The Design and Evaluation of the Persuasiveness of e-Learning Interfaces

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ABSTRACT

This study addresses the general goal of designing more engaging e-learning applications through persuasive technology. The authors present and discuss two potential approaches to the design persuasive e-learning applications that differ in terms of comprehensiveness and ease of application. The more straightforward approach based on Fogg is considered for designers who may not have the time or background to invest large efforts to analyze and understand how the principles of persuasive technology can be deployed. The Oinas-Kukkonen and Harjumaa (2009) approach is presented as a different approach that does require such investment. The design approaches are complemented with a persuasive assessment grid that can be used as an inspection instrument, akin to usability inspections as found in the field of human-computer interaction. The intent is that this instrument can complement the design process by giving early feedback on issues to address. The authors report an experiment where the inspection instrument is applied to an existing e-learning application. The actual data on how students used it provides feedback on how effective the persuasive grid is for detecting issues. The results show that the application scores low on most criteria, and the usage patterns generally confirm this assessment. However, the authors also find that some students were persuaded to engage more thoroughly to use the system and conclude that large individual differences affects the factors of influence and should lead the designers of e-learning application to consider different means in the design of persuasive technology.

Keywords: Applications, E-Learning, Heuristic Inspection, Persuasive Criteria, Persuasive Technology

INTRODUCTION

Persuasive technology (PT) nowadays spans across all domains of Human-Computer Interaction where some form of social influence is involved (Consolvo, Everitt, Smith, & Landay, 2006; Adams et al., 2009). For example, we can mention electronic commerce (influence the user to purchase), e-learning (entice the user to engage in effective means to enhance skills and knowledge), security (bring users to adopt safe behaviours); health (reduce and stop...
cigarette smoking), ecology (raise awareness of pollution and sustainable practices), management (influence people to optimise their family budget management), social life (foster community involvement).

Whilst the stakes are important in all these domains, we focus on the learning domain and note that on-line learners are particularly prone to dropping out of a learning process, and suffer from lack of support when faced with failures and obstacles. Means to design more engaging learning environments appear therefore of great importance.

The objective of this paper is threefold:

- Provide a theoretical framework for the design of persuasive e-learning technology.
- Motivate and provide a criteria grid to assess the persuasiveness of an e-learning interface; we demonstrate how the proposed criteria grid can be used as an interface inspection tool to assess the capacity of the application to effectively convince a user to engage in using it to learn; we will focus on one specific application to learn mathematics;
- Show the usefulness of the inspection approach to assess and improve the persuasiveness of an e-learning interface.

We first propose a design perspective by which the developers of e-learning technologies can build persuasiveness into their applications. It follows the standard guidelines to persuasive systems design. Complementary to this design perspective, we define a set of evaluation criteria grid to assess the persuasiveness of an e-learning interface. These criteria aim to help developers focus their efforts to improve the persuasiveness features of the application’s interface and interaction patterns. We demonstrate the application of the persuasiveness criteria over a study guide that is intended for bringing freshmen engineers’ level of mastery of college mathematics up to the expectations for the first year mathematics courses.

THEORETICAL FRAMEWORK FOR THE DESIGN OF PERSUASIVE E-LEARNING TECHNOLOGY

We adopt the perspective that the design of persuasive e-learning applications follows the same generic principles of designing persuasive technology and describe two frameworks towards this goal: the work by Fogg (2009a) who proposes a step by step approach to the design of PT, and the work of Oinas-Kukkonen and Harjumaa (2009) who introduce seven underlying postulates behind persuasive systems and 28 design principles. Based on the procedural nature of Fogg’s approach, we consider that it represents a simpler method than the principled-based approach of Kukkonen and Harjumaa, and therefore that the later approach is better suited for the persuasion aware designers willing to invest more time and effort to the design of PT. As such, they can be considered complementary.

In line with his own research on PT, Fogg introduced a guide to the design of PT (2009a). His design process proposal is tainted by his observation that «The landscape of persuasive technology is riddled with the carcasses of failed projects» (p.2) and that the emphasis should lie on providing accessible means to learn the principles and practice of designing PT. The process is broken down into eight steps and is targeted towards newcomers to PT. It aims to introduce early and small steps towards bringing desired behavioural changes:

1. Start by aiming to induce a simple behaviour by the user. Although apparently modest and benign, the underlying assumption is that it will bring an attitudinal change and open the way to more profound changes. For e.g., changing for low consumption light bulbs can raise the awareness of users towards ecologically friendly practices and raise their curiosity and willingness to learn more about them.
2. Designers must target the subset of users who are most receptive to behaviour change
Protein Structure Prediction by Fusion, Bayesian Methods

www.igi-global.com/chapter/protein-structure-prediction-fusion-bayesian/10412?camid=4v1a