentimes they will give children problems that are too complicated to solve individually. For the most part, these lessons will last between 30 and 60 minutes, and usually around one hour per week is devoted to prosocial behavioural training. Few teachers were able to detail specific school-wide policies regarding school values, but those that did mentioned emotional intelligence development sessions and mediation services.

For the prosocial behavioural ratings, Spanish teachers consistently rated understanding others' emotions as being key to academic achievement, followed by fairness and cooperation. Least important of the factors was following society's expectations. In terms of social integration, a similar pattern emerged, with understanding others' emotions coming out on top, followed by cooperation and concern for others. Once more, society's expectations were rated as the least important factor. The vast majority believe that all students would benefit from being directly instructed in these prosocial behaviours, and most teachers report that any lessons addressing these behaviours focus mostly on cooperation.

Spanish teachers use a wide variety of games in teaching, including online games, games that involve the Smartboard, memory games, traditional sports and other outdoor games. However, few of these games directly address prosocial behaviours; most of the prosocial learning takes place through roleplaying. Teachers report having a largely positive experience with digital games and media in the classroom. They say that digital games are great motivators for kids, and one teacher went so far as to say that technology in the classroom is the future of teaching. For the most part, teachers use various websites in their teaching, although many cite self-made powerpoints and DVDs as well. They do not, however, often use mobile devices in class; tablets and smartphones are restricted for personal use, with only a few teachers mentioning apps used in classroom settings. Many Spanish schools also have plans in place to provide tablets for students and teachers in the coming year, but they lament poor internet speed on current systems. Like their UK and Italian counterparts, Spanish students may not bring smartphones to school; this is largely due to the fact that many students simply cannot afford to own them. However, with more funding, teachers hope that students will be able to use tablets both in and out of school for learning.

In Spain, teachers are often trained in technology by school-led programs. They also work together in groups to tackle issues and learn about new developments in technology. However, for the most part, they search independently for resources to use in class. Some schools use Moodle and other formalized educational resources as well. As for specific digital policies in schools, many teachers report certifications in ICT they are able to take, while others point to teacher workshops. There are, however, a few schools which do not seem to have any specific policies in place.

Turkey.

In Turkey, school values are general: respect others, respect the environment, be truthful, be kind, etc. Emphasis is placed on individuals working in a social world; each child is unique, and must learn in their formative years how to best work together with different people in harmony with nature. However, there are also some schools who are much more bent on academic success, expressing their desire to assure high-paying jobs for their students after graduation. This is, however, the

exception; truthfulness and respect are the key components of schools' values. Students are rewarded with positive feedback as well as physical rewards for adhering to school values. These values are integrated into regular academic lessons, which last about 40 minutes, but it is estimated that about 1 to 2 hours a week is spent specifically on prosocial behaviour instruction. Turkey's educational department also has myriad specific policies in place for overseeing, rewarding prosocial behaviour, and punishing antisocial behaviour (http://www.resmigazete.gov.tr/eskiler/2014/07/20140726-4.htm).

The two most important prosocial facets for academic achievement according to Turkish teachers are acting fairly and compassion in the face of suffering. The least important factor was being cooperative. A different pattern emerged for social integration, with generosity coming out as the top predictor, followed by compassion and concern about others' feelings. Understanding emotion in others was rated least important for social inclusion. Teachers reported that almost all children would benefit from lessons in these behaviours, and that direct instruction in these are relegated to the first through third grades, with the exception of religious curricula which also include moral instruction.

Turkish teachers report that play is frequently used in the classroom, particularly online interactive games and guessing games in groups. Only one teacher reported the inability to use games and play in their lesson plans. They are also enthusiastic about the development of new digital materials designed for children, as their experience using digital media in class has been positive. For a few teachers, their experience with technology does not extend beyond a projector. With parental help, some have also been able to use some additional software in class, over and above what is available for free online. Turkey also has a specific project in place called the "Faith Project" which aims to provide every student and teacher with a personal tablet with pre-installed educational tools and apps, so teachers are optimistic about including more digital media in the classroom in years to come. There is, however, some conflict regarding use of personal devices in class. While some teachers encourage it, others claim that it is against national regulations; however, these same teachers claim that they use their own smartphones in class, so these regulations seem tenuous at best.

Turkey also provides for the technological education of its teachers. Teachers are sent documents informing them of new digital media available for their use. They also use Facebook groups, Twitter, and eTwinning to keep up to date. There is also an official website for teachers and technology: http://www.eba.gov.tr. However, teachers are also keen to keep up to date with the latest advances in their profession on their own time via internet searches and journal articles.

FYROM

In FYROM schools, like their counterparts elsewhere on the continent, respect is emphasized as a school value. They are unique, however, in their mention of gender equality; tolerance is valued not just between ethnicities, but also between men and women. These values allow children to function better in the world outside of school, but also enable them to demonstrate cooperation and generosity to all classmates, regardless of gender or race. Schools organize eTwinning events, workshops for children, parents and teachers on gender equality, and different school-wide projects to encourage their values. Generally, these values are also integrated into regular academic lessons; in one school, this is actually a requirement. These lessons take approximately 40 minutes for the most part, and about 1 hour a week is dedicated to prosocial learning. There is little available in

terms of specific policies, but schools give support to teachers including these values into their lesson plans.

FYROM teachers rate cooperation as the most important facet of prosociality leading to academic achievement. Acting fairly is a close second, with being trusting rated third. Following society's expectations is rated as least important. In terms of social inclusion, fairness and generosity were rated as the most important prosocial facets, with cooperation following. Once more, society's expectations were rated as least important. All teachers reported that at least half, if not all, students would benefit from direct instruction in these prosocial habits. With the exception of one teacher, all teachers report that direct instruction is already available in schools, through the form of cultural lessons in language classes, learning units about kindness, and programs dedicated to promoting harmony between students.

All FYROM teachers reported use of games and play in teaching, with one teacher going so far as to say that they use play exclusively as a means of instruction. Most of these games are cooperation-heavy, and some are school-wide. In terms of digital games, teachers are positive. Their complaints are largely centred around school deficits, such as poor internet connectivity. Most software used in class is open source, although TolKid and GCompri are mentioned specifically. With one exception, FYROM teachers use either tablets or smartphones for their work, with smartphones being dominant; although no specific apps are mentioned, apps in general are popular. Teachers are divided, however, when it comes to students using their own personal devices. Phones are forbidden in the classroom at present, but FYROM has a program similar to Turkey's "Faith Project" called "Computer for each child", so teachers expect devices to become more common in time.

Like in Turkey, teachers in FYROM have regular meetings to discuss and learn about new platforms and media. Teaching and technology seminars are also available both on and offline. These resources are complemented by regular internet searches and free software. Unlike their counterparts elsewhere in Europe, FYROM teachers seem to take part in a variety of online communities and forums including Edmodo, DELTA, CELTA, and Facebook groups. It is also required by law that at least 30% of all teaching should be done with information technology. That said, there are still policies in place to protect children online (see http://www.educa.jcyl.es/ciberacoso/es/plan-prevencion-ciberacoso-navegacion-segura/fomento-buen-uso-medios-informaticos/codigos-civicos-buen-uso-medios-informaticos-centros-educat/uso-internet).

Greece.

As has been the case in most other countries thus far, Grecian schools place a heavy emphasis on respect for others, equality, and tolerance. Many schools report creating a contract of some kind between students and the school outlining these values together in order to ensure understanding. Teachers claim that these values help schools and classrooms function smoothly as a unit. Students learn to better understand others while developing positive social skills. The vast majority of schools have some kind of disciplinary program with a rewards system component for encouraging school values. However, many also incorporate these values into lesson plans in the form of large-scale projects, particularly when it comes to teaching diversity and tolerance. Many schools mentioned specific programs like "CreatingReaders" and the Comenius project as context conducive schemes undertaken to instruct these values, and some schools were able to reference specific policies (see http://livingvalueszante.weebly.com/uploads/2/5/3/2/25322058/chouliara_via.pdf) that dictate how to teach said values. Lessons tend to be between 30 to 60 minutes, with one or two hours a week spent specifically on these prosocial behaviours.

For the purpose of academic achievement, Grecian teachers report that cooperation is the most highly-rated value, followed closely by fairness. In terms of social inclusion, fairness came out as the top predictor, with cooperation taking second place. Following the expectations of society, as has been the trend across the board, was rated as least important for both academic achievement and social inclusion. All teachers reported that a minimum of 30% of their students would benefit from direct instruction in these prosocial behaviours, with most teachers saying that the majority of their students would benefit. Not only this, but the teachers and administration themselves are deeply concerned with the development of these attributes in their students. One group of teachers cited the "Living values in education" and "RED Ball" programs as direct initiatives taken by their school to address this need, while others cited DeBono hats, religious education, the Flexible Zone, and CreatingReaders programs. Schools in Greece appear to be extremely proactive when it comes to the development of prosociality.

All teachers surveyed in Greece reported using play to varying degrees in the classroom. Drama and roleplaying appear to be particularly popular learning tools. Teachers also use games to introduce their students to difficult concepts, then use different games as ways for them to practice what they have learned. They are also quick to acknowledge the cooperation and kindness inherent in play. Digital media are also used to a lesser degree, and for the most part, teachers report that they have to be approved by the Ministry of Education. Their experience with technology in the classroom has been largely positive, with only one teacher saying that they feel personal interaction is more important than mediation via a computer. They reported using online software provided by the IEP (Institute of educational policy), YouTube, projectors, astronomy software, and interactive whiteboards. The teachers that had not yet used digital media in the class reported being open to the possibility were it to present itself. Teachers report using laptops and tablets for note-taking, and projectors for putting textbooks on the board for children to see. Several teachers mentioned initiatives in their schools to create "digital classrooms" in which all students have access to portable computers. However, law prohibits children from bringing their own devices into the classroom (official directive No. 100553/Γ2/04-09-2012 ΥΠΑΙΘΠΑ).

Teachers in Greece are communal in their approach to keeping updated with technology in the classroom; nearly all teachers reported learning about new initiatives via administration and fellow teachers. They are also active in seminars and online learning communities. A few teachers mentioned specific websites like Facebook, academia.edu, LinkedIn and Twitter as ways they stay on top of digital advances. Interestingly, most teachers were unable to provide written documentation in regards to computer usage in the classroom. However, teachers from one school in particular were careful to point out that there is an ICT directive from the Ministry of Education (Y.A. 132831/Γ1/ 18.11.2011). Future developments in Greece therefore would have to fall under t

Appendix C - Contextual factors affecting prosocial learning

There are a large number of characteristics of individuals that are correlated with the core prosocial domains developed in the earlier sections. For instance, sex, class membership, age, cardinal position, attachment style, parenting style, teacher-student relationship, and finally traits such as temperament and personality can be thought of as playing a mediating or moderating role in children's prosocial learning.

The following sections develop some of these factors and present the questionnaires that can be used to measure such traits in order to make the prosocial games modelled to the individual children's needs. These questionnaires might be used for calibration purposes (relationship between stated traits and measured traits with the sensors) and/or might be included question by question within the games.

Temperament

What is temperament and how does it affect prosociality?

Temperament refers to *"constitutionally based individual differences in emotional reactivity and self-regulation"* (Rothbart & Sheese, 2007, pp.331). Temperament is thought to be rooted in the biological system and defined from early infancy (Goldsmith et al., 1987;Rothbart & Bates, 1998). **Temperament in 7-10 years old can be measured using a questionnaire developed by Rothbart: the Temperament in Middle Childhood Questionnaire (TMCQ)** (Simonds & Rothbart, 2005). The TMCQ is composed of 17 dimensions: **activation control** (e.g. 'can make him/herself smile at someone, even when s/he dislikes them'); **activation level** (e.g. 'likes to be physically active'); **affiliation** (e.g. 'is warm and friendly'); **anger/frustration** (e.g. 'gets mad when provoked by other children'); **assertiveness/dominance** (e.g. 'likes to be in charge'); **attention focusing** (e.g. 'needs to be told to pay attention'); **discomfort** (e.g. 'is quite upset by little cut or bruise'); **fantasy** (e.g. 'likes to make up stories'); **fear** (e.g. 'is afraid of fire'); **intensity pleasure** (e.g. 'likes exploring new places'); **impulsivity** (e.g. 'says the first thing that comes to mind'); **inhibitory control** (e.g. 'can stop when told to stop); **low intensity pleasure** (e.g. 'likes quiet reading time'); **perceptual sensitivity** (e.g. 'notices the sound of birds'); **sadness** (e.g. 'tends to become sad if plans don't work out'); **shyness** (e.g. 'is shy with new people'); and finally **soothability** (e.g. 'cheers up quickly').

Research has shown that **temperament may have a direct effect on social development**. For example, a child rating high on temperamental inhibition might tend to be socially withdrawn. Furthermore, when added together, temperament dimensions that would not have an effect on social behaviour on their own can add up to important consequences. For instance, scoring high on reactivity and poor on regulation would together contribute to the development of aggressive behaviour. However, no clear temperamental traits have been linked with better or poorer prosocial skills.

Temperament may also play an **indirect role on a child's social skills by acting on the environment**, such as for instance the response from other peers, teachers and family members. For instance, a cheerful sociable child is likely to experience more positive responses than a negative and reactive child who might elicit more punitive discipline, which in turn may increase risk for aggression. Another instance would be of a child with poor self-regulation skills and living in a hostile parenting environment. This child might show anti-social behaviour whereas not all children with poor self-regulation would. Mostly, research suggests that temperament in itself might not predict direct prosocial outcome; whereas the relationship with the environment may affect, for better of for

worse, children's prosociality. For example, children scoring highly on emotional negativity may be more adversely affected by poor parenting than those with less negative affect, but they may also benefit more from positive parenting.

This suggests that although measuring children's temperament to make the ProsocialLearn digital games more user oriented might help, more variables such as the environment needs to be taken into account. Moreover, unfortunately, no research has yet investigated the role of each specific component on prosocial behaviour.

How to measure temperament in childhood?

As mentioned formerly, temperament in 7-10 years old can be measured using a questionnaire developed by Rothbart: the Temperament in Middle Childhood Questionnaire (TMCQ) (Simonds & Rothbart, 2005). Because young children can have difficulties reporting their own behaviours due to poor self-awareness and vocabulary (Winne & Perry, 2000) parent reports about their child's behaviour are usually used in the literature. Although findings from the literature indicate that parents may not be objective in providing accurate answers to questionnaires regarding their children (Seifer et al. 1994), parent report is now commonly accepted as a measure of children's self-regulation (Rothbart, 1981).

See Appendix 1 for a detail of the TMCQ.

Personality

Definition and how does it affect prosociality

The basic structure of personality has been consented over the years to consist of five factors, which are referred to as the Big Five (e.g. John & Srivistava, 1999). These factors are (1) **extraversion** which refers to aspects such as activity, enthusiasm, assertiveness, and self-confidence; (2) **agreeableness** which reflects concern and sensitivity towards others and their needs; (3) **conscientiousness** which has to do with dependability, orderliness, precision, and the fulfilling of commitments; (4) **neuroticism** which pertains to a proneness to experience feelings of anxiety, depression, discontent, and anger; and (5) **intellect/openness** which is concerned with intellectual functioning, creativity, imagination, and social and cultural interest.

Individual differences in personality at an early age shape a child's life experiences and influence the way in which the child responds to the environment (Caspi, 1998). Evidence shows that personality may add to the predictive power of evaluations of children's developmental outcomes, such as their adjustment, delinquent behaviours, conduct disorders, and risk behaviours (Ehrler, Evans, & McGhee, 1999; Graziano & Ward, 1992; John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994). Moreover, personality has also been shown to be related to general intelligence (Chamorro-Premuzic & Furnham, 2005) as well as academic outcomes (Furnham, Chamorro-Premuzic, McDougall,2003). For instance, a large number of studies have found that academic outcomes, as well as general intelligence are related to Agreeableness and Conscientiousness (Busato, Prins, Elshout, & Hamaker, 2000; Musgrave-Marquart, Bromley, & Dalley, 1997; Paunonen & Ashton, 2001), as well as Openness (Paunonen & Ashton, 2001). Neuroticism has also been found to be positively related to performance in relatively non-stressful environment (ChamorroPremuzic, & Furnham, 2003; Kappe, & van der Flier., 2009).

Finally, personality has also been related to prosocial behaviour. Particularly, **agreeableness has been suggested to account for selfish vs. prosocial behaviour,** such as reflecting the differences in the motivation to cooperate vs acting selfishly in resource conflicts (Denissen & Penke, 2008).

Questionnaire to measure personality

A lot of questionnaires have been created to measure personality in children. However, they do not all measure all the facets of interest or the research supporting their use is scarce.

Two questionnaires however seem to be equally good to measure personality in childhood: the BFQ-C, or the Big Five Questionnaire for Children; and the ICID-s, or the Inventory for Child Individual differences.

Because only the BFQ-C is available in both English and Italian, we suggest the use of this one for this project. The BFQ-C measures the basic personality dimensions of energy/extraversion, agreeableness, conscientiousness, emotional instability, and intellect/openness in youths.

Attachment style

Definition and how does it affect prosociality

Attachment in children is defined as an emotional long - lasting bond that a child forms with an attachment figure (usually the mother) who is not interchangeable with another person (Ainsworth, 1989). In typical development, a child will at first wish to maintain proximity and contact with the attachment figure and will progressively become more detached and lean towards independence. All children are expected to form attachments, even if the care provided by that figure is less than ideal (Bowlby, 1969).

Attachment does vary in quality and there are 3 main types of attachment, some healthier than others: **Secure** (e.g. 'I usually believe that others who are close to me will not leave me'), **anxious** (e.g. 'I'm sometimes afraid that no one really loves me') and **avoidant** (e.g. 'I find it uncomfortable and get annoyed when someone tries to get too close to me').

Attachment can help give children an 'internal working model', or mental representation about the world (Bowlby 1973). These representations have been conceptualized as relationship rules that script how a child will view him/herself, the other (friends or family) and their view of the relationship. These scripts guide one's actions and beliefs about what to expect from the social world (Bretherton & Munholland, 2008). For example, children raised in a sensitive and responsive manner would have an internal representation of themselves as worthy of care.

Attachment therefore has a direct role on social behaviour. Research has shown that securely attached (preschool) children, compared to insecurely attached children, use better strategies to regulate negative emotions in a waiting paradigm (Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002). They also display emotions more openly (Lutkenhaus, Grossmann, & Grossmann, 1985), show more positive affect with peers (Park & Waters, 1989 ; Sroufe, Schork, Motti, Lawroski, & LaFreniere, 1984), and have better understanding of emotions (Laible & Thompson, 1998). Additional research on middle school children showed that more securely attached children exhibit more positive mood, use more constructive coping strategies, and show better emotional adaptation in classrooms (Granot & Mayseless, 2001 ; Kerns, Abraham, Schlegelmilch, & Morgan, 2007; Sroufe, Egeland, & Carlson, 1999). Taken together, these results show that attachment can have a strong impact on children's social behaviour.

Moreover, studies have shown that attachment security is also linked to children's peer relationships. For example, **securely attached children are more socially competent** (Booth-LaForce & Kerns, 2008), have a better friendship quality (Kerns, 2008), and might be more popular (Bohlin et

al., 2000), although popularity has not been consistently been associated with attachment (Lieberman et al., 1999).

These studies show that attachment can play a role in children's prosocial development, and that secure attachment is positively linked with prosocial behaviour.

Questionnaire to measure attachment

The Attachment Style Classification Questionnaire for Latency Age Children (Finzi-Dottan, 2012) can be used to measure attachment style in 7-10 year olds.

Demographics

Age

Recent studies have found that even young preschoolers behave altruistically in simple economic games, and their altruistic behaviour increases consistently from preschool years to early school age (Blake & Rand, 2010; Benenson, Pascoe, & Radmore, 2007; Fehr, Bernhard, & Rockenbach, 2008). However, although age is having an impact in terms of preschool vs middle school vs adolescence vs adults**, no age effect is thought to occur in the 7-10 age group.**

Gender

Theory would predict that boys and girls differ in prosocial activities, as they do in many personality and social characteristics. However, **in the majority of studies, no consistent gender differences have been found** (e.g. Bar-Tal et al., 1982; Dunn & Munn, 1986; Yarrow & Waxier, 1976). It is suggested that because many more parameters such as the environment play a larger role, gender effect is somewhat diluted in this. For instance, some research found an effect of gender on prosociality among siblings (Summers, 1987), where girls were seen as more altruistic. However, these results might be artificial, due to the gender-role stereotype that females are more altruistic than males, and that girls are usually viewed as more prosocial than boys by peers and teachers (Berman, 1980; Block, 1973; Shigetomi, Hartmann, & Gelfand, 1981). Moreover, some observational instruments using characteristic related to girls to measure prosociality (such as 'comforting a younger child') might also explain why girls could potentially be seen as more prosocial. The work done on adults in laboratory settings (without the use of questionnaire) support this hypothesis where adult males have actually been found to be more helpful than females (Eagly & Crowley, 1986), particularly when measuring such things as 'helping to change a tire' or 'picking up a hitchhiker'. In contrast, adult females have been found more prosocial when the situation measured involved giving psychological assistance and helping friends and acquaintances.

In summary, it seems that even in childhood, **there is no clear and consistent evidence of gender differences in prosocial behaviour.** The only **difference would be in what type of prosocial behaviour is measured.** For instance, girls are more likely to help and nurture others as society seems to favour this kind of behaviour to girls; while boys are more likely to be reinforced for helping behaviours that involve some risk or involve helping females.

Income: SES

Family socioeconomic status does not seem to have any reliable and consistent effect on children's prosocial behaviour. Some studies have found no influence of social class differences on helping, sharing, or cooperative behaviours (DePalma, 1974; Nelson & Madsen, 1969). Other studies however found differences with high SES children being more prosocial (Berkowitz, 1968; Payne, 1980; Raviv & Bar- Tal, 1981) or actually showing that children from family with low socioeconomic status are

more prosocial (Friedrich & Stein, 1973; Knight & Kagan, 1977). It has been suggested that the reason for the inconsistent findings is due to the large range of prosocial behaviour as well as the influence of other factors such as the environment. Mainly, research supports the fact that individuals with low SES tend to give more (Piff, Kraus, Côté, Cheng, Keltner, 2010); although this result is more inconsistent in children. For instance, a Chinese study with children (Rochat and Dias) showed that low SES children donated more sweets and stickers to others compared to higher SES children. Benenson et al (2007) however conducted a study in the UK and found that children aged nine from higher socioeconomic status (SES) environments in England behaved more altruistically than those from lower SES contexts in the dictator game.

Moreover, a recent meta-analysis showed that l**ow SES was associated with more anti-social behaviour** (Piotrowska, Stride, Croft & Rowe, 2015), although they warned that the results obtained from the various studies may have depended on the antisocial subtype under investigation and the design of the study.

Culture

Cultural values can play a role in prosociality. Two main types of culture have been described: individualistic cultures, which value independence, competition, achievement and self interest; and collectivist cultures which value mutual interdependence, loyalty and group membership. For instance, the UK and the US are seen as individualistic, whereas Kenya or Mexico are seen as collectivist. Research has shown that individualist cultures raise less helpful, co-operative children due to need to compete in later life (capitalism). However, research has also demonstrated that both types of cultures might actually be equally prosocial, and that it is the reason behind prosociality that might differ. For instance, individualist culture might feel motivated by personal rewards (such as feeling good about oneself), whereas collectivist cultures might feel motivated by continued survival of group and possible reciprocation. Moreover, another problem of conducting research with different cultures is to deal with differences in languages and social norms, so cross-cultural research is still one step behind what is needed.

To summarise**, and although culture might play a role, more research is needed to confirm which role it exactly plays. Moreover, the cultural values in the different countries of the European Union are quite similar (in terms of Western culture) so we do not expect to see any major cultural effect.**

Family

Research on the relationship between family size and/or ordinal position and prosocial behaviour has been very inconsistent.

First regarding family size, no clear-cut results exist. Indeed, while some researchers found that family size and sharing behaviour are unrelated (Dreman & Greenbaum, 1973; Gelfand et al., 1975; Handlon & Gross, 1959). Some other studies found that small family size is positively associated with helping behaviour (Staub, 1971a,b) and that growing up in a large family may encourage generosity (Benson et al., 1980; Ribal, 1963; Sawyer, 1966; Ugurel-Semin, 1952) and sharing (Dreman & Greenbaum, 1973).

Second regarding the influence of ordinal position on prosociality, the review of the literature yields again inconsistent results. For instance, one study showed that second borns were more altruistic than firstborns (Raviv, Bar-Tal, Ayalon, & Raviv, 1980); while another study conducted with another sample (American instead of Israeli families) found that firstborn or older siblings were actually more likely than middle or younger children to help in a situation of distress and to donate generously

(Staub, 1971b). One consistent finding is however that **only-children or children being the youngest in a family tend to be more egoistic than others, and offer less help and support to peers** (Whiting & Whiting, 1975).

Therefore, although for research purpose it might be interesting to get data on the family size or cardinal position, it might not get any influence on prosocial learning, apart from maybe training only-children and youngest of a family to be more prosocial.

Characteristics of the beneficiary

Although a very small amount of research has been conducted with children on such parameter, the research with adults seems interesting to design games that will make prosocial learning better for children. A variety of characteristics of the potential recipient might indeed affect children's helping or sharing behaviour such as the recipient's needs, gender, relationship to the child, and demographic and social characteristics.

Research has shown that adults consider the characteristics of the potential beneficiary when making the decision whether or not to assist someone. They are for instance more likely to assist friends than strangers and helpless people than people considered as undeserving (Berkowitz & Daniels, 1963; Schopler & Matthews, 1965).

The situation where the prosocial behaviour takes place also can have an influence. A large amount of research shows that an adult is more likely to help someone in distress if the adult is unaccompanied (rather than in a group) (Latane & Nida, 1981). It has been hypothesised that the failure to help in a group situation may be due to fear of negative evaluation by others if the person misunderstands the situation and offers help unnecessarily for example. The person might think that if there really is something wrong, the others in the group should have helped. Research conducted in children shows a far murkier picture. For instance, one study found that young children were more likely to assist someone in distress if they were with a peer, whereas older children helped regardless of the group situation. The authors suggested that the presence of a peer might have reduced young children's fears and inhibitions and thus increased their helping; whereas older children may be inhibited by their concern about the peer's evaluation, like it is the case in adults (Staub, 1970). In another study, however, children who were with a peer helped more than did those who were not with a peer, irrespective of their age (Peterson, 1983). The difference in the findings of these two studies may have been due to the difference in the experimental setting as in the second study, the pair (helper – group) were separated by a screen and could not easily communicate with each other which may have reduced children's concerned with the peer's approval (Peterson, 1983).

In summary, **it might be a good idea to create a digital game where the children can help in different group settings (they know the person or not; they are in a group or not etc.) and to focus on where the children have difficulties for the rest of the digital games.**

Summary of the Contextual Factors affecting prosocial learning

Table 7 summarises the findings from the Contextual Factors that might influence prosocial learning. **Generally, research findings have been very inconsistent so it might be difficult to create a personal profile for each child playing the games. However, if such questionnaires are implemented, then this will be valuable data for research purpose as the literature is in need for such data.** We suggest that researchers could measure any or all the variables listed below when collecting the data to show the impact of the digital games in prosocial learning as such data will be immensely valuable for the research sphere on prosociality. However, for time constraint reason, we

understand this might not be possible. Indeed, teachers and children will already have a lot of activities to do related to this project and we do not want to over load them with questionnaires that might not be relevant.

Therefore, we suggest that some of the questions within each questionnaire could be implemented within the video games to learn more about the children's trait. For instance, asking the children 'I like to compete with others' (response with a Likert scale) after a competitive game. This item is part of the personality questionnaire so with more questions fitting each games/situation, we could have all a large part of our questionnaire answered. Moreover, these questions could be used to calibrate sensors between stated and observed measures. Indeed, sensors would give information about observed measured (smiling , frowning etc.) that we could use to compare with the children's answer on these questions ('I usually get angry' from the personality questionnaire vs sensors measuring angry expression).

Table 7: summary of the contextual factors

Variables	Effect on Prosociality	For research purpose
Temperament	Inconsistent	YES
Personality	Agreeableness	YES
Attachment Style	Secure attachment	YES
Age	Not in 7-10 age group	Maybe
Gender	Inconsistent	YES
SES	Inconsistent (low SES more generous but also more behavioural problems)	YES
Culture	Not within Europe	YES
Family	Inconsistent	YES: Family size and cardinal position
Beneficiary	Yes: children should help different groups	YES