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From the Editors …

Welcome to the April 2010 issue of the Learning Technology newsletter.

Usability is acknowledged as one of the key qualities of technology-enhanced learning (TEL) applications and services, since it can significantly affect their overall success and acceptability. This issue focuses on usability aspects in TEL and introduces papers which describe new frameworks for addressing and evaluating usability in TEL, as well as specific usability evaluation case studies.

Minocha & Reeves discuss design considerations which can help the development of 3D virtual learning spaces which are accessible by all potential users, including users with special needs. Metscher & Bredl describe the edubreakCAMPUS learning environment and some studies which aimed to investigate its usability. Santos & Boticario describe their work on developing and evaluating the usability of semantic educational recommender systems (SERS). Gasparini, et al., present the AdaptWeb adaptive learning environment and discuss the results of a series of experiments which investigated its usability. Zaharias & Koutsabasis present the empirical application and comparison of two heuristic sets that have been proposed specifically for contemporary e-learning applications. Finally, Daneshgar, et al., investigate methods for enhancing e-learning satisfaction among adult e-learners in today's workplaces.

The issue also includes a section with regular articles (i.e. articles that are not related to the special theme on usability in TEL). Retalis & Sloep describe idSpace, a groupware system for supporting collaborative creativity. Shah, et al., discuss the evolution of game-based learning. Konetes discusses findings from literature concerning the online attrition rates in university and business settings. Finally, Nicaud & Viudez describe epsilonwriter.com, a tool for easy working on documents with formulas.

After this section, you find an announcement for a recently published book by Stephen Reed with the title *Thinking Visually*.

We sincerely hope that this issue will help in keeping you abreast of the current research and developments in usability aspects of TEL. In our effort to improve the usefulness of the newsletter, this issue also includes an annex with a list of conferences related to Learning Technology (the list is taken from ASK's Web-Site, at http://www.ask4research.org).

We also would like to take the opportunity to invite you to contribute your own work on technology enhanced learning (e.g., work in progress, project reports, case studies, and event announcements) in this newsletter, if you are involved in research and/or implementation of any aspect of advanced learning technologies. For more details, please refer to the author guidelines at http://www.ieeetclt.org/content/authors-guidelines.

Deadline for submission of articles: **28 June, 2010**
Special theme of the next issue: **Collaborative Learning Supported by Technology**

Articles that are not in the area of the special theme are most welcome as well and will be published in the regular article section!

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Special Theme Section: Usability Aspects in Technology Enhanced Learning

Designing for Usability and Accessibility in 3D Virtual Worlds

Introduction

Educational institutions are increasingly adopting 3D virtual worlds (VWs) in their learning and teaching. In a 3D VW, users synchronously interact in 3D spaces via their graphical self-representations known as 'avatars' and converse in real-time through gestures, audio- and text-based communication. *Second Life*[1] *(SL)* is the most widely used 3D VW in education. Unlike role-playing games such as World of Warcraft that has a storyline, SL, is not a 'game' per se. The lack of a guiding narrative in SL provides flexibility for users to design spaces and activities for their requirements. In the research project 'DELVE'[2] (Design of Learning Spaces in 3D Multi-user Virtual Environments), we conducted a study to investigate users' perceptions of learning space designs in SL. Although our focus in DELVE was on the design of *3D learning spaces*, our empirical investigations have shown that usability of 3D spaces, in general, influences user's experience and sense of engagement in a 3D VW.

Research on the usability of spaces in 3D VWs has been anecdotal to date but there is a growing interest in the community. For example, Pursel[3] discusses usability issues such as navigation, space design and familiarity: narrow corridors and tight corners are difficult for avatars to navigate as are rooms with narrow ceilings and no natural exits (e.g. doors) even if the teleporting facility for an exit is present.

We have discussed usability principles related to way-finding, navigation and others in [1]. In this article we focus on usability aspects that influence the accessibility of 3D spaces.

Figure 1: Virtual Ability Island: Welcome area

Figure 2: Virtual Ability Island: Orientation area

Accessibility of 3D spaces

By accessibility we mean designing 3D spaces so that they are accessible to users who may have a range of disabilities (mental or physical) in real life. In this article, we discuss five design considerations along with data-excerpts from our conversations with colleagues associated with the Virtual Ability Island in SL [2] (see Figure 1 and 2). These design

[1] http://www.secondlife.com
[2] http://www.jisc.ac.uk/whatwedo/programmes/elearning/ltig/delve.aspx
[3] http://tinyurl.com/lm6dg7

considerations and data-excerpts provide interesting insights about how the designing for accessibility could actually imply 'universal usability', that is, usability for all users.

Design for accessibility

The design strategy should consider target users and their accessibility requirements. The designs should be evaluated with the end-users.

"Accessibility is # 1. We did many tests as we built to make sure that it was accessible in many ways. The builders and I would wear wheelchairs as we built to test different aspects of the floor. We had real-life accessibility experts come in to advise us as we progressed too also making the signage easy to read was key we had low vision members testing the signs as we would develop a new one to give us feedback"

Design to avoid fatigue amongst users

A sequence of activities towards a goal such as the orientation centre, should be designed to avoid fatigue:

"We created the Orientation Centre to take about an hour, which we thought was the fatigue limit on our target audience. But you don't SEE that, so there is no reminder that there is a fatigue limit, we just made it part of the design, that is how Universal Design [4] works"

Design accessibility into both the look and the function

The look and function of the 3D spaces should be designed for accessibility:

"The training facilities where we hold classes had to look and function accessibly. So we made them open, easy seating, lots of spaces for chairs, level floors, three screens for the presenter to show media, and all within hearing distance of the presenter"

"There are things we can do in SL that we can't in RL, for instance, space inside an SL building is cheap compared to similar space in RL, so when we designed the auditorium, we could put enough space in front of the rows of seats that a person in a wheelchair can pass in front and not roll over toes of those already seated; you can't afford that space in an RL theatre!!"

Design to overcome existing mental barriers

Designers should consider how their designs and the associated guidance for the use of the spaces might help overcome the mental inhibitions that disabled users may bring into a 3D VW:

"There are some people with disabilities that have problems doing things in SL, their avatars CAN do it but mentally they can't. For example, some folks feel that if their wheelchair could not go ride over sand or grass in real-life, they can't do it here as well" …"we stayed away from path-textures that had planks with spaces between them and any path-textures that looked broken or uneven."

Support blind and dyslexic users

Designing for people with disabilities can also help other user groups, e.g. non-native English speakers:

"We know that what we design specifically for assisting people with disabilities also helps others. For instance, when we design wav files to provide our posters in auditory format it not only benefits our blind users but also those who are dyslexic and those for whom English is not their first language and they understand what is spoken more readily than what they read"

Conclusions

Careful consideration to accessibility of learning spaces can provide benefits for all user groups. As the designer-participant in our study stated: "I would recommend using the principles of Universal Design [3] as far as possible. We know that what we design specifically for assisting people with disabilities, it also helps others."

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Continuous Evaluation and Improvement of a Learning Environment including a Rich Video Player

Abstract. This article highlights the continuous study and improvement of the usability of the online environment *edubreakCAMPUS*, which was developed by the company *Ghostthinker GmbH* and was evaluated by the Institute for Media and Educational Technology at the University of Augsburg. We outline the challenge created through the use of a combination of a complex software solution, including a rich video annotation application, and an ambitious didactical approach for embedding video reflections in a blended-learning course targeting a heterogeneous group of users.

Introduction

Since 2007, Ghostthinker GmbH company developed an overall concept for advanced training courses in close partnership with different sports associations and the Institute for Media and Educational Technology. Of foremost importance is a combination of the latest Web 2.0 technologies, an adapted blended learning concept and the principles of media-supported quality and knowledge management. The underlying instructional design is based on the latest findings in research in the field of media-supported teaching and learning. It supports a model of active and social learning which is enhanced through an elaborated task design. These tasks are designed in a way that motivates participants to articulate their tacit knowledge with the help of the *edubreak video player*, to reflect on their individual learning experience in a blog.

Implementation

The technical implementation is accomplished in short development cycles based on the idea of agile methods. The development includes a rich video annotation application called *edubreak video player*, which enables the user to directly create time precise annotations and to enhance annotations with a number of different extensions like drawing, audio remarks, rating and tags. In addition, participants have the option of using Web 2.0 applications, like web blogs and e-portfolios, together with *edubreakCAMPUS*.

One of the major challenges regarding the usability of the learning environment is supporting each user equally: the *participants* during the learning and reflecting process and the *moderators* during the teaching and supervising process. The latter have the benefit of a customized module called *Moderator Cockpit*, which provides an overview of all contents created by participants, including video annotations and blog entries. In addition, it enables moderators to manage their feedback.

During the first courses, which took place early in 2009, the efforts to support participants quickly exceeded the capacities of the moderators (see figure 3) and it was neither efficient nor satisfying to reply to every post directly in the video player. Hence, further development focused on the improvement of feedback management by the moderators.

Particularly, when working with videos, the internet bandwidth of each user is still a critical factor. With an unstable and volatile internet connection, the reaction of the video player may be delayed and it may cause a decrease in ease of use.

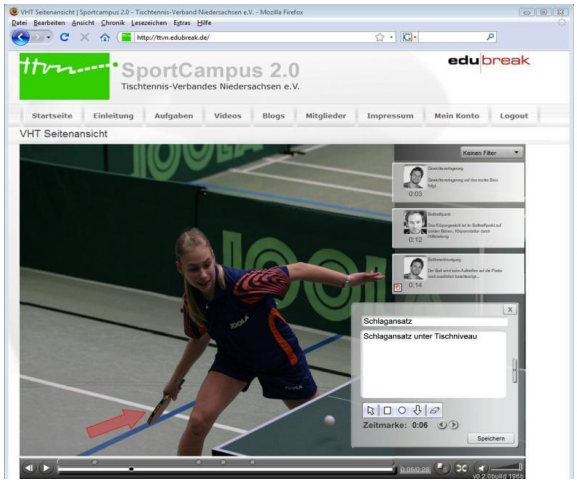

Figure 1: *edubreak* video player

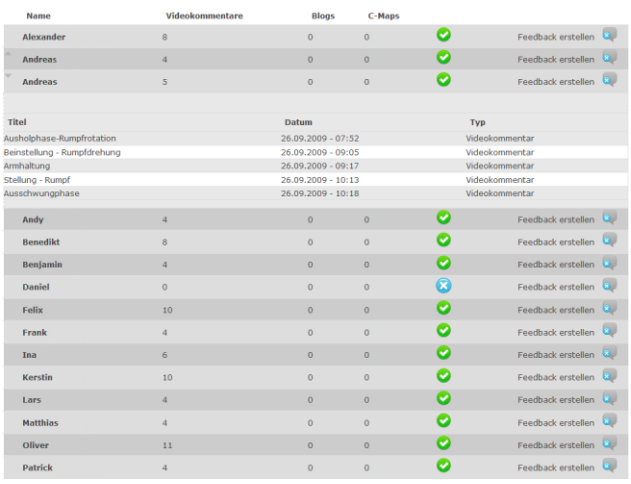

Figure 2: Moderator Cockpit

Evaluation

The learning environment has been continuously evaluated in terms of user satisfaction and motivation for use. The blended-learning courses are reviewed by means of questionnaires and interviews. In addition, the analysis of usage statistics of the learning environment also allows the tracking of users' actions. The results are included and consulted in the next development cycle.

	Course 1	Course 2
Number of participants	21	14
Gender: M/W	16/5	12/2
Over all annotations Replies by the moderators	1759 435	1746 661
Internet Connection	Majority: DSL 2000	Majority: DSL 6000 or faster
Videoprobleme	Majority had problems	Majority didn't have problems
Improvement potential	Frequency of exercises , video player	Frequency of exercises , video player, my content
Conclusion	High learning factor / fun	High learning factor / fun

Figure 3: Analysis of questionnaire and user statistics of two courses in 2009

In the winter term 2009/2010, the *edubreakCAMPUS* was introduced at two local schools and its usage was evaluated by a group of students. A user survey with the help of a semi-standardized questionnaire was used to inquire the perceived usability and clarity of the online environment. In addition, the students carried out a scenario testing, enhanced with thinking aloud.

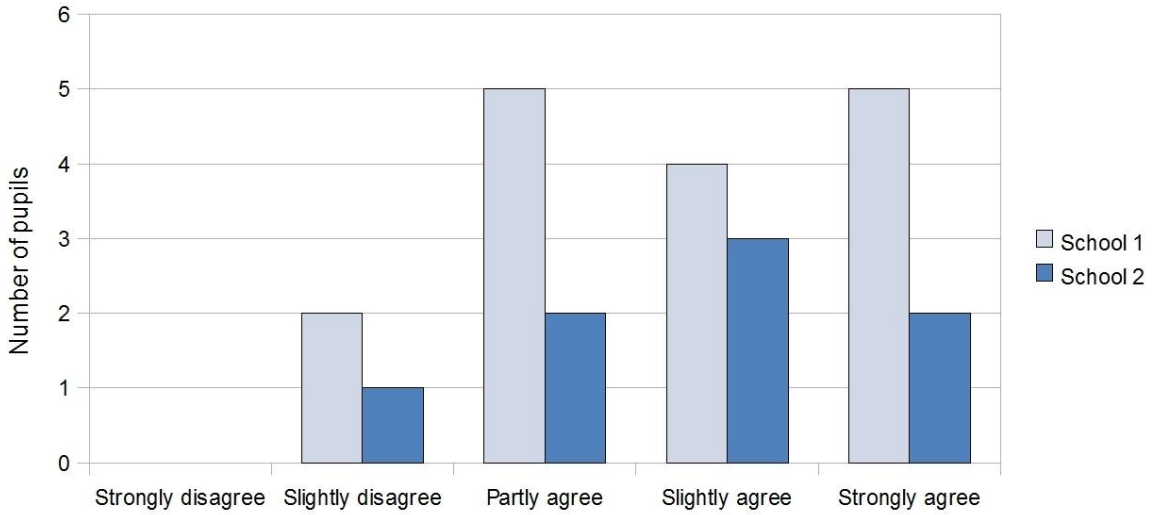

Figure 4: Have you oriented yourself fast in the online environment?

Although the majority of the students from both schools were able to orient themselves relatively quickly in *edubreakCAMPUS* (see Figure 4), the difference between the results (see Figure 3) is striking. Differences could be due to the dissimilarity in the types of schools (School 1 is a supportive school an/d School 2 a high school). The students of the first school were complaining about unknown technical terms mentioned on the learning environment. The result also shows that the online environment should be adapted more closely to each user group and context to increase its usability. In the future a usability-test with a few individuals of the new user group should be arranged during the preparation of the environment.

Conclusions and Further Work

The minimization of efforts and optimization of use in the sense of User-Centered Design has been used in features such as the *Cockpit* which has been successfully implemented. Concurrently, the *edubreak video player* has also been improved in terms of its capabilities, even with a slow internet connection, as a result of the latest inquiries.

In addition to the described methods, it is essential to evaluate the environment and all its components using an expert heuristic, to enhance the adaptability of language in the environment and further the reduction of complexity. This will allow for *edubreakCAMPUS* to be introduced in further contexts and to additional user groups.

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Usability Methods to elicit Recommendations for Semantic Educational Recommender Systems

Recommender systems aim to offer relevant guidance to individuals who lack sufficient experience or knowledge on the alternatives when they have to make choices in daily life situations. The successful implementation of these systems in the e-commerce domain has motivated their consideration for the educational domain. However, it is arguable that educational recommender systems share the same key objectives as recommenders for e-commerce applications (i.e. helping users to select the most appropriate item from a large information pool) since there are some particularities that make not possible to directly apply existing solutions from those systems. For instance, recommendations in the educational domain should not be guided only by the learners' preferences but also educational criteria should be considered. However, up to now, most educational recommender systems approaches have focused on applying traditional recommendations algorithms in order to find out relevant resources to recommend to learners in learning scenarios. While this approach is pointing at interesting open issues, there are complementary views in this field.

We have been working in the definition of a semantic educational recommender system, which recommend learners relevant actions to carry out while they are involved in the learning process in a learning environment. Those actions are described in terms of a semantic recommendation model that we have proposed in [4]. In our approach, the involvement of the educator in the process of eliciting the recommendations is essential [5] to obtain qualitative information to describe the recommendations required from an educational perspective. This includes issues such as what to recommend in which situation, as well as to characterize the recommendation with some metadata (e.g. category, relevance, origin …). The approach is complemented with data mining algorithms, which can be used to tune the educators' design work with specific values for the conditions by analyzing previous interactions in the learning environment. This model helps to bridge the gap between the educator understanding and the algorithms, as the former is able to express the recommendations required to accomplish the educational needs of their students, while the latter are able to detect additional pieces of information that turns out to be relevant in real use.

A number of usability methods [1] can be used in the process of involving the educator to elicit recommendations. In our approach, we have applied methods such as meetings with stakeholders, brainstorming, and observational studies to understand the learning needs and how recommendation strategies can be applied in the educational domain. This information was useful to design the semantic recommendations model.

Next, we evaluated if it was possible to describe recommendations with that model and what was the users' perception of them. We prepared an experiment with a total of 40 users in 3 runs of a course developed using the ALPE methodology [3] focused on how to use the learning platform. For that course, and based on this recommendations model, 13 recommendations were described, which addressed different users' features. Participants worked on the course for one hour. Some of these recommendations were offered to them, depending on their user model. After the experience, they were given a questionnaire to evaluate the experience, the recommendations and the model elements. The feedback obtained was positive.

Subsequently, we looked for usability methods to involve the educator in the recommendations design process. A methodology to elicit recommendations was defined [5] which combines questionnaires to know the expertise of the participants regarding online teaching and interviews to identify relevant situations in their previous online teaching experiences. Three educators were consulted. The situations identified were turned into scenarios, identifying the problem and solution scenarios [2]. Problem scenarios state the situation as it is, while solution scenarios are modifications to the problem scenarios to introduce recommendations that could be provided to avoid or limit the problems identified. At this point the recommendations are described in terms of the conditions that should take place for the recommendation to be offered. 18 scenarios and 43 recommendations were proposed.

These recommendations were discussed in a focus group in order to refine them. To classify the recommendations as defined in the model, some card sorting activities [6] were carried out. First, an open card sorting was done by 6 educators to reveal relevant categories for the given set of recommendations. Second, a close card sorting -involving 20 educators and 20 learners- focused on classifying the recommendations in the categories learnt. As a result, 51 recommendations were produced, grouped in 11 categories. These results were validated by 3 educators and recommendations are now ready for the course.

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Usability in an Adaptive e-Learning Environment: Lessons from AdaptWeb

Introduction

Both Learning Technology and Human-Computer Interaction (HCI) communities are unanimous in recognizing that *usability* is a very important quality criterion for e-learning systems (ELS). Usability is the effectiveness, efficiency and satisfaction with which specified users achieve specified goals in a particular context of use [1].

Since ELSs are normally used by a wide variety of students with different skills, background, preferences, and learning styles, a straightforward way an ELS can provide *usability* is that of being adaptive/personalized adopting different adaptive strategies like adaptive ordering, link hiding, and adaptive link annotation [2]. Adaptive ELSs ideally provide the student with exactly the material s/he needs: for this, they adapt dynamically the content, the presentation, and the assistance offered to users, according the student's profile. Adaptive techniques are examples of user-centered techniques for approaching a range of serious usability problems found in conventional non-adaptive web-based ELSs, usually related to present homogeneous content and navigation scheme for all students, without focusing on a more adequate for each student. These usability problems are critical for ELSs design, i.e. referring to ELS as a whole, not just the visual aspects of it.

An aim of our research has been ultimately to investigate approaches putting the users' profile and contextual knowledge into practice in the development process of the actual ELSs – in particular of an ELS called AdaptWeb® (Adaptive Web-based learning Environment) [3], an adaptive hypermedia system aiming to adapt the content, the presentation and the navigation in web-based courses, according to the student model. AdaptWeb is an open source environment, available in SourceForge (http://sourceforge.net/projects/adaptweb/), and being used in different universities today.

AdaptWeb® environment

AdaptWeb provides personalized content to different students groups. AdaptWeb is composed of a) an authoring environment where the teacher/author organizes and creates the structure of content of their courses, adapted to degree programs (e.g. Engineering or Computer Science - CS), and b) the students' environment, which personalizes the content, the interface and navigation to each student.

The AdaptWeb's educational contents are modeled through a hierarchical structure of concepts where the criteria for prerequisites are established. This structure is defined during the authorship stage and then stored in XML format. The XML documents should go through a filtering process, which happens dynamically at the student interaction with the environment, and satisfies the criteria of adaptation represented in the model of each student in particular, namely: knowledge, degree program (area of knowledge), and preferences. In the design and implementation of AdaptWeb, usability issues (like navigation, interface, content disposable [4,5]) were always considered as requirements.

AdaptWeb® usability evaluation

AdaptWeb has been made available for use by actual users in our academic context. Following well-known subjective evaluation methods from the HCI field, we made some experiments to obtain qualitative and quantitative information about AdaptWeb usage and the viewpoint of its users.

The goal of first experiment was the evaluation of major usability problems and user satisfaction, concerning 40 students. Thus, many improvements were necessary and implemented, not only based on the evaluation, but mainly because new technologies and cooperative tools were available; a second experiment was oriented to both points of view: the students´ and authors´ interfaces. The first evaluation method adopted was heuristic evaluation by 3 GUI experts to detect general interface design problems. We used the Nielsen´s 10 heuristics [5], the Ergonomic criteria proposed by Scapin and Bastien [6] and a specific evaluation for online courses proposed by Dringus and Cohen [7] to achieve more particular ELS´s problems related. A second evaluation method adopted was user testing, involving 44 CS students in a HCI course at UDESC University, to identify difficulties related to user´s task performance. During user testing, each user was observed directly using AdaptWeb (in a laboratory) and was asked to answer a questionnaire. To the author´s point-of-view, we also used first the heuristics evaluation followed by a focus group with 14 teachers followed by an usability test and questionnaire answering.

As a direct result of the combination of several methods for evaluation many improvements for AdaptWeb were detected: a) a better support for helping author(s) and student(s) to communicate to each other, including mechanisms like forum, agenda and whiteboard; b) a richer context modeling – complementary to existing student modeling - in order to provide better adaptation mechanisms; c) fault report and diagnosis mechanisms, helping users to relate problems and make suggestions and critics; d) providing teachers with a more sophisticated student´s log analysis, helping to identify usage patterns, frequency, the content most searched, the most used type of navigation, days with more/less access, and so on. Clearly the most important evaluation results were those that allowed us to identify some features not being addressed by the initial design of AdaptWeb.

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Heuristic Evaluation of e-Learning: comparing two Heuristic Sets

Overview

Improving the effectiveness and efficiency of heuristic evaluation has gained the interest of several researchers and practitioners within the e-learning research community (Zacharias, 2007). This study focuses on the empirical application and comparison of two heuristic sets that have been proposed specifically for contemporary e-learning applications. The main results of the study indicate that both heuristic sets exhibit wide coverage of potential usability problems, despite that some heuristics are more general than others.

Heuristic evaluation of e-learning applications

Heuristic Evaluation (HE) is a systematic inspection of a user interface design for usability (Nielsen & Molich, 1990). It is the most commonly used inspection technique and it is inexpensive and relatively easy to conduct in comparison to other evaluation methods.

This study focuses on the comparison of two different heuristic protocols that have been developed specifically for e-learning applications. The first was developed by Reeves et al. (2002) based on Nielsen's protocol, having expanded this to include instructional design heuristics:

1. Visibility and System Status
2. Match between System and Real World
3. Error Recovery and Exiting
4. Consistency and Standards
5. Error Prevention
6. Navigation Support
7. Aesthetics
8. Help and Documentation
9. Interactivity
10. Message Design
11. Learning Design
12. Media Integration
13. Instructional Assessment
14. Resources
15. Feedback

The second heuristic set was proposed by Mehlenbacher et al. (2005), having been influenced by usability research, rhetorical theory and e-learning design (Table 1).

Overview of the study of heuristic evaluation for e-learning

Method

A typical commercial asynchronous e-learning course was evaluated in this study. The course was on "Internet Marketing" and it contained four main learning modules. The heuristic evaluation was conducted by two reviewers that have experience in usability evaluation and in e-learning ('double experts' according to Nielsen). The goal was to identify as many usability problems (UPs) as possible, and then to match these with the heuristics of the two heuristic sets, while a common report format was used for documentation. The matching of heuristic sets to UPs found is discussed in terms of:

- *Coverage*, i.e. the degree to which the heuristic sets 'include' the UPs identified. A high coverage of all UPs identified by a heuristic set for a particular evaluation study indicates that the set is inclusive and does not leave important aspects of usability out of its scope.

- *Distribution*, i.e. the degree to which each heuristic 'gathers' a considerable amount of UPs. If some heuristics gather the large majority of UPs, then it is possible that these should be refined.
- *Redundancy*, i.e. the degree to which UPs appear relevant to more than one heuristic. These heuristics are not distinct and allow broader interpretations.

Dimensions of all Instructional Situations	Heuristics
Learner Background and Knowledge	• Accessibility • Customizability and maintainability • Error support and feedback • Navigability and user movement • User control, error tolerance, and flexibility
Learner Tasks and Activities	Instructional content • Completeness • Examples and case studies • Readability and quality of writing • Relationship with real-world tasks Interaction display • Aesthetic appeal • Consistency and layout • Typographic cues and structuring • Visibility of features and self-description
Social Dynamics	• Mutual goals and outcomes • Communication protocols
Instructor Activities	• Authority and authenticity • Intimacy and presence
Learning Environment and Tools	• Help and support documentation • Metaphors and maps • Organization and information relevance • Reliability and functionality

Table 1: Dimensions of Instructional Situations and heuristics (Mehlenbacher et al. (2005)

Results

The heuristic evaluation resulted in a total number of 76 UPs found, out of which 54 (71%) were severe, 20 (26%) were moderate and 2 (3%) were minor problems. Overall, the reviewers felt that a lot of good technical work has been put on to set up this environment (i.e. all major Web technologies were present including HTML, CSS, Javascript and Flash); however several problems were identified regarding usability, accessibility and instructional design issues.

Table 2 presents an overview of the match of heuristic sets to UPs indicating the values of the above criteria.

#	Reeves et al 2002 (HS #1)	UPs	%	#	Mehlenbacher et al 2005 (HS #2)	UPs	%
1	Visibility of system status	17	22%	1	LEARNER BACKGROUND AND KNOWLEDGE	49	64%
2	Match between system and the real world	2	3%	1.1	Accessibility	19	25%
3	Error recovery and exiting	3	4%	1.2	Customizability and maintainability	2	3%
4	Consistency and standards	3	4%	1.3	Error support and feedback	0	0%
5	Error prevention	0	0%	1.4	Navigability and user movement	10	13%
6	Navigation support	7	9%	1.5	User control, error tolerance, and flexibility	18	24%
7	Aesthetics	3	4%	2	SOCIAL DYNAMICS	5	7%
8	Help and documentation	1	1%	2.1	Mutual goals and outcomes	4	5%
9	Interactivity	12	16%	2.2	Communication protocols	1	1%
10	Message Design	8	11%	3	INSTRUCTIONAL CONTENT	26	34%
11	Learning Design	17	22%	3.1	Completeness	8	11%
12	Media Integration	5	7%	3.2	Examples and case studies	4	5%
13	Instructional Assessment	3	4%	3.3	Readability and quality of writing	11	14%
14	Resources	5	7%	3.4	Relationship with real-world tasks	3	4%
15	Feedback	4	5%	4	INTERACTION DISPLAY	18	24%
UPs that match more than one heuristic (redundancy)		15	20%	4.1	Aesthetic appeal	5	7%
Ups that do not fit well in any heuristic (N/A)		4	5%	4.2	Consistency and layout	1	1%
				4.3	Typographic cues and structuring	3	4%
				4.4	Visibility of features and self-description	9	12%
				5	INSTRUCTOR ACTIVITIES	0	0%
				5.1	Authority and authenticity	0	0%
				5.2	Intimacy and presence	0	0%
				6	ENVIRONMENT AND TOOLS	5	7%
				6.1	Help and support documentation	2	3%
				6.2	Metaphors and maps	1	1%
				6.3	Organization and information relevance	1	1%
				6.4	Reliability and functionality	1	1%
				UPs that fit in more than one heuristic		30	39%
				Ups that do not fit well in any heuristic		5	7%

Table 2: Heuristic sets and usability problems (UPs) identified.

With regard to *coverage*, we have seen that both heuristic sets exhibit high coverage. This is certainly a desirable attribute for any heuristic set (HS). HS #1 (Reeves et al, 2002) has incorporated 72 out of 76 (95%) of the UPs identified. HS #2 also exhibits a particularly high coverage of 71 out of 76 (93%) of the UPs found.

With regard to *distribution*, for both heuristic sets there are only some heuristics that have attracted a large portion of UPs, while other attracted too few and some even not a single UP! The fact that a high distribution is observed to a few heuristics is a strong indication that these heuristics may be too generic, therefore there may be a need to refine these for more useful guidance to practitioners. Specifically, for HS #1, the heuristics that have attracted most UPs were: 'visibility of system status' (22% Ups), 'interactivity' (16%), 'learning design' (22%). For HS #2, the 'most important' heuristics were: 'accessibility' (25%), user control error tolerance, and flexibility (24%); readability and quality of writing (14%).

With regard to *redundancy*, we have found that the HS #1 (Reeves et al, 2002) exhibited better (i.e. lesser) than HS #2 (Mehlenbacher et al, 2005): A 20% of UPs were reported for more than one heuristic for HS #1, while a 39% of UPs were reported for more than one heuristic for HS #2. For these UPs it was not particularly straightforward to match them with a single guideline.

Future work

Future work will employ a larger number of evaluators and additional e-learning applications. In addition we plan to compare the results of these heuristic sets to user testing. A comparative analysis can be conducted along criteria such as: realness, validity, thoroughness and effectiveness (Koutsabasis et al, 2007).

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Investigating e-Learner Satisfaction in the Workplace

Background

Today's knowledge economies have created a need for life-long learning among adult employees. In preparation for a globally diversified workforce, organisations are providing e-Learning courses for their employees in their international operations in an attempt to address both cultural differences that affect management, as well as employees' need for life-long learning. This paper investigates methods for enhancing e-Learning satisfaction among adult Learners in today's workplaces. Whilst the current body of literature provides some evidence of similar studies having been conducted, the domain of these previous studies has always tended to be *higher education* (Daneshgar, Van Toorn and Abedin, 2009). The current study seeks to extend these findings by applying existing methods and practices to the domain of *the workplace environment*.

A systematic review of the current literature pointed to thirteen factors affecting learners' satisfaction of e-Learning settings. These are shown in the research model, Figure 1 below, a synthesized model explored from existing literature to define constructs and relationships between perceived learner satisfaction and e-Learning environmental characteristics.

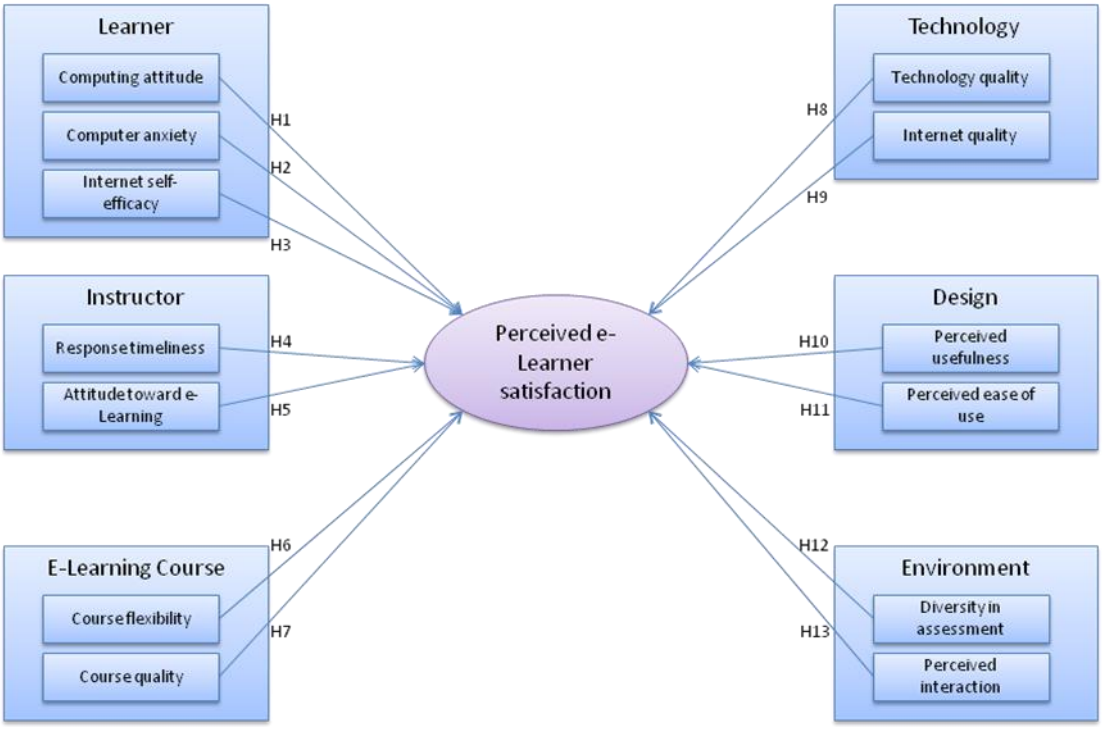

Figure 1: Proposed Conceptual Model

Based on the above model, thirteen hypotheses – labelled H1-H13 – were identified to test the existence and strength of relationships between the various factors and perceived user satisfaction.

Research Methodology

A sequential exploratory strategy was adopted commencing with qualitative data collection and analysis, followed by a quantitative approach. The purpose of this was to use qualitative results to assist in the interpretation of quantitative findings. A three-step exploratory research was conducted, including (i) a preliminary set of structured interviews for preparing the main survey instrument, (ii) a survey pilot study to validate the survey instrument, and (iii) a main survey study. This paper reports on the last two components.

Development of the Survey Instrument: The Pilot Study

A review of the literature identified thirteen crucial factors influencing the perceived satisfaction of e-Learners - shown in Figure 1. These were drawn from tested scales in existing literature (Amoroso and Cheney, 1991; Gattiker and Hlavka, 1992; Barbeite and Weiss, 2004; Sun, 2008; Daneshgar and Van Toorn, 2009). Three demographic questions were included in the survey to aid in the identification of potential limitations of the study or other possible contributing factors.

The pilot study was conducted after the survey was developed and reviewed by the researchers to validate the survey questions and identify any errors or areas of improvement in the survey. Results revealed that no *instructor* was present and therefore there were no interactions between the learner and instructor or between the learners themselves. As a result, the three questions related to the *Instructor's Response Timeliness*, *Instructor's Attitude Towards e-Learning* and *Perceived level of Interaction* factors were dropped and ten factors remained for the main survey. All scales in the pilot study satisfied the assumptions that justified the use of factor analysis with the exceptions of *Computer Anxiety* and *Internet Quality.*

The Main Survey

The refined survey was created using iSalient (http://www.isalient.com) online survey software and was open for two weeks to collect responses. A total of 275 people were eligible to participate in the survey. To determine the suitability of formative and reflective indicators, weights and loadings were examined respectively. In the current study, eight factors were identified as formative constructs. These included *Computing Attitude*, *Internet Self-Efficacy*, *Course Flexibility*, *Course Quality*, *Technology Quality*, *Internet Quality*, *Diversity in Assessment* and *Perceived e-Learner Satisfaction*. Whilst two factors were treated as reflective constructs, these included *Computer Anxiety*, *Perceived Usefulness*.

Implications of Key Findings

In summary, the statistical results found that *Course Quality* and *Perceived Usefulness* of the e-Learning courses had a significant impact on perceived e-Learner satisfaction in the workplace. These findings were also consistent with results from the interviews. To a lesser extent, it was found that individual learner's *Internet Self-Efficacy* and the organisation's *Internet Quality* may also have an impact on e-Learner satisfaction in the workplace. Organisations offering e-Learning courses for adult learners in the workplace should focus on these four factors when designing and implementing e-Learning courses to ensure learner's satisfaction with the e-Learning system and to maximise their life-long learning experience.

The ten factors identified from the existing literature: *Computing Attitude*, *Computer Anxiety*, *Internet Self-Efficacy*, *Course Flexibility*, *Course Quality*, *Technology Quality*, *Internet Quality*, *Perceived Usefulness*, *Perceived Ease of Use*, and *Diversity in Assessment*, when combined, were able to explain at least 76% of the variances in *Perceived e-Learner Satisfaction* in the workplace. Other factors may also influence *Perceived e-Learner Satisfaction* in the workplace and thus future studies may set out to explore and investigate the remaining 24% of the variance in *Perceived e-Learner Satisfaction* in the workplace.

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Regular Articles Section

idSpace: A groupware System for Supporting Collaborative Creativity

Collaborative Creativity Process

Nowadays, to invent and design new/innovative products and/or services requires collective creative performance: creative action in combination with collaboration. Creativity is being seen as a "universal attribute, suggesting a need for greater creativity in order to both survive as well as thrive in the twenty-first century" (Craft, 2006). Several creativity techniques such as TRIZ, SCAMPER, Six Hats, 5W1H and more than 90 others have been created in order to encourage people's original thoughts and divergent thinking. Some techniques require groups of two or more people while other techniques can be accomplished by individual. All techniques try to steer thought processes and help the individual or the group to find a structured approach to answer questions, to see problems in their entirety, generate new ideas and to reach to faster and better decisions.

Fostering creativity is increasingly seen as a key direction and focus for pedagogic approaches, from nursery education, through compulsory education to higher education and work environments. While individual factors and initiative were important to creativity, social environments made the difference (Glor, 1998). According to Amabile's study (1996), individual creativity can be mediated by the group and can be supported by the social environment and management. Support of collaborative inventive and creative thinking has to deal with intensive interaction and collaboration of participants and evolving artifacts during exploration. So, collaborative creativity requires:

- Generation of new perspectives, new ideas.
- Articulation of yet 'tacit' knowledge.
- Exchange of ideas, finding common ground.
- Learning from each other, exchanging existing knowledge.
- Evaluation of ideas.
- Collaborative 'construction' of new propositions

Existing systems that aim to support collaborative creativity processes are either mind or concept mapping tools, or mere groupware tools. Most of them offer real-time cooperation and integrate necessary functionalities like text chat, for instant communication, and a common shared workspace. During the idSpace EU-funded IST FP7 project [http://www.idspace-project.org/] a web-based platform in prototypical form was created that allows a distributed team of innovators to elaborate on existing ideas, to create and preserve new ideas, and to learn about them.

Supporting the collaborative creativity process: The idspace platform

The idSpace platform features an integrative toolset. It employs techniques for exploring new ideas (e.g. mind mapping in story writing and brainstorming) and for refinement of ideas (e.g. morphological analysis.) The platform contains tools to support traceability among stories, mind maps, concept maps, goals, new product features, as well as company values and policies. The platform also preserves semantic relationships among the different viewpoints for later exploration, retrieval, and navigation purposes.

The idSpace platform (see Figure 1) differentiates and innovates in guidance that offers to its users throughout the creative process and elaboration on that process. Pedagogical learning

scenarios guide the use of the available creativity strategies, leading users to an effective and efficient session of creation and innovation. The strengths of the idSpace platform are the following:

- The possibility of working over distance on a problem/challenge
- A workflow for working collaboratively. It guides the users through creativity sessions while simultaneously supporting them with related information
- Reuse of creativity projects that have been created with the platform. Earlier projects can be used as input for new projects, thus transforming ideas into reusable knowledge.
- Open platform that can contribute to a productive result.
- Inspiring the user with ideas expressed in past projects, as well recommending related ideas, suitable users, past solutions, and appropriate pedagogical strategies and creativity techniques
- Supporting a complete process of project definition, creativity activities, evaluation, and solution formulation
- Easy expansion of the collection of creativity techniques now used by the idSpace platform now supports

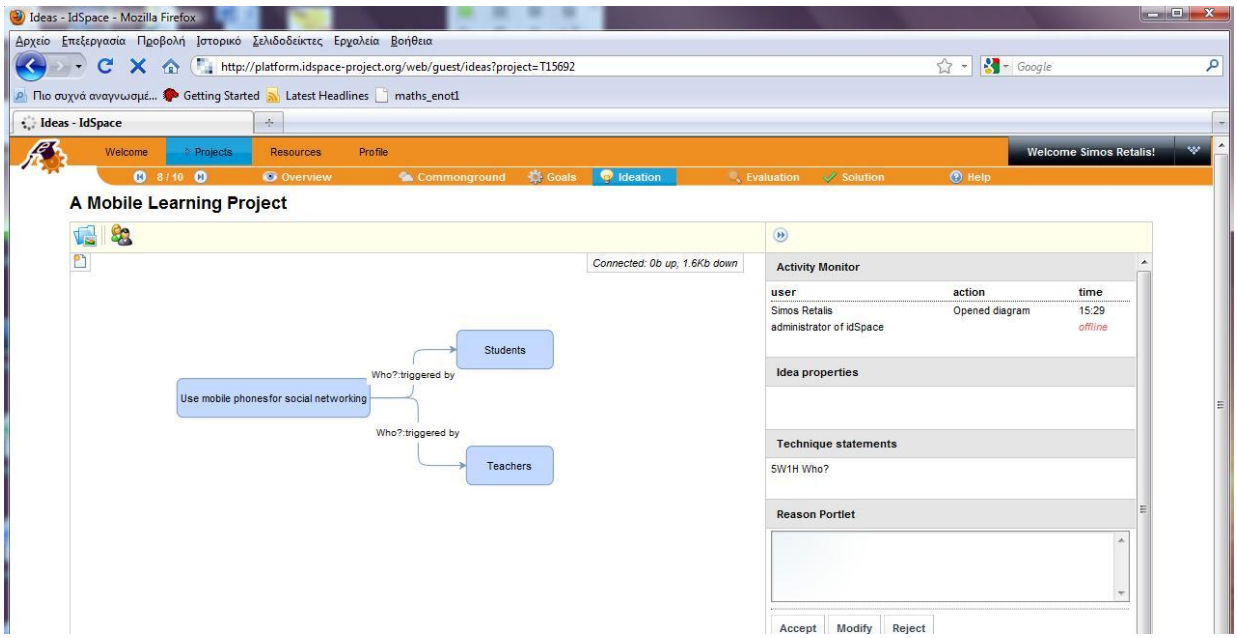

Figure 1: Screenshot of the ideation process at the IdSpace platform

Extensive evaluation studies were performed with an overall aim to analyze the usability and viability of the idSpace platform as a tool:

- to support actively and in a context-aware manner the creation of new ideas.
- to support elaboration (representation, storage and management) of ideas.

The evaluation methodology and the promising findings have been documented in an idSpace project deliverable report (IdSpaceEval, 2010).

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Game-Based Learning: The Learning Revolution

Abstract. Games as learning environments are widely believed to have prospective benefits such as increased motivation, engagement, and improved learning outcomes. Games in general and computer games in particular offer an array of knowledge presentation and create opportunities to relate the knowledge within a virtual world, thus support and facilitate the learning process. This paper discusses games and their potential as learning tools.

Introduction

Interactive entertainment and digital media today serves as a potent new economic, cultural, and educational force. Games are now a multi-billion dollar industry. Experimenting with alternative learning-environments combining digital games and learning edutainment is currently in the spotlight and is the focus of a number of researchers. (Prensky, 2001), author and CEO of games2train.com assert that educational games generate an environment in which all the important factors of successful learning are included: engagement, interactivity and most of all, fun. But most of the people assume that today's games are measly "fancy graphics". Wenger (1998) remarks that "the remoteness between doing and learning, or between entertainment and learning, is not a difference in terms of activity nor it is that one is mindless and the other thoughtful, that one is hard and the other easy or that one is fun and the other arduous. It is that learning – whatever form it takes - changes who we are by changing our ability to participate, to belong, to negotiate meaning."

The 21st century learners are overexcited. Prensky (2005) underscores that the student of today anticipates to be engaged in the everyday activities, plus in school, because of the amount of engagement in most other facet of his/her life. Today's students "have something in their lives that's really engaging—something that they do and that they are good at, something that has an appealing, imaginative constituent to it". In today's learners' lives everything is "Online", online gaming, online shopping, online dating and every facet of their lives is engaged by computer games, instant messaging, the Internet, music, movies and sports…except in school! *Game-Based Learning* (Prensky, 2004), Gee, Prensky, and Herz suggest that digital game-based learning lets learners to actually experience a given subject rather than just reading about the subject. The learner gets a hold and actually lives the subject and solicits about the rules within the simulation; the learner in fact develops a vested interest in the subject.

Why do we play games?

Really…why do we play games? To have fun, to plunge into an imaginary world, to take the challenge and outsmart the opponents and/or win, etc. There are perhaps scores of slightly different reasons to play games.

When we come across the games in the learning context, contrary to the activity only for the leisure time, we have learners' and teachers' viewpoint of using games for learning. From the learners' point of view using a game for learning can have a variety of meanings, e.g. learning and having fun, taking the challenge and realize better score, trying out different roles, being able to experiment and seeing what happens, being able to express the feelings, be able to reflect about certain conflict situation, etc.

As of the teachers' standpoint, we select to use games for learning to reach a new age bracket (Millennials) of learners with the means they are familiar with to interact since their childhood.

The Games

To further support Gee, Prensky, and Herz words, consider the game FarmVille developed by Zynga[4] and available on the popular social networking website Facebook. The game has over 83 million active users. These users are not only playing a game but also through this game learning about crops and farming. Another good example is that of Food Force a game published by United Nations World Food Program (WFP) to educate children about hunger and its effects. Within six weeks of its release the game had over 1 million players and as of now the game has been translated into ten different languages.

Perhaps this is enough evidence to say that edutainment is the way forward. Websites such as (www.internet4classrooms.com, www.4teachers.org, www.schoolzone.co.uk) are just a few names to help teachers bring edutainment to classrooms.

Meaningful effect

A full-time mother Gemma for whom Farmville has become part of the daily routine, in-between nappy changes and feeds. Both her sisters are signed up too. She was initially dismissive of Farmville when she was asked to join, but is now an enthusiast. So, what is the appeal?

"It becomes a personal experience and something you care about," says Johnny Minkley, a computer games expert. The game has certain "stickiness" to it, because of the nurturing element involved, he says. "What you're doing needs to have some meaningful effect, like the planting and growing of crops." [5]

Benefits of game-based learning

With using games we can stimulate motivation and stimulate engagement of the learners in a positive way. Games offer environment that foster different skill acquisition, skills like problem solving skills, communication and collaboration skills, strategy making skills etc.

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Online Learning Attrition Rates in University and Business Settings

Introduction

In the dynamically developing field of online learning there are a number of issues that are in somewhat of a state of flux while potential solutions and applications are debated; student attrition rates being high on this list. This paper draws upon recent research concerning the state of online learning attrition rates in university and business applications, considers some of the varying causes behind this issue and makes critical observations regarding these causes and potential solutions.

Attrition Rates

Online learning as a whole is and has been plagued with high course attrition rates spanning across the university, corporate and training sectors. In terms of higher education, distance learning courses experience an average attrition rate of 10% – 20% higher than corresponding classroom courses (Angelino, Williams, & Natvig, 2007). However some institutions report certain situations where online course attrition rates are between 25% – 40% (Levy, 2007). These high dropout rates are seen as a significant problem within the online learning sector as a whole (Van Tryon & Bishop, 2009). In addition to high attrition rates at universities, there are also similar concerns regarding distance learning for corporations and various forms of non accredited courses and training (Tao, 2008). Certain online learning centers have recorded dropout rates in excess of 50% while the same courses are taught face-to-face with only a 10% dropout rate (Levy, 2007).

Causes

Attrition within online learning courses is a result of a number of application specific issues as well as overarching problems such as student satisfaction. According to Levy (2007), a specific key identified that is a determining factor influencing a student's choice to drop out of an online course is student satisfaction with the course and learning procedures. Students who have completed online courses reported high levels of student satisfaction while those who dropped out often reported significantly lower satisfaction levels (Levy, 2007). Some specific causes for low satisfaction are feelings social disconnection, lack of interpersonal social cues and interactions as well as loss of teacher immediacy, all of which are typically alleviated in face-to-face learning environments (Van Tryon & Bishop, 2009). Additional reasons for dropping out of university online courses include professional, academic, family, health and personal issues. According to Tao, (2008) attrition reasons which are more closely linked to the online format and requirements also include lack of instructor assistance, poor course and technical support, communication problems and lack of learning community. University attrition concerns have also been linked to a focus on expansion of online programs and optimizing enrollments at the cost of course content and management (DiRamio & Wolverton, 2006). However the reasons for online learning attrition among corporate employees somewhat differ and include time constraints, workplace distractions, lack of internet access at home, poor management, poor motivation, technology issues, inexperienced teachers, badly designed courses and lack of incentives like college credits and active instructor correspondence through reliable online office hours (Tao, 2008).

Critical Evaluation

Many of the specific issues mentioned in the literature in regard to causes of attrition in university online learning programs stem from problems within the course content and methodologies. These issues may be correctable at the institutional level and do not seem to be problems inherent with the medium. However, the overarching issues such as student satisfaction are somewhat more difficult to solve. Even with the use of well coordinated learning strategies it does not seem as if this issue can be easily or completely resolved. Although perhaps it does not need to be completely resolved as the paradigm shift towards online learning does not necessitate or require the extinction of traditional face-to-face learning structures, thus allowing students with strong dispositions toward traditional learning to continue in their chosen avenues.

Corporate online learning attrition structures however seem to operate under different and more complex issues. Motivation, access, course quality, time and financial concerns are matters that reach out beyond the locus of control of the educational structures and even perhaps beyond the student. Corporations operating within their financial constraints may not have the means to provide acceptable online learning accommodations to their employees and even if they did, employee disinterest may counter the efforts. It would appear that this challenge requires action on multiple levels and greater investments made on more fronts to achieve optimal results. According to Konetes (2010), the intrinsic motivation found within university students is often lacking in the business sector thus relegating online learning to a secondary position of duty in order to maintain the status quo. In effect this may add additional factors which influence attrition in online learning environments.

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Easy Design and Use of Educational Questionnaires including Formulas with epsilonwriter

The epsilonwriter.com portal is launched in May 2010. It aims at providing an easy web tool for writing texts and formulas, in particular educational questionnaires, both for self-learning and for distance learning.

On the one hand, until now, there was no application for easily communicating between teachers and students with text and formulas, and for designing and using questionnaires including formulas. On the other hand, we have developed in the past an application called Aplusix [4] for helping students learning algebra, with an advanced formula editor and an authoring tool for building exercises. Aplusix has been experimented with success [5]. However, the authoring tool needs to be improved. These two points led us to develop the epsilonwriter.com portal [2] to allow teachers and students easily designing and using questionnaires.

This work is situated in the ITS authoring system framework [3] with advanced features for mathematical formulas (syntax and semantics) and with a very large set of possible users. The activities carried out are mainly rehearsal and learning by doing.

The epsilonwriter editor

The epsilonwriter editor has been developed to allow writing and modifying text and formulas in a natural way, i.e., avoiding rigid mechanisms observed in many equations editors. It is based on the Aplusix editor with several extensions. It is described in [6].

Questionnaires for self-learning

Questionnaires for self-learning contain explanations to be displayed to students during the evaluation phase. Authors can insert multiple choice questions, with radio buttons or checkboxes, writing formulas everywhere when they need. They choose the maximum score and the way incorrect answers are scored.

Authors can also insert open questions to let students enter freely their formulas. They provide the expected answer, with the indication of the way the student's answer has to be compared with it, the maximum score and explanations.

Students answering such questionnaires can answer to a question and go immediately in evaluation of this answer to get the right answer, a score and the explanations. In the case of an open question, they can modify the score. This has been made to avoid frustrations for situations where the score is not well calculated, for example because the author chose a too strict comparison way.

Questionnaires for distance learning

Questionnaires for distance learning are built like the previous ones with, in addition, an "assessment" password. When students answer these questionnaires, they cannot go in evaluation of the answers. They have to send their work to the tutor. The tutor, using the "assessment" password can write annotations on each question and a tutor score on open questions. At the end, the tutor sends the questionnaire to the student.

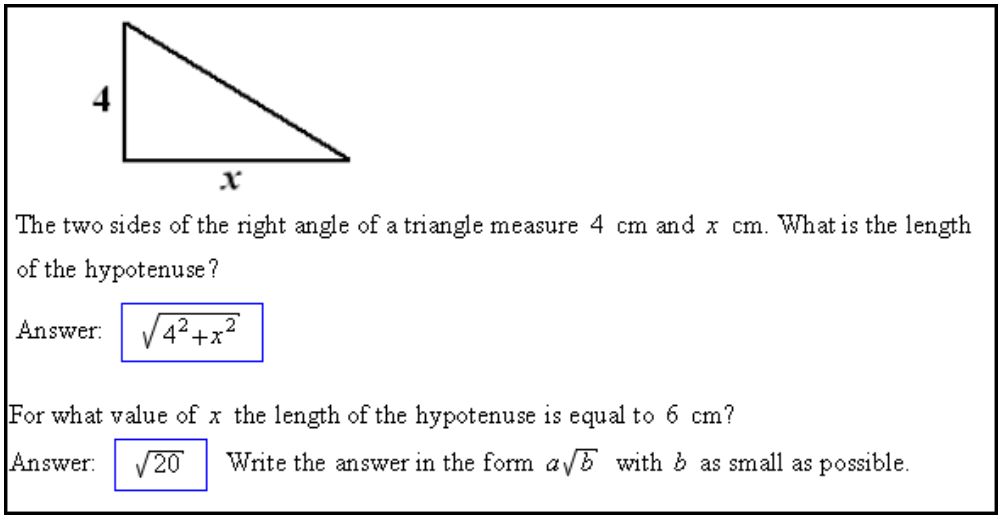

Figure 1. Mary answers to a questionnaire for distance learning. Then she sends her work to the tutor ("Send" menu of the applet).

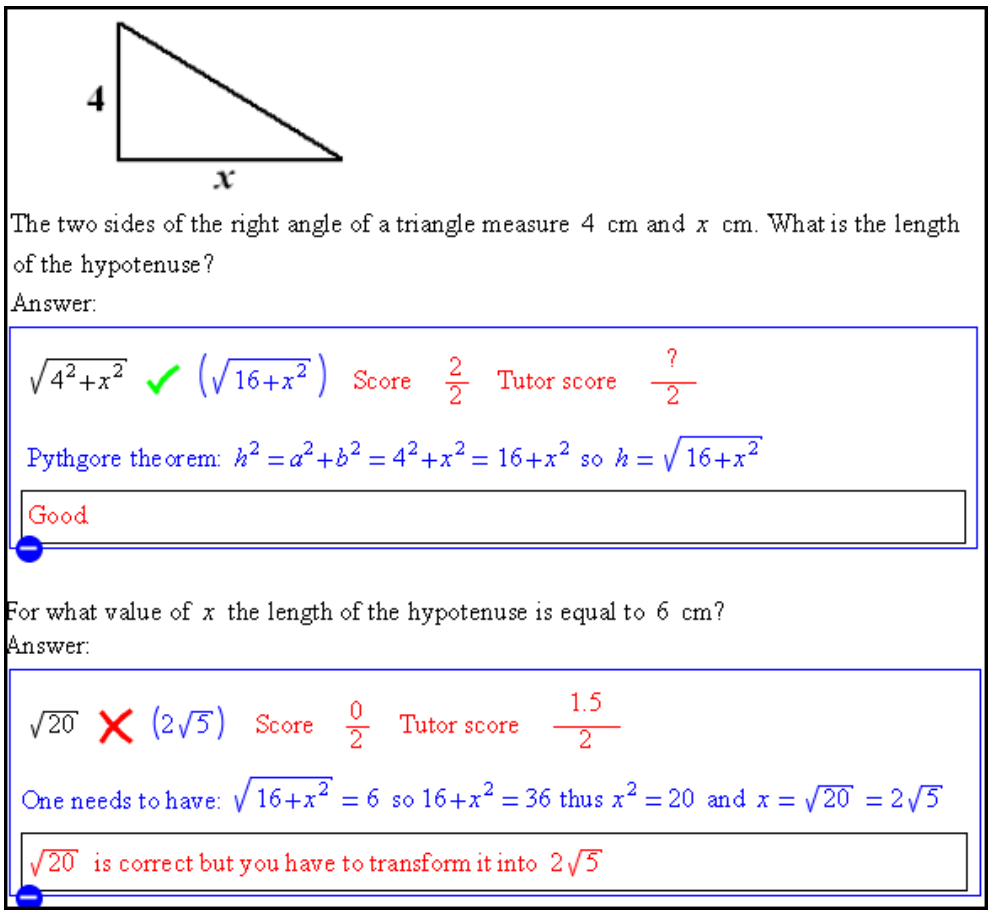

Figure 2

Peter, the tutor, receives Mary's email. He clicks on the link and goes to the portal. He chooses the "Assessment" menu and enters the "Assessment" password. The explanations written by the author appear in blue. Note that the first answer is considered as correct although it differs from the expected answer, because of a comparison mode including calculations. Peter writes the annotations (in red) and inputs a tutor score for the second question because he thinks that 0 is not the right score. When Mary receives Peter email, she will see exactly this figure.

Use cases of epsilonWriter

EpsilonWriter is a Java applet running in a browser. Questionnaires can be saved on the local computer and on the website. In the second case, links are provided to be pasted on web pages, email, etc.

Questionnaires for self-learning can be written on forums. We have adapted the phpBB forum [7] for that purpose.

Questionnaires can be sent by email. In that case, the body of the email has an HTML representation with images for the formulas and a link is included allowing answering to the questionnaire on the portal.

Experiments

Forums with questionnaires for self-learning are currently experimented in the Grenoble University, first year, math teaching. They are proposed to students for training before examinations. They have been built from preexisting paper multiple choice questionnaires, adding explanations.

A group of teachers currently experiments multiple choice questionnaires in French high schools (math).

Future work

The epsilonwriter project is conducted by the Aristod Company [1], a spin-off of the University of Grenoble. It is developed in Java in order to run on many platforms, however, in the current stage, the Windows platform is favored (we will pay attention to Linux and MacOS soon). The portal will be announced the 20th of May 2010 on the "Café pédagogique" mailing list which reaches many French teachers. The portal is currently in French and English, it will be extended soon to Spanish, Italian and Portuguese.

Future developments include:

- A stand alone application, to allow working offline.
- A chat, to be implemented on the portal.
- A calculation module, for doing calculations asked by the user.
- A module for drawing curves from their equations.

References

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[2] The epsilonwriter portal: http://www.epsilonwriter.com
[3] Murray T. (1999). Authoring Intelligent Tutoring Systems: An Analysis of the State of the Art. In *International Journal of Artificial Intelligence in Education* (1999), 10, 98-129.
[4] Nicaud, J.F., Bouhineau, D. and Chaachoua, H. (2004). Mixing Microworld and CAS Features in Building Computer Systems that Help Students Learn Algebra. *International Journal of Computers for Mathematical Learning* 9 (2) (2004) 169-211.
[5] Nicaud J.F., Bittar M., Chaachoua H.,InamdarP., Maffei L. (2006). Experiments with Aplusix in Four Countries. In *International Journal for Technology in Mathematics Education*, Volume 13, No 2.

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[7] phpBB: http://www.phpbb.com

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Book Announcement: *Thinking Visually*

Language is a marvelous tool for communication, but it is greatly overrated as a tool for thought. This volume documents the many ways pictures, visual images, and spatial metaphors influence our thinking. It discusses both classic and recent research that support the view that visual thinking occurs not only where we expect to find it, but also where we do not. Much of comprehending language, for instance, depends on visual simulations of words or on spatial metaphors that provide a foundation for conceptual understanding.

Thinking Visually supports comprehension by reducing jargon and by providing many illustrations, educational applications, and problems for readers to solve. It provides a broad overview of topics that range from the visual images formed by babies to acting classes designed for the elderly, from visual diagrams created by children to visual diagrams created by psychologists, from producing and manipulating images to viewing animations. The final chapters discuss examples of instructional software and argue that the lack of such software in classrooms undermines the opportunity to develop visual thinking. The book includes the Animation Tutor™ DVD to illustrate the application of research on visual thinking to improve mathematical reasoning.

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For more information, please visit:
http://www.psypress.com/thinking-visually-9780805860672

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List of Conferences

Conference Title	Date	Venue	Submission Date
2nd Hellenic Conference on ICT in Education	28 - 30 April 2011	Patras, Greece	1 December 2010
ICCE 2010 The 18th International Conference on Computers in Education	29 November - 3 December 2010	Putrajaya, Malaysia	17 May 2010
INCoS 2010 International Conference on Intelligent Networking and Collaborative Systems	24 - 26 November 2010	Thessaloniki, Greece	28 June 2010
7th Pan-Hellenic Congress E.E.E.P. – D.T.P.E, "The Future of Learning"	30 - 31 October 2010	Apollo Edifice, Piraeus	Closed
IVLA2010 42nd Annual Conference of the International Visual Literacy Association	29 - 3 October 2010	Limassol, Cyprus	10 May 2010
FIE 2010 The 40th Annual Frontiers in Education Conference	27 - 30 October 2010	Arlington, Virginia	Closed
MTSR 2010 4th Metadata and Semantics Research Conference	20 - 22 October 2010	Alcala de Henares, Madrid, Spain	15 June 2010
PTF 2010 Professional Training Facts 2010 "Learning – Competence – Performance"	20 - 21 October 2010	Stuttgart, Germany	N/A
TIC2010 2nd International Conference on Learning and Teaching	18 - 19 October 2010	Petaling Jaya, Malaysia	Closed
E-Learn 2010 World Conference on E-Learning in Corporate, Government, Healthcare & Higher Education	18 - 22 October 2010	Orlando, Florida	Closed
EL-A'10 International Symposium on E-Learning – Applications	18 - 20 October 2010	Wisla, Poland	31 May 2010
ICWI 2010 IADIS International Conference WWW/Internet 2010	14 - 17 October 2010	Timisoara, Romania	28 May 2010
EADTU 2010 EADTU's annual conference 2010: Strategies and Business Models for Lifelong Learning	27 - 29 September 2010	Zermatt, Switzerland	Closed
ICT 2010 Digitally Driven	27 - 29 September 2010	Brussels, Belgium	Closed
APTEL 2010 Asia-Pacific Conference on Technology Enhanced Learning 2010	24 - 26 September 2010	Kansai University, Osaka, Japan	15 May 2010
ETPE 2010 7th Pan-Hellenic Conference Information and Communication Technologies in Education	23 - 26 September 2010	Korinthos, Greece	Closed
IFIP AI 2010 The 3rd IFIP International Conference on Artificial Intelligence in Theory and Practice	20 - 23 September 2010	Brisbane, Australia	Closed
CLEF 2010 Conference on Multilingual and Multimodal Information Access Evaluation	20 - 23 September 2010	Padua, Italy	Closed

Conference Title	Date	Venue	Submission Date
USAB 2010 HCI in Work & Learning, Life & Leisure, 6th Symposium of the WG HCI&UE of the Austrian Computer Society	16 - 17 September 2010	Carinthia, Austria	Closed
UXFUL 2010 International Workshop on Enabling User Experience with future Interactive Learning Systems in conjunction with the USAB 2010: HCI in Work & Learning, Life & Leisure	16 - 17 September 2010	Klagenfurt, Austria	20 May 2010
DSC2010 5th South East European Doctoral Student Conference	13 - 14 September 2010	Thessaloniki, Greece	Closed
DEXA 2010 21th International Conference on Database and Expert Systems Applications	30 August - 3 September 2010	Bilbao, Spain	Closed
SPeL 2010 3rd International Workshop on Social and Personal Computing for Web-Supported Learning Communities in conjunction with the 21st International Conference on Database and Expert Systems Applications (DEXA 2010)	30 August - 3 September 2010	Bilbao, Spain	Closed
CATE 2010 13th IASTED International Conference on Computers and Advanced Technology in Education	23 - 25 August 2010	Maui, Hawaii, USA	Closed
ICSNC 2010 The 5th International Conference on Systems and Networks Communications (track PESYS: Pervasive Education Systems)	22 - 27 August 2010	Nice, France	Closed
Edutainment 2010 The 5th International Conference on E-learning and Game	16 - 18 August 2010	Changchun, China	Closed
NDT 2010 The 2nd International Conference on Networked Digital Technologies	4 - 6 August 2010	London Metropolita Business School, United Kingdom	Closed
IET FC 2010 The 1st IET International Conference on Frontier Computing - Theory, Technologies and Applications	4 - 6 August 2010	Taichung, Taiwan	Closed
WBC 2010 IADIS International Conference on Web Based Communities 2010 part of the IADIS Multi Conference on Computer Science and Information Systems (MCCSIS 2010)	29 - 31 July 2010	Freiburg, Germany	Closed
KES IIMSS 2010 The 3rd International Symposium on Intelligent and Interactive Multimedia: Systems and Services	28 - 30 July 2010	Baltimore, USA	Closed
eL2010 The IADIS International Conference on e-Learning 2010, part of the IADIS Multi Conference on Computer Science and Information Systems (MCCSIS 2010)	26 - 29 July 2010	Freiburg, Germany	Closed
HSci2010 7th International Conference on Hands-on Science	25 - 31 July 2010	The University of Crete, Rethymno, Greece	20 May 2010

Conference Title	Date	Venue	Submission Date
ICBDE 2010 International Conference on the Business and Digital Enterprises	22 - 24 July 2010	Bangalore, India	Closed
DEBS 2010 4th ACM International Conference on Distributed Event-Based Systems	12 - 15 July 2010	King's College, Cambridge, United Kingdom	Closed
ICALT 2010 10th IEEE International Conference on Advanced Learning Technologies	5 - 7 July 2010	Sousse, Tunisia	Closed
T4E' 10 International Conference on Technology for Education	1 - 3 July 2010	IIT Bombay, Mumbai, India	Closed
EISTA 2010 The 8th International Conference on Education and Information Systems, Technologies and Applications	29 June - 2 July 2010	Orlando, Florida, USA	Closed
CIT-10 10th IEEE International Conference on Computer and Information Technology	29 June - 1 July 2010	Bradford, UK	Closed
ICLS 2010 9th International Conference of the Learning Sciences Learning in the Disciplines	29 June - 2 July 2010	Chicago, IL, United States	Closed
EDMEDIA 2010 World Conference on Educational Multimedia, Hypermedia & Telecommunication	28 June - 2 July 2010	Toronto, Canada	Closed
JCDL 2010 Joint Conference on Digital Libraries	21 - 25 June 2010	Gold Coast, Australia	Closed
UMAP 2010 18th International Conference on User Modeling, Adaptation and Personalization	20 - 24 June 2010	Big Island, Hawaii	Closed
ITS2010 10th International Conference on Intelligent Tutoring Systems	14 - 18 June 2010	Pennsylvania, USA	Closed
CSPRED 2010 Computer-Supported Peer Review in Education: Synergies with Intelligent Tutoring Systems	14 June 2010	Pittsburgh, Pennsylvania, USA	Closed
ISWSA 2010 The International Conference on Intelligent Semantic Web – Services and Applications	14 - 16 June 2010	Faculty of Information Technology, Isra University, Amman, Jordan	Closed
Hypertext 2010 21st ACM Conference on Hypertext and Hypermedia	13 - 16 June 2010	Toronto, Canada	Closed
EDM2010 The 3rd International Conference on Educational Data Mining	11 - 13 June 2010	Pennsylvania, USA	Closed
EDEN 2010 European Distance and E-Learning Network Annual Conference	9 - 12 June 2010	Valencia, Spain	Closed
IDC2010 The 9th International Conference on Interaction Design and Children	9 - 11 June 2010	Universitat Pompeu Fabra, Barcelona, Spain	Closed
LEAFA 2010 The 1st International Conference of e-Learning For All	3 - 5 June 2010	Hammamet, Tunisia	Closed

Conference Title	Date	Venue	Submission Date
ESWC 2010 7th Extended Semantic Web Conference	30 May - 3 June 2010	Heraklion, Greece	Closed
LUPAS 2010 International Workshop on Linking of User Profiles and Applications in the Social Semantic Web in conjunction with ESWC 2010	30 May 2010	Heraklion, Greece	Closed
Global Learn Asia Pacific 2010 - Global Conference on Learning and Technology	17 - 20 May 2010	Penang, Malaysia	23 November 2010
ACA 2010 Academic Cooperation Association Annual Conference	16 - 18 May 2010	Cordoba, Spain	N/A
AICT 2010 The 6th International Conference on Telecommunications (special area ELETE: E-learning and mobile learning on telecommunications)	9 - 15 May 2010	Barcelona, Spain	10 December 2010