

# Design, Use and Experience of E-Learning Systems

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## ABSTRACT

The use of computer applications to support learning and assessment is becoming more common, along with a growing body of research focusing on the pedagogical effectiveness of these applications. However, until recently less research attention has been given to the design of learning technology with regard to their usability, actual use, and the way they motivate and engage learners. Learner centred design [7] looks beyond the technological possibilities such as distance learning, virtual reality, and computer assisted assessments by focussing on learners in their learning contexts, and how their interaction with these applications can help and stimulate them to apply deep learning strategies. However, what are the best and most effective ways to accomplish this? Can lessons learned in the field of HCI be directly applied, or do e-learning applications have their own set of design guidelines? The workshop plans to bring together individuals with an interest in the design and use of e-learning systems with the aim of improving and understanding the learning experience. The workshop will be a platform to discuss new ideas and to share experiences, but also to identify new research challenges and potential solutions.

## Categories and Subject Descriptors

K.3 [Computers and education]: Computer Uses in Education – *collaborative learning, computer-assisted instruction (CAI), computer-managed instruction (CMI), and Distance learning.*

## General Terms

Design and Human Factors.

## Keywords

e-learning, computer assisted training, computer assisted assessment, web-based learning, educational technology, learner centred design, usability, usage.

## 1. INTRODUCTION

The use of technology to support learners in the classroom, the office, workplace, at home or on the move has become an everyday phenomenon. Educators use online learning environments to distribute their material, set quizzes, answer student questions posted on discussion boards, collect student coursework assignments, etc. Where traditionally the learning

experience was limited to classroom and text books, e-learning environments allow learners to conduct experiments in a simulated lab [3], watch videos in which instructors solve mathematical problems [1], engage in scientific enquiry using handheld and remote sensors and advanced visualisation tools [10] or practice a second language online with native instructors on the other side of the world [4]. Much of the success of these educational technologies depends on their ease of use, ability to engage the learner and to adapt to their needs, for example to be accessible at the right time and in the right place, to match the learners' existing knowledge of the material, learning style, culture, etc. Well designed systems should also discourage learners from applying surface approaches to learning, which do not lead to in-depth understanding of the material, but simply mimic learning behaviour, e.g. clicking through a series of online quizzes without consideration of the question, rote learning to pass an exam, or simply staying away from classroom sessions expecting that a last minute look before the exam at the e-learning environment will substitute these sessions. Badly designed educational technologies can even become an obstacle to learning when they are hard to use. Even if learners manage to operate such environments, boredom or frustration can prevent them from learning. Educational technology designers are left with difficult questions about how best to create systems that are usable and appealing whilst simultaneously engaging users in learning, which may itself be difficult and require effort.

## 1.1 Design guidelines

Educators use learning theories, such as constructivism, behaviourism, cognitivism, Piaget's developmental theory, humanistic oriented theories, and learning styles to develop their curriculum, module, lesson plans etc. How effective are these theories for the design of e-learning? And how do they relate to HCI inspired practices and design guidelines suggested by for example Nielsen [8] and Norman [9]. Are such guidelines alone sufficient to guide the design of successful learning systems? Or do we need a set of guidelines tailored for these types of applications? Fortunately research on the design of e-learning systems is making progress. For example at previous BCS-HCI conferences work was presented that explored student diversity (such as cognitive styles [12]) and the use of learning systems [2], or the use and attitude towards computer-adaptive tests [5][6] and the design of educational software to support creative learning [11].

## 1.2 Research Methods

Studying the use of e-learning systems might require a specific research approach. Systems could be evaluated for example in the lab under controlled conditions. Because of time limitations this might only provide a small snapshot of the initial use of these systems. Field studies provide a more advanced understanding of the actual use of the entire system during a

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training course. Offering or withholding system elements to understand their effect on the learning process whilst providing a very robust experimental design might not always be possible because of pedagogical and ethical considerations. The latter often needs special attention because of the potential position of power between the learner and the researcher, who might at least be perceived as closely associated with the educator even if they are not the same individual. Furthermore, what is the value of data collected from interviews or questionnaires with learners? Are learners able to understand the learning process or can they only comment on the learning experiences?

## 2. WORKSHOP FOCUS

Workshops that focus on the intersection of HCI and e-learning systems are not new, for example CHI 2003 hosted a workshop on Designing for Learning<sup>1</sup>, and INTERACT 2005 hosted a workshop on eLearning and Human-Computer Interaction<sup>2</sup>. This workshop wishes to continue this tradition and additionally look at new developments in this area such as: designing for inclusion, personalisation, blended learning, and consistency in computer assisted marking. Possible topics include but are not limited to:

- ❑ Design guidelines and patterns for e-learning and computer assisted assessment
- ❑ Research methods to study the design, learnability, and use of e-learning systems
- ❑ The learner's experience of e-learning systems
- ❑ The design of personalised and adaptive e-learning systems
- ❑ E-learning tools such as video, quizzes, discussion board and dynamic voting.
- ❑ The design of novel educational technologies such as VR, AR, mobile learning and games for learning.

The workshop intends to attract researchers, designers, and educators that are interested in understanding good design and the learner experiences of e-learning systems. Workshop participants could come from a variety of backgrounds such as HCI, psychology, design, and education. The main objective of the workshop is to establish a community of individuals with an interest in this area, allowing a lively exchange of ideas, and a joint exploration of current problems, as well as discussion leading to the proposal of possible solutions.

## 3. WORKSHOP FORMAT

This is a full-day workshop. The morning session will consist of short presentations and discussion of participants' position papers. Participants will be encouraged to demonstrate e-learning systems or evaluation tools that they might use or have developed. In the afternoon session, participants will break into small groups depending on their main interest and discuss topics such as research methodology, designing usable and engaging e-learning environments, while exploring new research questions, unsolved problems, potential solutions and new research directions. At the end of the workshop, the small groups will report back, which will form the basis for a plenary discussion. The workshop will also be supported by a website (<http://disc.brunel.ac.uk/HCI2007elearningworkshop>) hosted by Brunel University. The draft position papers will be posted here in advance, and participants' slides will also be made available on the website before the workshop. After the workshop

position papers and minutes from the workshop discussions will be published in the proceedings of the workshop.

## 4. WORKSHOP COMMITTEE

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<sup>1</sup> <http://www-personal.umich.edu/~sjul/learning03/>

<sup>2</sup> <http://www.dis.uniroma1.it/~lhci/default.htm>