Internet-Based Learning Tools: Development and Learning Psychology (DLP) Experience

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ABSTRACT

The project aims to establish a deeper involvement of students and teachers in the learning process by using the ICT in higher education. We will try to address the following two questions: "how can the use of ICT help educators to accomplishing their academic goals and how do the students use the ICT to develop their academic skills?" The work team constituted by four teaching staff and two researchers at the University of Aveiro has developed a project on the 'Development and Learning Psychology' course. The course follows the traditional style of lecturing but with a Web site as a supporting tool aiming at increasing the involvement and responsibility of the students in the class.

Keywords: ICT, teaching and learning in higher education, research-action, students' academic success.

1. INTRODUCTION

As we are facing the new millennium, new challenges appear in the traditional educational role played by Higher Education Institutions. With the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important. New technological innovations, the globalisation of our society and culture, and new lifestyles will bring a demand for a different type of education. The role of the teacher as well as the student has been changing in the past years due to the new demands of the information society. The traditional teaching model has been giving placed to a student-centred learning setting. Faculty can not only be focused on the delivery of knowledge but how that knowledge is acquired by students and the resources they use to make the information more accessible. Teaching processes may, therefore, concentrate on developing learners' capacity to be innovative, to work independently, to set and solve problems and to handle large quantities of information in a wide range of media.

The use of Information and Communication Technology is yet not wide spread in all content courses delivery at Portuguese Institutions. The success of implementing ICT in tertiary education depends on a number of factors. These factors might not only be related to internal processes at the university itself, but also from outside the institution and related to educational and technological developments. The implementation of the technology arise cost issues and questions related to the support during and after the process of implementing ICT that can slow down the process of implementing innovative projects. The teachers' involvement in creating new pedagogical methodologies with the support of the new technologies in a classroom context is also very important to the efficacy of such methods.

Despite of all this issues, a group of staff and researchers from the Department of Educational Sciences at the University of Aveiro decided to use an e-Learning Program (eLP) in the process of teaching and learning the 'Development, Learning and Psychology' course. In previous years the course was delivered in a traditional teaching style. It was time to change this structure by using a web based learning tool to support the teaching process.

The present study presents the development of this project and its impact on the students' academic motivation for the course.

The interaction of all the project participants: students, teaching staff, ICT tools (WebCT), observers and monitors (fig.1) lead to the development of intervention strategies to promote the academic success. This goal is integrated in a research project – SPASHE (Strategies for Promoting the Academic Success in Higher Education) funded by the Science and Technology Foundation in Portugal. Having this objective in mind, the project aims to:

1) develop a research activity integrated in the curriculum courses;
2) promote the students' autonomy in the learning process;
3) involve the faculty in the teaching process;
4) develop the students' skills in using ICT;
5) involve students in monitoring activities.

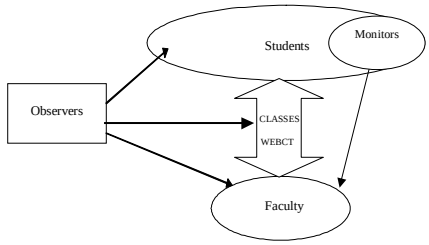

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Fig.1

2. THE USE OF ICT IN EDUCATION/TRAINING BY THE UNIVERSITY OF AVEIRO

Beginning in October 1998 the University of Aveiro (UA), launched an e-Learning Program (eLP), focused in promoting the use of Information and Communication Technologies (ICT) on higher education teaching/learning environments. From that main focus several other objectives derived, namely:

- Evaluate and analyse new technologies and teaching/learning pedagogies and methodologies;
- Study the new roles for teachers and students in a web-based environment;
- Promote the production of digital pedagogical content and its availability on the Internet;
- Create from a students perspective, flexible channels to access on-line content and teacher support;
- Encourage the creation and promotion of On-line Learning Communities (OLC);
- Reduce high failure rates among students, especially in some first year graduation courses.

The eLP is a joint effort of several units/services of UA, namely the Multimedia and Distance Learning Centre (CEMED) and the Computer and Information Systems Centre (CICUA), all working under the Rectory supervision.

3. LEARNING MANAGEMENT SYSTEM - WEBCT

The eLP's support software package is WebCT[1]. This web based Learning Management System (LMS) was originally developed by the British Columbia University in Vancouver and is now owned by an American company. This LMS is widely used by other higher education institutions and is very reliable and easy to maintain/manage. Although not very flexible in terms of customisation and synchronous features, WebCT does not demand much prior computer knowledge from its users and provides a good support for the eLP demands. Every interaction with WebCT is made with a simple web browser and no special plug-ins or applications are needed. WebCT support four types of users: Administrators, Teachers, Teaching assistants and Students. All these types have their own tools, features and application interface. From the moment that a user enters a WebCT server the application detects its user profile and adapts the environment accordingly.

The Administrator possesses tools for general server management such as Course Management, User Management and Server Settings. The teacher tools are dedicated to the course internal management: Content Management & Editing, Time Planning, Student Management & Tracking, Student Assessment and Communications.

Teaching assistant tools are concentrated on the Student Assessment and Tracking. For the student available tools are directed to Content Retrieval, Study Auxiliaries, Presentations, Self-Assessment, Performance Report & Tracking, Time Planning and Communications.

Every course can be accessed from a user's personal homepage - my WebCT, or from a Course Listing. In this listing, Public and Private Areas can be defined for every course, with a user name and a password being necessary to access the private ones.

In terms of communication tools WebCT supports two asynchronous: the Private Mail, the Discussions and two synchronous: The Chat and the Whiteboard. Under the eLP the asynchronous are the ones mostly used due to their time flexibility features.

The eLP's System Architecture comprises three WebCT servers. The first and oldest server [2], hosts mainly graduation courses. The second server [3], hosts pos-graduation courses and the other courses with on-line

assessment and assignment delivery. The third and newest server [4], hosts solely courses from an UA Accounting School.

4. STRATEGIES/APPROACHES UNDER Elp

The model adopted by the Elp is based on a volunteer enrolment of teachers and students, at no additional fees/costs. Each teacher is responsible for defining his/her own pedagogical approach/methodology. Right from the Elp start, back in 1998, this "teachers based approach/methodology" provided a multitude of approaches that cohabit today inside the program. Different methodologies are thus implemented:

- Diffusion of pedagogical content, where courses web sites act as a complement to face-to-face teaching/learning. This is normally the first approach that a newcomer teacher adopts;
- Replacement of face-to-face lab classes, namely in Computer Sciences courses, for on-line based lab classes;
- On-line assessment, especially in courses with massive numbers of enrolled students. As all the quizzes are automatically evaluated, this feature reduces largely the teachers evaluation workload;
- Discussion and support groups for courses with students that are about to become full-qualified teachers and are located far away from the University. These groups promote the communication among participants, the exchange of ideas and opinions, thus developing true OLC. This approach is also used to maintain contact with UA students located abroad due to some interchange programs (e.g. ERASMUS initiative);
- Survey delivery mechanisms, allowing thus to collect students opinions on courses, curricula, teacher performance and any other topics related with field work of ongoing research & development projects.
- Support to research & development projects and its Labs, creating so an on-line space to interact/communicate with other researchers, to publish papers, reports and other scientific work.
- B2B/Virtual Marketplace On-line Simulation, in a course named 'Professional Project' with more than 170 virtual companies managed by students with the supervision of teachers and teaching assistants.

5. eLP DEVELOPMENT

Currently more than 400 courses are available from different under-graduation, graduation and pos-graduation programmes. Although a special emphasis on engineering and science courses can be detected, other knowledge fields are also available such as Languages, Economics, Arts, Management and Education. Figures **X** and **Y** show the eLP evolution since 1998 in terms of courses available and WebCT server accounts.

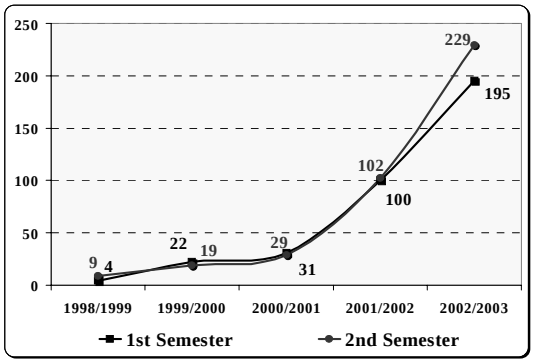

Fig. **X** – Number of courses available in eLP.

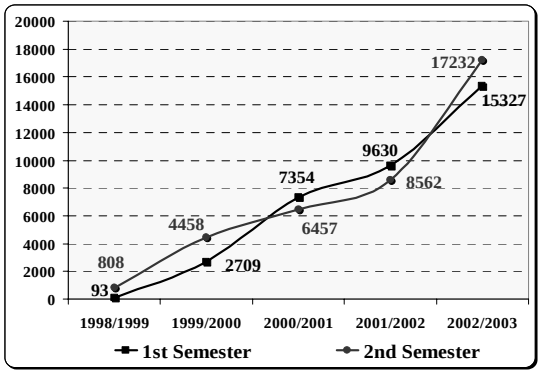

Fig. **Y** – Number of WebCT server accounts.

6. "Development and Learning Psychology" – WEBCT COURSE SITE OVERVIEW

The project was divided in three stages: a) preparation and planning, b) implementation and c) evaluation.

6.1 The first stage: preparation and planning

The first decision was to create a friendly structure of the web page to be easily used by the students and lecturers.

Located in the second UA WebCT Server [3], this course web site provides the needed tools and features to act as a complement to the "Development and Learning Psychology" face-to-face lectures. Four main organizational areas can be identified on the web site homepage (see Figure **Z**):

- Content Area, with the Information and Content sections. The Information section contains documents with important information to the students regarding the ongoing course. The Content section (see Figure **K**), is divided in several sub-sections. The course syllabus, lectures slides and additional support contents are all available here. Another three sub-sections contain specific documents regarding face-to-face practical classes and are managed by different course teaching staff persons. All contents are presented in a hierarchical structure created with WebCT Content Module Tool.
- Announcements Area, with the Calendar Tool and a Latest News section. On the Calendar Tool exists a full course time plan, with classes, special dates and events thoroughly up dated. The Latest News section allows teaching staff to publish urgent announcements.
- On-line Assessment & Surveys Area, with Surveys/Quizzes Tool. Several assessment quizzes are conducted here (see Figure **W**). A preliminary Survey was also given to the students with the help of this tool. All questions are stored on the server and are mainly of Multiple Choice type.
- Communication Area, with the Discussion Groups, Mail and Chat Tools which provide all the communication with teaching staff and among students. The asynchronous ones: Discussion Groups, where all messages sent are broadcasted to all participants and the Mail Tool very similar to a standard e-mail system but works only inside the course web site. Only enrolled students and teaching staff can use this Mail Tool. In terms of synchronous communication tools there is only one – the Chat, where real time text based conversations can be scheduled and maintained.

Fig. **Z** – "Development and Learning Psychology" Homepage

Fig. **K** – "Development and Learning Psychology" Content Area.

Fig. **W** – "Development and Learning Psychology" Quiz example.

[1] http://WebCT.ua.pt [2] http://WebCT.ua.pt
[3] http://WebCT2.ua.pt [4] http://WebCT.isca.ua.pt
[5] http://www.cemed.ua.pt/ed

6.2 The second stage: the implementation

A group of monitors were chosen from the students aiming to be the contact link between the researchers and the students of each course. The monitors helped the teachers to understand the students' difficulty in using the WebCT and give suggestions regarding the teaching of the course in following years.

To complement this support two researchers developed systematic class observation activities which were analysed based on specific reports concerning the teaching tools applied during the different learning situations; the learning approaches of the students and the role of WebCT tool as learning facilitator in the whole complex process. The researchers also helped faculty in managing the content information of the web page.

In the first lecture there was a presentation of the main aims and scope of the project to the students followed by the description of the 'observers' role. Faculty promoted the use of the WebCT near the students. The material used in the practical classes was available on the site. The students had to log in with their personal password and username to get the necessary material to work in the class. One of the teachers tried an on-line class in the chat room but the experience was not the most successful one. The high number of students enrolled in the class (more or less 30) and their inexperience in using this tool made the experience quite confusing. Students tried to make questions at the same time, not allowing the teacher to answer to all the questions. The chat room was never used by the students to contact with the teachers. The email was the chosen vehicle for establish the contact between faculty and students.

Students were evaluated in the practical classes by an online exam and an assignment. This activity was very well accepted by the students. For must of them it was their first experience on doing an on-line exam.

This online exam consisted in five multiple questions regarding the main issues developed in the DLP lectures and worked in these course practical classes. Filled in by 209 students, this exam had the aim of providing some information about the students' learning stage in this course to provide information about the students' achievement rate.

The results indicated that the students had a performance mean of about 68,8% (more than 50% of the students had a mean score in the exam of about 89,5%) what therefore came to indicate that the students in this course tend to have an intermediate/high level of achievement.

6.3 The third stage: evaluation of the project

The evaluation of the project was possible due to the class observations, the meetings with the teaching staff and monitors and the on-line questionnaire. The online questionnaire gave the students' perceptions and opinions on the WebCT experience. The researchers created a set of reports with the collected information from the meetings with the monitors and the class observation. They also supported the reports with some photographic and video material.

7. EVALUATION OF THE PROJECT

7.1 DLP experience reports

The reports about the attended lectures and practical classes and meetings with the faculty members and monitors allowed us to get some insights about the students' perception and feelings towards the observation process and WebCT usage in this course.

In a general way, the students seemed to feel satisfied with this experience and consider the DLP WebCT site to be one of the best organized and complete ones although for some students (Humanities) this opportunity was their first contact with WebCT. The lack of computers and some technical problems for such a diverse and large student population, especially in the departments of humanities led to some difficulties in accessing the web. However, the students emphasized the role of this ICT learning tool for the promotion of mutual knowledge, cooperation and material sharing between the seven degrees involved in this experience. The presence of the observers led to, in a first moment, some feelings of uncertainty and curiosity in the students and faculty but, in the next stages of observation, the students became more comfortable with the presence of strangers to the teaching-learning process.

7.2 The use of Support resources (WebCT)

The results presented before can somehow be explained by their level of motivation which can be the product of a correct and frequent use of the support resources and learning tools used to help the student to access contents and interact with the faculty members.

By the use of WebCT files we can determine, on one hand, the number of students who accessed the site and, on the other hand, the number of visits which had the goal of visiting and reading the items provided. A total of 97 students (out of 209), this is to say, about 46,4% of the students felt motivated to explore the resources accessed the site about 64 times but each student only opened and visited the contents 3,9 (mean) times. In fact, these two variables demonstrated to be highly statistically correlated (r= 0,648 p=0,000).

7.3 Students' perceptions and opinions on the WebCT experience.

In order to analyse the students' perceptions and opinions on the WebCT experience the observation team composed a 16 items questionnaire following a 6 point likert scale (1=min 6=max) where the students where invited to refer to their motivation level to the course ("I feel motivated for this course": item 1), their opinion about the approaches and strategies adopted by the faculty members during this course classes ("The approaches and strategies adopted are interesting and motivating": item 2), the frequency of the use of the WebCT tools ("I usually use the WebCT ": item 3) and its specific uses "to get general information about the course"(item 3.1), "to get the course program"(item 3.2), "to get the lecture slides" (item 3.3), "to get the unit content questions"(item 3.4), "to get the support texts" (item 3.5), "to get the summaries;"(item 3.6), "to get support resources;" (item 3.7), "to get the course schedule;" (item 3.8), "to participate in the discussion groups;"(item 3.9), "to access the course email;"(item

3.10) and "to participate in the course chat" (item 3.11). Finally there were two items concerning the usability of this learning tool ("It is easy to use this ICT learning tool"; item 4) and the role of WebCT in the students learning achievement ("The use of this ICT learning tool increases my learning.: item 5).

In a general way, and by analysing the mean and mode values presented in the following table we can get the main students' perception and opinion about the use of this resource:

ITEMS	MEAN	MODE
item 1: "I feel motivated for this course"	4,59	5
item 2: "The approaches and strategies adopted are interesting and motivating"	4,04	5
item 3: "I usually use the WebCT"	4,31	5
item 3.1: "I usually use the WebCT to get general information about the course"	4,41	6
item 3.2: "I usually use the WebCT to get the course program"	4,71	6
item 3.3: "I usually use the WebCT to get the lecture slides"	5,01	6
item 3.4 : "I usually use the WebCT to get the unit content questions"	4,69	6
item 3.5: "I usually use the WebCT to get the support texts"	4,66	6
item 3.6: "I usually use the WebCT to get the summaries"	4,04	6
item 3.7: "I usually use the WebCT to get support resources"	4,60	6
item 3.8: "I usually use the WebCT to get the course schedule"	2,81	1
item 3.9: "I usually use the WebCT to participate in the discussion groups"	2,33	1
item 3.10: "I usually use the WebCT to access the course email"	2,94	1
item 3.11: "I usually use the WebCT to participate in the course chat"	1,80	1
item 4: "It is easy to use this ICT learning tool"	4,68	6
Item 5: "The use of this ICT learning tool increases my learning"	4,26	5

The collected data indicated that students tend to feel highly motivated about this course (4,59 mean and a mode of 5) and consider that the approaches and strategies adopted are interesting and motivating (4,04 mean and a mode of 5). When questioned about the frequency of use of this tool, the students indicated a fairly high level of usage (4,31 mean and a mode of 5) which we can analyse by studying the several situations in which this tool can be used. The more frequent use of WebCT has to do with getting the slides from lectures (5,01 mean and a mode of 6) followed by access to the course plan (4,71 mean and a mode of 6), then by the unit content questions (4,69 mean and a mode of 5) and then by the support texts (4,66 mean and a mode of 6) and resources (4,60 mean and a mode of 6). From the items presented to the students the less used tools of WebCT are associated with getting information about the course (4,41 mean and a mode of 6), accessing the summaries (4,04 mean and a mode of 6),email (2,94 mean and a mode of 1), course schedule, (2,81 mean and a mode of 1), the discussion group (2,33 mean and a mode of 1) and chat room (1,80 mean and a mode of 1).

8. SOME CONCLUSIONS

The project main aims targeted the development of specific intervention strategies near students and faculty to improve the academic success by using an ICT teaching-learning tool (WebCT).

The development of this research activity turned to confirm the initial research hypotheses that the participation of the students would be quite effective and positive. In fact, the majority of the students stated to have enjoyed this initiative and used quite often this tool. The promotion of the students' autonomy in the learning process was, moreover, one of the main objectives and, at the same time, an outcome of this project because students started using this tool (some, for the very first time) and integrated it in their daily schedule tasks.

Students also had the opportunity to develop skills in using ICT and become more aware of the importance and several usages associated to this internet-based learning tool.

The participation of the faculty members in the teaching process was also highly achieved and the contribution of the students as monitors came to allow the involvement and acknowledgement of these educational agents for the role of these new technologies in a more and more demanding global information world.

9. FURTHER WORK

This exploratory study is the basis for the development of the main ideas of this project regarding the involvement of the students and faculty in this research activity integrated in the specific courses. In the next academic year we plan to increase the level of participation of the monitors as interfaces between the other students, the faculty members and the WebCT by providing monitors specialized training about this internet based learning tool. The Monitors will be trained to insert on the Web page material and information available and also to have the necessary skills for designing the site.

The faculty members are also a major priority of this projects' further work especially in what comes to providing training and specialized support to increase their level of motivation and commitment with the new technologies. Moreover, the role of the teacher itself is changing: more than a reference and a content provider the teacher is becoming a learning facilitator, manager and a tool's provider.

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