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Persuasive Design in Teaching and Learning

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ABSTRACT

The EuroPLOT project (2010-2013) has developed Persuasive Learning and Technologies (PLOTs) and has evaluated them in four real-world case studies, which cover the widely different teaching scenarios of university education, adult learning in industry, informal learning at a museum, literature studies, and language learning. At the International Workshop of EuroPLOT Persuasive Technology for Learning, Education and Teaching (IWEPLET 2013), the results of the project were presented, and an overview of related research was given. One of the main conclusions of EuroPLOT has been that the specific learning context has to be considered when applying persuasive designs. At IWEPLET 2013, both the theoretical background as well as evaluations of persuasive technology demonstrations were presented. This paper provides an overview of these presentations.

Keywords: Case Studies, Learning Objects, Persuasive Design, Persuasive Technology, Technology-Enhanced Learning

INTRODUCTION

The concept of *Persuasive Technology* (PT) is based on the idea that through technology, the behaviour and attitudes of people can be influenced resp. changed through conscious implementation of *Persuasive Design* concepts. This has been introduced by BJ Fogg (1998) and has been further expanded in his seminal work (Fogg, 2003), in which he identifies three roles which a computer can play in Persuasive Design: Tools, Media, and Social Actors (ibid., pp. 23 and following). The following core types of Persuasive Tools are identified (Chapter 3):

1. Reduction,
2. Tunnelling,

3. Tailoring,
4. Suggestion,
5. Self-Monitoring,
6. Surveillance,
7. Conditioning.

These types of persuasive tools may be said to represent important principles in persuasive theory for influencing a person's behaviour or attitude. This holds in general, and particularly in learning contexts. Already early on, the ethical concerns regarding this approach have been voiced (e.g. Berdichevsky, 1999), and further use of these persuasive principles did proceed under considerations of these concerns (Verbeck, 2006).

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In the domain of learning, persuasion in general has been applied by “good” and effective teachers throughout history. The advent of technology-enhanced learning has then prompted research into how the *persuasive design* principles could be harnessed for making machine-guided learning more effective and persuasive. In 2010, the EuroPLOT consortium was formed to investigate how persuasive technology could be used in learning and teaching by developing and evaluating Persuasive Learning Objects and Technologies (PLOTs) in four different real-world case studies. These included a wide variety of learning contexts, scenarios, and styles, which demonstrated in an exemplary manner the possible application of these technologies in learning and teaching. The concluding event for this project was the *International Workshop on EuroPLOT Persuasive Technologies for Learning, Education, and Teaching* (IWEPLET) and it took place in Paphos (Cyprus), co-hosted with the EC-TEL 2013 conference. At this event, the results from the EuroPLOT project were presented, as well as research that goes beyond its original scope (Behringer and Sinclair, 2013). The following sections provide an overview of the papers presented at IWEPLET 2013. A few of these authors have contributed here in this Special Issue with extended papers about related research, showing novel aspects that go beyond their IWEPLET publications.

Theroretical Considerations

The challenge to define a fundamental framework of Persuasive Technology has been taken up by Wiafe (2013) in his concept of a Unified Framework for Analysis, Design and Evaluation, based on relationships between attitude and behavior models. Tørning (2013) did provide a literature survey and review of several persuasive design models specifically for technology-enhanced learning. One of the main conclusions of the EuroPLOT project was that one cannot simply add persuasive design elements in the design of learning objects and expect that these would then be “persuasive” (Gram-Hansen, 2012). Instead, one needs to

consider the specific context of the learning situation and then exercise judicious care in applying the persuasive design that is appropriate for this context (Gram-Hansen, 2013). This has been applied in the concept of immersive layers design with geographical, temporal, and conceptual layers (Grund-Sørensen, 2013a), primarily in an application for literature studies, and secondarily in an application for informal learning in a museum context.

THE EURO PLOT CASE STUDIES

In the EuroPLOT project (2010-2013), two tools have been developed for creating learning objects which are based on persuasive principles: the PLOTMaker tool is a further development from GLOMaker and allows the creation of learning objects through a graphical interface (Smith and Chinnici, 2013). Three case studies have used this tool to develop persuasive learning objects.

In an industrial context, employees often need training in how to implement and handle new regulatory demands. This is especially important in the case of using chemical substances which may be harmful. The case study about Chemical Handling (Winther-Nielsen & De Rosa Carstensen, 2013) has developed learning objects which teach health and safety aspects, employing the persuasive design elements of tailoring and simulation.

For academic business computing at the undergraduate level, persuasive learning objects have been developed to teach basic SQL (Soosay & Mikulecká, 2013). The goal of this case study is to demonstrate the applicability of this approach in two different countries and languages (English in UK, Czech in Czech Republic), employing the persuasive principles of reduction and interactivity.

Informal learning in the context of literature studies and a museum context has been examined in relation to the presentation of the presentation of the life and work of the Danish playwright, pastor and poet, Kaj Munk (Grund-Sørensen, Gram-Hansen, & Øhrstrøm, 2013).

Here, Augmented Reality allows the learner to visit the museum virtually on a mobile device, using location-based technology (Bech, 2013). Furthermore, the works of Kaj Munk can be explored with the Kaj Munk Study Edition desktop application which allows annotated browsing and retrieval of large corpus texts through the architectural underpinning of the Emdros text database engine (Sandborg-Petersen, 2013).

The Emdros database is also at the core of the other technology, developed in EuroPLOT: The PLOTLearner system is designed to teach language by browsing large language text collections (Winther-Nielsen, 2013a). In EuroPLOT, this has been evaluated in teaching the Ancient Hebrew language of the Hebrew Bible (Winther-Nielsen, 2013b).

The evaluation of these case studies has revealed an overall positive attitude of the learners towards their learning experience in these case studies (Herber, 2013). Weaker points have included a lack of self-monitoring and suggestion. Furthermore, learners in some cases were not aware of the various feedback options which were provided by the learning objects. Based on this evaluation, recommendations will be provided in the final report of EuroPLOT.

Further Outlook

Going beyond the scope of the EuroPLOT project, several papers at IWEPLET 2013 presented approaches of new concepts in which persuasive designs have been implemented. Mobile Learning has been explored by Gram-Hansen, Kristensen, and Gram-Hansen (2013) in the context of school children. The use of robotic dolls can help Autism therapy and education, as shown by Bertel and Rasmussen (2013). Important is also the measurement of assessment: Gottschalk and Winther-Nielsen (2013) have applied learning theory in data mining of students' learning success. And Brangier and Desmarais (2013) have examined two persuasion grids for the evaluation of motivation and persuasion. The Conceptual Pond by Grund-Sørensen (2013b) provides a simple way of collecting qualitative user feedback.

CONCLUSION

The EuroPLOT project has successfully demonstrated and evaluated the exemplary use of persuasive technology in a wide variety of learning scenarios. Further work is needed to provide a more rigid evaluation against other more traditional learning methods and to establish how persuasive technology can be used successfully in teaching contexts.

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REFERENCES

- Bech, C. J. (2013). Augmented reality in persuasive learning: The Kaj Munk case (pp. 127-134). In Behringer and Sinclair (Eds.).
- Behringer, R., & Sinclair, G. (Eds.). (2013). *International Workshop on EuroPLOT Persuasive Technology for Learning, Education, and Teaching (IWEPLET 2013)*, Paphos, Cyprus. ISBN 978-1-291-47628-6.
- Berdichevsky, D., & Neuenschwander, E. (1999). Toward an ethics of persuasive technology. *Communications of the ACM*, 42(5), 51-58. doi:10.1145/301353.301410
- Bertel, L. B., & Rasmussen, D. M. (2013). PEERs at play: A case study on persuasive educational and entertainment robotics in autism therapy and education (pp. 161-168). In Behringer and Sinclair (Eds.).
- Brangier, M., & Desmarais, M. (2013). A set of criteria to access motivation and persuasion of e-learning applications (pp. 117-124). In Behringer and Sinclair (Eds.).
- EuroPLOT. (2010). *Persuasive learning objects and technologies*. Retrieved October 28, 2013, from <http://www.eplot.eu>
- Fogg, B. J. (1998). Persuasive computers, perspectives and research directions. In *CHI 1998*. Los Angeles, CA: ACM Press.

- Fogg, B. J. (2003). *Persuasive technology - Using computers to change what we think and do*. San Francisco, CA: Morgan Kaufmann Publishers.
- Gottschalk, J., & Winther-Nielsen, N. (2013). Persuasive skill development: On computational surveillance strategies for modeling learning statistics with PLOTLearner (pp. 71-77). In Behringer and Sinclair (Eds.).
- Gram-Hansen, S. B. (2012). *Persuasive learning designs*. Deliverable D3.3 of the EuroPLOT project.
- Gram-Hansen, S. B. (2013). Persuasive design - A matter of context adaptation (pp. 71-77)? In Behringer and Sinclair (Eds.).
- Gram-Hansen, S. B., Kristensen, D. K., & Gram-Hansen, L. B. (2013). In Behringer and Sinclair (Eds.). (pp. 153-160).
- Grund-Sørensen, C. (2013a). Immersive layers design exploring culture through a persuasive multimodal interface (pp. 91-98). In Behringer and Sinclair (Eds.).
- Grund-Sørensen, C. (2013b). Intuitive surveying & quantification of qualitative input through the conceptual pond (pp. 135-142). In Behringer & Sinclair (Eds.).
- Grund-Sørensen, C., Gram-Hansen, S. B., & Øhrstrøm, P. (2013). Kaj Munk: Using persuasive learning (pp. 45-52). In Behringer and Sinclair (Eds.).
- Herber, E. (2013). Designing the persuasive learning experience (pp. 61-65). In Behringer and Sinclair (Eds.).
- Sandborg-Petersen, U. (2013). Architecture of applications built on Emdros: Case studies in systems for persuasive learning (pp. 143-150). In Behringer and Sinclair (Eds.).
- Smith, C., & Chinnici, V. (2013). PLOTMaker—Persuasive learning design through context engineering. In Behringer and Sinclair (eds., 2013), (pp. 9-20).
- Soosay, M., & Mikulecká (2013). *Applying persuasive principles to influence students in adopting deeper learning approaches* (pp. 37-44). In Behringer and Sinclair (Eds.).
- Tørning, K. (2013). Persuasive design of TEL: Models and challenges (pp. 79-89). In Behringer and Sinclair (Eds.).
- Verbeek, P.-P. (2006). Persuasive technology and moral responsibility: Toward an ethical framework for persuasive technologies. In Persuasive 06.
- Wiafe, I. (2013). A unified framework for analysing, designing and evaluating persuasive multimodal interface (pp. 99-106). In Behringer and Sinclair (Eds.).
- Winther-Nielsen, M., & De Rosa Carstensen, I. (2013). Chemical handling—PLOTMaker for training in exposure scenarios under REACH (pp. 29-36). In Behringer and Sinclair (Eds.).
- Winther-Nielsen, N. (2013a). PLOTLearner as persuasive technology: Tool, simulation and virtual world for language learning (pp. 21-28). In Behringer and Sinclair (Eds.).
- Winther-Nielsen, N. (2013b). PLOTLearner for a corpus of the Hebrew Bible: the case for repurposing in language learning (pp. 53-60). In Behringer and Sinclair (Eds.).

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Peter Øhrstrøm is Professor of Information Science at Aalborg University, Denmark. He obtained a PhD in 1980 in history of ideas from Aarhus University, Denmark, and a D.Sc. in 1988 in history and philosophy of science - also from Aarhus University. In his research he has mainly focused on topics in information science and in science in general related to the ideas of time, logic and ethics. He is the leader of the elite study of Persuasive Design at Aalborg University.