

Cooperative Learning in Higher Education using Weblogs: a study with undergraduate students of Education in Portugal

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ABSTRACT

This paper presents an experience of internet integration in an Education Program of the University of Minho, Braga, Portugal. The project was developed in the first semester of 2006/2007 and integrated 23 undergraduate students who attended Educational and Communication Technology (ECT) class. Students, in small groups, were encouraged to set up and maintain a weblog as a portfolio of the team work. Cooperative learning was the central object of study: students worked together to maximize their own and each other's learning. At the end of the semester students filled a five-point Likert scale online questionnaire evaluating four dimensions of the experience: a) weblogs as educational/communicational tools; b) weblogs in ECT course; c) weblogs and the future of the profession and, d) weblogs and cooperative learning. The results show up that weblogs are versatile educational tools that can promote learning whilst developing social skills.

Keywords: weblogs, cooperative learning, higher education

1. INTRODUCTION

In the knowledge-based and global society we live in, cooperative team skills and social learning are essential for individual success, employment and social inclusion. According to [1] school systems must recognise the importance of learning objectives such as social competence, critical thinking, knowledge sharing and cooperation techniques.

On the other hand, thinking about the future of learning in the knowledge-based society needs to be holistic as learning will become a lifelong activity that cuts across different learning generations and life spheres such as private, public and work. The focus should therefore be not only on traditional formal learning institutions such as schools and universities; and existing training organisations and training practices for both the unemployed and employed, but it should also embrace other forms of adult education and many forms of informal learning

Living in a knowledge-based society driven by the wide-spread diffusion of ICT does indeed give rise to the need for acquiring new digital competences and ICT skills. The European Commission has already identified "digital competence" as a "key competence" that individuals need to acquire for personal development, active citizenship, social inclusion and employment. It is important to acknowledge this and to confirm that it is not only about "ICT literacy", i.e. learning to operate the technology, but also about higher-order skills such as knowing and understanding what it means to live in digitalized and networked society but specially what it means to work in online cooperative teams where information is shared and knowledge collaboratively constructed.

As [2] we assumed that internet based technologies such as

blogging provided new ways of doing and thinking and could be used in higher education for other purposes than the traditional information delivery and communication tool reported in the literature. The key question motivating this study is whether blogs used in undergraduate education programs: a) enhanced a cooperative learning environment, and b) contributed to the development of innovative forms of formative assessment.

2. COOPERATIVE LEARNING

The term "collaborative learning" refers to an instructional method in which students, at various performance levels, work together in small groups toward a common goal. The students are responsible for one another's learning as well as their own. Thus, the success of one student helps other students to be successful. Cooperative Learning, a form of collaboration, is "working together to accomplish shared goals" [3]. Whereas collaboration happens in both small and large groups, cooperation refers primarily to small groups of students working together.

Within cooperative activities individuals seek outcomes that are beneficial to themselves and beneficial to all other group members. Class members are organized into small groups after receiving instruction from the teacher. They then work through the assignment until all group members successfully understand and complete it. Cooperative efforts result in participants striving for mutual benefit so that all group members gain from each other's efforts (*Your success benefits me and my success benefits you*), recognizing that all group members share a common fate (*We all sink or swim together*), knowing that one's performance is mutually caused by oneself and one's colleagues (*We can not do it without you*), and feeling proud and jointly celebrating when a group member is recognized for achievement (*We all congratulate you on your accomplishment*). In cooperative learning situations there is a positive interdependence among students' goal attainments; students perceive that they can reach their learning goals if and only if the other students in the learning group also reach their goals [3] [4]. The essential components of cooperation are: a) positive interdependence, b) interaction, c) individual and group accountability, d) interpersonal and small group skills, and e) participative assessment [5]. The first and most important element in structuring cooperative learning is **positive interdependence**. Positive interdependence is successfully structured when group members perceive that they are linked with each other in a way that one cannot succeed unless everyone succeeds. Group goals and tasks, therefore, must be designed and communicated to students in ways that make them believe they sink or swim together. When positive interdependence is solidly structured, it highlights that (a) each group member's efforts are required and indispensable for group success and (b) each group member has a unique contribution to make to the joint effort because of his or her resources and/or role and task responsibilities. The second

basic element of cooperative learning is promoting **interaction**, preferably face-to-face. Students need to do real work together in which they promote each other's success by sharing resources and helping, supporting, encouraging, and applauding each other's efforts to achieve.

The third basic element of cooperative learning is **individual and group accountability**. Two levels of accountability must be structured into cooperative lessons. The group must be accountable for achieving its goals and each member must be accountable for contributing his or her share of the work. Individual accountability exists when the performance of each individual is assessed and the results are given back to the group and the individual in order to ascertain who needs more assistance, support, and encouragement in learning. The purpose of cooperative learning groups is to make each member a stronger individual in his or her right. Students learn together so that they subsequently can gain greater individual competency.

The fourth basic element of cooperative learning is teaching students the required **interpersonal and group skills**. Social skills for effective cooperative work do not magically appear when cooperative lessons are employed. Instead, social skills must be taught to students just as purposefully and precisely as academic skills. Leadership, decision-making, trust-building, communication, and conflict-management skills empower students to manage both teamwork and taskwork successfully [6].

The fifth basic element of cooperative learning is **participative assessment**. Participative assessment exists when group members discuss how well they are achieving their goals and maintaining effective working relationships. Group members need to be responsible for their educational process and for group and individual achievement.

3. WEBLOGS IN EDUCATION

The term weblog refers to a personalised webpage, kept by the author in reverse chronological diary form. As a "log on the web" it is kept first and foremost on the web, either on a static web page, or via a database-backed website, enabled through "blogging" software. As a "log on the web" it easily refers to other internet locations via hyperlinks. The features of weblogs including archival of past weblogs by date-posted, hyper linking to other weblogs, instant publishing of web content with little technical skill required, and ways for other to comment/feedback, provide new opportunities for people to present and express themselves online and to communicate with other cibernetos [7].

[8] systematizes the rationale for using weblogs as an "educational resource" or as a "pedagogical strategy". As an "educational resource" weblogs can function as: a) a space for efficient information retrieval or b) a space for the teacher to provide online information for students. As a "pedagogical strategy" blogs can serve as: a) digital portfolio, b) a space for the exchange of ideas, c) a space for role-playing and d) a space for integration.

Recent research on educational uses of weblogs show promising results specially regarding the pedagogical uses of this tool as a digital diary or portfolio [9], [10]; [11]. Some advocate they are very flexible communication means in b-learning environments [12], others defend that building a blog encourages critical thinking in classroom settings [2], or even that blogging inspired by Vigotskian theories offers students the opportunity to discuss ideas in a social plan, enabling the social construction of knowledge [13]

In many ways, weblogs combine the best elements of portfolio-driven courses, where student work is collected, edited, and

assessed, with the immediacy of publishing for a virtual audience. Content management platforms on which weblogs are built make this entire process easier and more efficient. But while new uses of web-based applications can make writing more real for students, educators will still need to consider how to evaluate what happens when students write and publish online [14]

4. METHOD

The 4 years Education Program of Minho University, Portugal, intends to prepare professionals (other than teachers) who will develop tasks in different areas of educational systems such as schools, libraries, municipal councils, hospitals, etc. Those professionals must be prepared to versatile functions, such as preparing life long learning projects design and assessment, socio-cultural and recreational activities, etc. Educational and Communication Technology (ECT), is a one semester course and integrates the curriculum of students 2nd year undergraduate program. The main goal of the subject is to prepare students with digital skills and competences necessary for employment, education and training, self development and life long learning in the knowledge society. ECT is a 3 hour week course (1h magisterial and 2h practical sessions). In the magisterial session student learn the conceptual frameworks for ECT. In the practical sessions, students develop a written project and present it at the end of the semester to the instructor for assessment. The need to enhance innovative pedagogical experiences using the internet motivated the study we present in this paper. W

The cooperative learning model described [15] which emerges from social constructivist theory formed a framework for integrating blogs into our teaching and learning process. in ECT classes. We assumed that people work together and learn from each other, mentor each other, and grow together towards a final goal. Students worked in four or five-member heterogeneous groups on a team assignment task. Emphasis was given to team-building activities and regular discussions within groups about how well they were working together.

Students were asked to set up a weblog using the editor *blogs.sapo.pt* (a portuguese version of blogger.com). In the first week of the study students were introduced to the weblog technology. Most were already familiarised with internet technologies and felt enthusiastic about learning how to build a weblog. All students quickly became engaged with the subject and the following week all groups had personalized the layout of the group weblog with logo and an identification photo.

The weblog had to be kept of on-going thru the semester as the digital portfolio of the group to be assessed both by the instructor and the class-fellows. The weblog portfolio should: a) include posts on selected program topics; a) provide online information for the class and the instructor; b) gather and organize internet resources for every specific topic; c) provide links to appropriate sites and annotating the links to highlight their relevance; c) post photos and comments on group activities.

The project lasted one academic term – the 1st semester of 2006/2007 - and enrolled 23 students who attended ECT classes. Students freely organised into groups and were asked to post once every two sessions in response to a specific program subject; 7 program topics were selected for posting; in the first week, students used the internet to search information and share responsibilities within group members; the second session was dedicated to discussing streams of thinking and final postage of the written essay. The journal format and the blog writing was optimised according to the comments both of the instructor and other students. The nature of the activity demanded a high degree of continuous evaluation. All groups were involved in

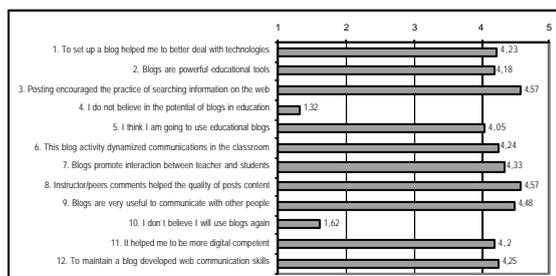
their own assessment; at the final session students auto and hetero evaluated the group artifacts. The teacher was a mediator who adjusted the level of information and support so as to maximize student ability to take responsibility for learning. Every time a new post was added to the group portfolio, instructor and other groups visited the new contributions to leave a feedback comment or/and post reflections on own learning. Upon completion of the study students were administered an online questionnaire (using www.monkeysurvey.com). The questionnaire was organized into three parts; some initial identification items related to students age, gender and previous experience with technologies; the second part was designed to evaluate four dimensions of the learning activity: 1) blogs as education/communication tools; 2) blogs in ECT classes; 3) the blog experience for the future of the profession; 4) blogs and cooperative work. The items for dimensions 1-3 were adapted from an author's previous questionnaire [11], [16]; items for dimension 4 (cooperative learning) were adapted from a similar questionnaire used by [17] in a study with 8th grade students. A total of 44 items in the format of a five-point Likert scale of agreement were included in a random order. Each degree of agreement was given a numerical value from one to five (1=Strongly disagree; 2=Disagree; 3=Neither agree or disagree; 4=Agree, 5=Strongly agree). The third part consisted of one open ended question (*Do you think it was a good idea to develop this learning activity?*) and it was included in the questionnaire in order to obtain additional information on students overall opinion of the blog activity in ECT course.

5. RESULTS

All 23 students filled anonymously the online questionnaire. 87% students were female and 13% male. The average age of students was 22,43 years old (range 19-30), and 21% (5) were student workers. Most students had already heard about weblogs (82%), but only two had ever set up a personal blog. None had ever used a blog as a portfolio in any other curricular course. The analysis of group interactions (n° of comments/per week/per group) showed high levels of performance compared to the author's previous experience with pre service teachers [11]

5.1 Blogs as an educational/communication tool

Twelve items of the questionnaire investigated students perceptions on the potential of weblogs as educational/communicational tools. Two items were formulated in a negative format in order to avoid a response pattern (acquiescence response bias) [18], and were used to confirm the corresponding positive statements (items 1-4, and 5-10). For each item it was computed the arithmetic mean, and this value was the basis for discussing results; as we used a 5 points Likert scale for degree of agreement (1=Strongly disagree - 5=Strongly agree), we considered the mean of 3 as the cut point for considering the existence of agreement/disagreement. Graph 1 presents the results for N=23.



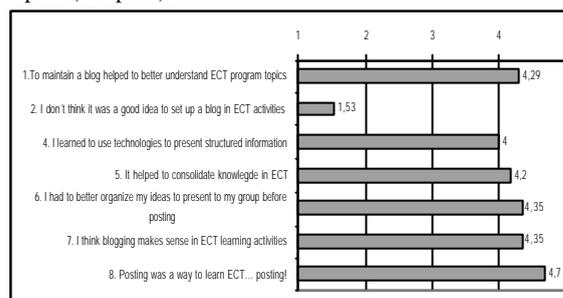
Graph 1 – Blogs as educational/communicational tools

The first overall remark is that student's expressed rather extreme response sets either for agreement/disagreement showing therefore a firm opinion regarding this issue (all positive agreements over 4 and negative ones above 2). We can see students consider blogs as *powerful educational tools* (it. 2 - 4,18 confirmed by the negative it. 4-1,32), and that they *intend to use this educational tool again* (it. 5-4,05 confirmed by the negative value in it. 10-1,62). Weblogs were also considered *powerful tools to communicate* (it. 9-4,48), that *promoted class interactions* (it. 7-4,33), *helped them to deal with technologies* (it. 1-4,23), and even encouraged the *search for information in the web* (items 3, 11 and 12 all with average means over 4,2).

As a general idea for this whole dimension we can conclude students view blogs as an interactive technology with potential both for educational and communicational purposes that has potential to promote the quality of learning. Students answers to the open ended final question confirm the same evidences: *we could feel the enthusiasm, as all wanted to do better and more, making the blog look more beautiful and rich; we learned to communicate with different tools; bogs allowed us to access to information anywhere and anytime.*

5.2 Blogs as learning tools in ECT classes

A global analysis of the 8 items (one in a negative statement) that evaluated the dimension "Blogs as learning tools in ECT classes" shows a very high level of agreement regarding the positive impact of blogs as a strategy for learning ECT course topics (Graph 2).



Graph 2 – Blogs as learning tools in ECT

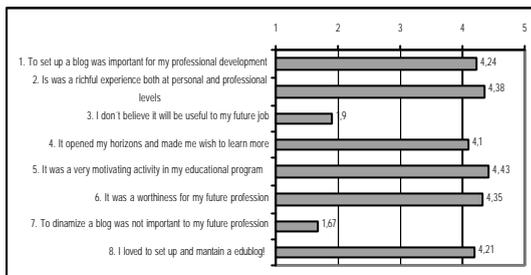
In fact, students responses show they considered the blog experience helped them to *better understand ECT program topics* (I.1 =4,29), to *better organize the ideas* (I. 6 =4,35) and also to *consolidate knowledge in ECT* (I. 5=4,2 and I. 8=4,7). They also considered to be a good idea to introduce this kind of activities in their curricular practices (I. 7 =4,35, confirmed by the reversed negative I. 2 =1,53).

This idea was confirmed by students answers on the final open item of the questionnaire: *I think we learn more this way than with final exams; It was an easier way to learn ECT program topics; We could learn practicing not just reading theories.*

5.3 Blogs and the future of the profession

A global analysis of the 8 items (2 in negative statement) for this questionnaire dimension shows students considered the blog learning experience as a "very important" one in terms of their future professional activity (items 1, 2, 6, 7 with average means above 4,24 confirmed by the negative values obtained in item 3). They also considered the experience to be "very motivating" (it. 5=4,43 and it 8= 4,21) in terms of their education graduate curriculum; they also considered that this learning activity *encouraged them to learn more* (it. 4=4,11). Graph 4 shows the

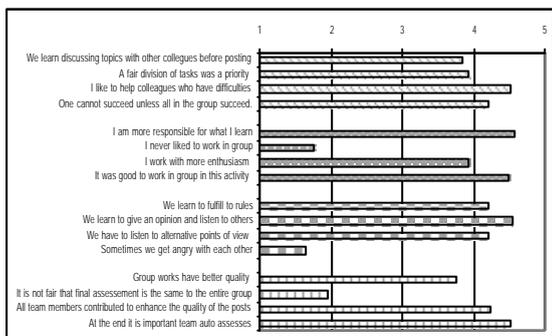
results for N=23.



Graph 3 – The blog experience and the future of the profession

5.4 Blogs, cooperative work and group assessment

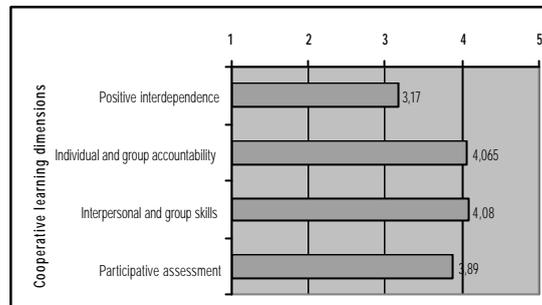
This questionnaire, the most important in terms of our research goals, intended to evaluate students perceptions on blogs potential to promote cooperative learning and formative assessment. According to the literature, 16 statements were formulated to evaluate four dimensions on cooperative learning: positive interdependence (PI), individual/group accountability (IGA), interpersonal/group skills (IGS) and participative assessment (PA). Graph 3 shows the results for N=23 (each bar represents the average mean for the 1-5 points degree of agreement for each item).



Graph 3 – Blogs and cooperative work

We could verify the highest levels of agreement concentrated on the following items: *I like to help colleagues who have difficulties* (IP); *I am more responsible for what I learn* (IGA); *We learn to give an opinion and listen to others* (IGS) and *At the end it is important team auto assesses* (PA). The lowest degree of agreement occurred in two items on participative assessment: *it is not fair that final assessment is the same for all members* and *group works have better quality*.

Considering each one of the four dimensions as a whole (Likert scales allow items addition, [18]), we could obtain an average mean of agreement (reversed the items in a negative format) for each of the four dimensions on students cooperative learning perceptions (Graph 4). We could verify that *Individual and group accountability* and *Interpersonal and group skills* were the dimensions students valued more in the blog learning activity. On reverse, *positive interdependence* and *participative assessment* were the dimensions students considered to be less successful in the learning experience.



Graph 4 – Four dimensions on cooperative learning

The comments left by students in the final open ended question showed some additional interesting cues. In fact, the content of students answers confirms they valued the group work: the ideas were discussed in the group, each member presented his point of view and the difficulties were, therefore, transposed; it is important that group skills and interactions are valued; it is important that students learn to work in groups that function as a whole. Another interesting cue that arises from students answers is directly related to the formative evaluation process adopted in our ECT course classes: *the evaluation process is more transparent and we can really interact with the instructor; we could develop group tasks along the semester and there was no need for extra work at final; work was divided within all semester, and so we don't have to do all at the end like in other disciplines; as in other curricular courses, evaluation should not be based in only final work but during the whole class period.*

6. FINAL REMARKS

When we decided to improve this learning strategy with our undergraduate students we never imagined this experience would result the way it did. In fact, the author's previous blog experience with pre-service teachers students set up a blog seen as an instructional device to use in real classrooms [16]; in the learning experience we present in this paper blogs functioned not only as a group portfolio but also as the only final artifact used by the instructor to assess students learning outcomes in ECT program. This is an original use of blogs not yet reported in literature but that we believe has enormous potential for higher education learning environments, in particular for learning courses. This is important in particular for European Universities as the Bologna Process changed all our traditional evaluation practices whose main focus was on final exam evaluation of the student's learning outcomes; we need to prepare digital competent users of ICTs in the knowledge-based society so we have to promote formative assessment in order to ensure that the learning goals have being achieved and improved the instructional process. The way participants (instructor and students) got involved in the weblog activity is difficult to assess only by discussing students responses to a final questionnaire; it is impossible to quantify the real elm of this learning activity but we are sure it was different from all other students previous learning experiences. The enthusiasm and the animation of the class sessions, the crescendo in student's interdependence, and specially the quality of the written posts that become, week after week, more solid and consistent, offering links to qualified additional sites and sources of information, were the best indicators of the success of this learning strategy.

The data collected from the final questionnaire reflect this evidence. Student's enjoyed the experience of setting up a weblog that was not just busywork but the only instrument for the formative evaluation of ECT instructional module. Most

students developed group skills and felt more responsible for one and others learning. Of course much more needs to be done in order to achieve better results in future experiences: we verified that the groups did not work all as good as desired. One of the groups had difficulties to work together and to manage disagreements; the quality of the group posts reflects this evidence and not even the feedback provided by the instructor helped to attain consensus. Further research needs to be done in order to identify factors that explain the differences in the outcomes reported for cooperative learning groups: should the instructor decide how the groups will be formed in order to maximize heterogeneity? The group size is important to group success? Should all students receive the same grade on the group task or the grade should not account for more than a small part for final assessment? Those are some of the questions that urge for answers and that we propose for future research.

7. LIMITATIONS

The number of participants in the study was relatively small and limits the scope of the study. The course instructor was also the researcher and the single observer who assessed and evaluated the learning experience.

The data presented in this paper are an initial feedback of student's perceptions regarding cooperative learning in ECT classes. Further evaluation to be performed will include further analysis of the quantitative data collected related to the levels of interaction between students, between student and instructor and between students and external sources. Finally we consider the possibility of interviewing some of the participants in the study at the end of the 2nd semester in order to have a feedback of this cooperative learning experience compared to other learning methods on other subjects of student's curriculum.

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