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The Application of Persuasive Technology to educational settings: Some theoretical from the HANDS Project

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Abstract. In the HANDS project Persuasive Technology is applied in an educational context in special schools for children with autism, in which social skills development is the aim of the persuasion. We consider how in such educational settings the interventions can be theorized in the context of existing educational paradigms.
We discuss the relation between such paradigms and persuasive technology, and the specific case of persuasion in the pedagogical context of children with autism.

Keywords: education, educational settings, credibility, kairos.

1 Introducing the HANDS Project

The HANDS (Helping Autism Diagnosed young people Navigate and Develop Socially) (HANDS 2008) project is a multi-disciplinary project which has developed a mobile software solution, based on persuasive technology to help young people (aged 11 to 16) with high-functioning ASD (autistic spectrum disorders) to become better integrated into society by supporting them to develop their social skills and self management skills. The project is financed by the European Commission FP7 program, as part of the Accessible and Inclusive ICT section of the framework. It runs from May 2008 to May 2011.

There are potential arguments in favour of using persuasive technology, including mobile persuasive technology, in educational contexts in general and specifically with children with ASD. This is especially the case when the educational objective is social skills development. This paper will explore and illuminate the potential benefits of persuasive technology in educational contexts, based on our initial experiences with designing and implementing such software in the HANDS project. One key issue identified in the course of the project is that dealing with innovation in the classroom is a huge challenge for teachers, and clearly for such technology to be considered positively for adoption by teachers, they need to know the answer to this question: how do mobile ICT tools based on Persuasive Technology relate to and potentially support (or augment) current paradigms of teaching and learning and related strategies.

A rigorous multi-modal programme of evaluation is a feature of the HANDS project, but at this stage, detailed data is not yet available for reporting. In this mainly theoretical paper, we consider emerging themes and issues within the project, Such themes will be expanded upon in greater detail in due course when data is available, and will be the subject of later empirical papers.

2 Paradigms of Learning and Teaching – where does Persuasive Technology fit?

The literature on professional thinking (Schön 1983) and on teacher thinking in particular (Brown and Macintyre 1994, Nias 1989, Calderhead 1991) indicates that at least to some extent the decisions that teachers make in the classroom about what particular teaching strategy or activity to adopt, are influenced by particular paradigms of teaching and learning extant in the minds of teachers.

Paradigms of teaching explain how education should be conceptualised, how different tools or methods can be used and give suggestions for good practice. Yet the teacher's behaviour in a classroom is not determined by a paradigm alone, as Donald Schön points out in his discussion of “reflection in action”, the link between theory and practice is a complex one. Thus theory may influence teachers explicitly (for example through theoretical structures adopted during initial training or subsequent professional development), or implicitly where its influence on structures and discourses within educational systems is reflected in teacher practice. Further, the literature on the introduction of innovation in the classroom (for example Hennessy et al (2003) and Sandholz et al (1997)), indicates that encountering new technology requires teachers consider how they will assimilate the innovation in to their practice, and thus in to the existing paradigms of teaching and learning that influence that practice.

Thus the paradigms of teaching and learning that are extant in any particular classroom, and the extent to which innovations do or not fit in to the existing paradigm(s) are a key factor in determining the overall trajectory of innovation introductions in that classroom. Typically in western educational discourse, the following paradigms can be identified: behaviourism (Skinner 1974), constructivism (Kogan 1987), socio-cultural theory (Vygotsky 1980), and cognitive and humanistic psychologies (Egan 2002).

2.1 Persuasive Technology Design and Educational Contexts

Persuasive Technology resides outside of a defining social context and research and empirical research have paid attention to persuasive effects rather than studying and using the social context. Harri Oinas-Kukkonen(Oinas-Kukkonen 2008) argues that 3 types of persuasion can be identified. Human-Human Persuasion, Computer-Human persuasion and Human-Computer mediated-Human persuasion. The relationship between these types of persuasion depends on an analysis of the concrete social context. This is often lacking in considerations of persuasive technology design. For example, David Lockton gives a well argued but essentially abstracted account of "design instructions" in "Design with Intent" (Lockton et al 2009). The social context is referred to as one parameter in the design consideration, but is not explicitly conceptualized.

In an educational context the social context is crucial, and defines important properties of the persuasion. First of all Computer-Human persuasion is initiated by humans (i.e. teachers) and orchestrated by human-human persuasion and does not reside outside the social context. Rather the influence of the social context is often formalised in education plans developed in advance by teachers

Furthermore the persuasion takes place in a power-relation, or as Harri Oinas-Kukkonen (2008) states it: "Information is not neutral". Motivation is not only an internal state of mind but also a question of understanding what correct behaviour is, which is largely defined by the social context created by the teacher.

Finally the educational context is one in which there exist explicitly expressed educational goals. A variety of approaches and tools, often based on different educational paradigms, may be used by the teacher in pursuit of these goals. The right type of persuasion could be Computer-Human and it could not.

Thus Issues of social context, power relations, and the combination of different pedagogical tools potentially including persuasive technology need, therefore, to be considered when applying persuasive technology design to educational contexts.

2.2 Persuasive Technology in the Classroom

The introduction of this "new" technology in the classroom introduces new opportunities for education. As indicated, if teachers encountering persuasive technology as a new tool in the classroom are to effectively assimilate it, it is necessary to consider how it relates to existing educational paradigms and how it may offer something innovative to teachers.

There is a relatively limited discussion in the literature on the relationship between typical paradigms of teaching and learning, and the model of learning that is represented in the use of persuasive technology. This is partly due to the "fuzzy boundaries" (Fogg 2003) of persuasive technology – i.e. its basis in a number of different theoretical positions drawn from aspects of social psychology.

Alexander et al (2002) identify an emphasis on credibility as a key aspect that identifies "persuasion" as a distinct educational approach. The credibility of particular texts and educational tools, and the resulting emotional influence of these on particular students is emphasized. Murphy (2001) similarly argues that individual student beliefs and interest in a particular topic or text are, when persuasion is used as a model in teaching, important considerations in determining if learning does or does not take place. Murphy quotes Petty and Cacioppo's (1986) model of persuasion, in which they propose that affective and motivational factors are in fact key in determining depth of learning. Again, Murphy stresses the importance of affective aspects in persuasion as teaching, giving the example of teaching about AIDS being more effective if the teacher gave a personal account of a friend's experience of the disease, rather than charts and tables of statistics.

Alexander et al (2002) consider persuasion in relation to socio-cultural or Vygotskian theories of learning. Whilst not identifying any actual points of conflict, they do identify a difference in emphasis. They posit that socio-cultural approaches, with their emphasis on the social process of learning, do not give enough weight to the quality (i.e. credibility) of the texts, evidence or tools that are employed. They argue further that the emphasis on group social processes in learning in Vygotskian theory underplays the role of individual emotional and cognitive preferences in determining the outcome of the learning process. Considerations of credibility related to the alternative paradigms have we not notified. And Credibility is crucial when technology has the role of being the persuader and the development of

credibility should be integrated in the overall pedagogical strategy. The credibility means power to influence and technology does not have that property by nature.

Persuasive Technology's polygot roots mean that its relationship to dominant theories of learning is complex. Clearly, aspects of typical application in persuasive technology, such as the use of rewards, have clear synergy with behaviourism. Indeed, many teachers, in fact, do not use reward systems in their classrooms precisely because they see them as rooted in naive behaviourism (Hall 2009). However, as Alexander et al and Murphy illustrate, persuasion and persuasive technology are much more than applications of naive behaviourism. However, it is difficult to locate persuasive technology in a radical constructivist model of learning. The focus in persuasive technology on meta-designer, and designer, and its typical orientation towards clearly defined goals, does seem to be in conflict with a constructivist approach. Thus we can potentially question whether teachers aligned to "child centred learning", who are predominantly influenced by a constructivist paradigm of learning, would be easily able to assimilate the use of persuasive technology in their classrooms.

The most dominant paradigm in western educational systems in the last twenty years has been socio-cultural theory (or social constructivism) – so it is particularly of interest to consider how this approach relates to persuasion. Alexander et all draw a sharp distinction between Vygotskian approaches and persuasion. However, typical applications of persuasive technology – for example the use of social actors, of varied media, an emphasis on debate and evaluating different viewpoints do have significant resonance with a socio-cultural approach. Thus persuasive technology tools such as tailoring, tunnelling and reduction have significant overlap with the metaphor of "scaffolding", used as the perhaps dominant motif in socio cultural approaches to learning; the area of commonality focusing on offering assistance to the learner to allow them to achieve a higher outcome than they would do unaided. However, as Alexander et al point out, thinking of teaching as persuasion gives greater prominence to credibility as a factor in determining learning outcomes. We can posit that teacher credibility is an integral part of the way on which teachers typically exert authority and influence in the classroom (i.e. any teacher that is in any way effective in developing learning must have some degree of credibility with their students), however it is rare for teachers to think about issues of credibility explicitly. Persuasive technology, in its consideration of the strength of individual teaching instructions, topics and texts in terms of their credibility, and how such credibility can be differentially received by students depending on their existing beliefs and motivational state, does potentially offer something new and of value to teachers. However, whilst there is a difference, there is no clear line of conflict between persuasive technology and the socio-cultural paradigm of learning.

Another important concept which Persuasive Technology potentially introduces in to educational discourse is the notion of Kairos –, including the emphasis on providing interventions at the right time. Although there is clearly an implicit understanding by teachers that certain times are propitious for some interventions and certain times are not, the notion of Kairos it is not found as an explicit concept in educational discourse. In the context of the use of mobile technology in classroom contexts in particular, the idea of Kairos is key in considering how such technologies can be used effectively, and again is a concept that may be of valued to teachers

Within the HANDS project to date, our initial observations focus on the use of strategies rather than the underlying educational paradigm, at least in the first instance. The range of strategies identified, and their positioning, in theoretical terms, between existing educational paradigms, and persuasive technology, are show in Figure 1. Scaffolding and the use of rewards have been observed in the initial stages of the HANDS project as having the potential to be utilised in the context of persuasive technology implementation. Initial analysis indicates that scaffolding may have particular potential for being effective in developing learning in relation to social skills. This will be reported on more fully in a future paper.

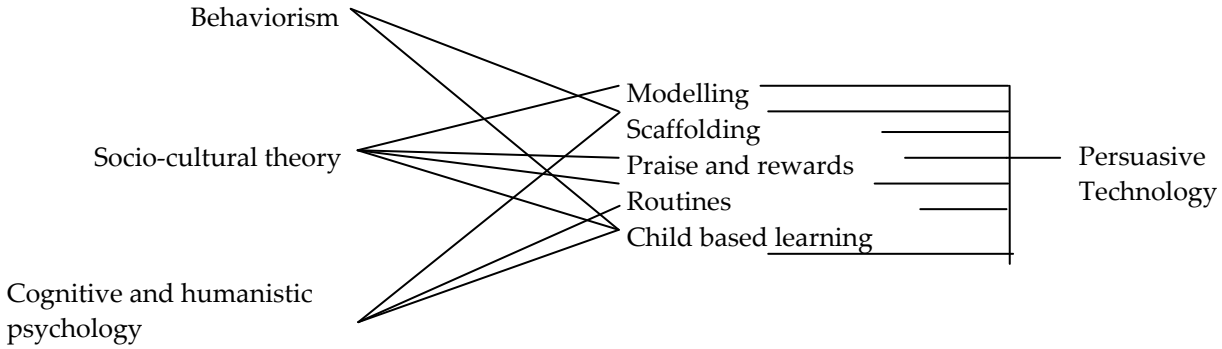

Figure 1: General pedagogical strategies and their support in different pedagogical paradigms that can be supported by Persuasive Technology.

4 Conclusion

In this paper we have argued that it possible to frame persuasive technology in the context of paradigms of learning extant in educational discourse. Areas of synergy in both theoretical and practical pedagogic terms can be identified, such as between persuasive technology and the common metaphor of scaffolding derived from the socio-cultural paradigm. Thus persuasive technology has the potential to be assimilated in to the existing classroom pedagogy.

We also considered where persuasive technology can offer something innovative for teachers. We argue that the concepts of credibility and Kairos, central to persuasive technology design, are either absent or only weakly implicit in existing educational discourse – they are not concepts that teachers typically make explicit use of. Yet the persuasive technology literature indicates their potential power in bringing about behaviour change. Clearly further detailed data from the HANDS project will better illuminate the possibilities, but we proposed that persuasive technology can offer something new and useful to the classroom and to teachers.

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