

USING A WEB BASED COLLABORATIVE LEARNING MANAGEMENT TOOL TO TEACH PROFESSIONAL ISSUES

Joe Griffin

Department of Computer Science and
Information Systems
University of Limerick
Ireland
joe.griffin@ul.ie

ABSTRACT

Professional Issues in Software Engineering (PISE) is a final year undergraduate module for computer science students that focuses on the legal, ethical and social aspects of computing. Although the module has been taught for a number of years at the University of Limerick, increased student numbers have added to the pressure on the existing group teaching and assessment methods.

During the current academic year a commercially available collaborative learning management tool (CLMT), Blackboard, has been used to enable the large cohort (130 students) to be taught and assessed using a group based approach. This system comprises an integrated set of tools - publishing tools to allow the course tutor to publish teaching materials, communication tools such as bulletin boards, chat rooms and whiteboards to allow for asynchronous or synchronous student/student & lecturer/student communication and statistical tools to gather data on student activity in the different functional areas of the CLMT.

This paper gives details of the various different facilities offered and some of the ways in which the tools were used and some reflections on the strengths and weaknesses of the tool.

Keywords

collaborative learning, computer ethics, professional issues

1. PROFESSIONAL ISSUES IN SOFTWARE ENGINEERING

Professional Issues in Software Engineering (PISE) is concerned with the ethical, legal and social issues surrounding the design, implementation and use of computer and information systems. The main aim of this module is " ...to encourage students to develop the ethical foundations of good professional practice in computing." (<http://www.csis.ul.ie/>). A major theme is the relationship between ethics and the legal and social consequences of being a computer professional.

The module starts with a series of core lectures where students are introduced to the main concepts in this area. These focus on an introduction to ethical theories (ethical relativism, utilitarianism, deontological theories) the dialectical process, legal issues and social consequences (gender & access issues). Students then undertake a group-based presentation and produce a written report based on a moral dilemma scenario. In this study there was a student cohort 130 and this raised significant management and pedagogical issues. For example how does the tutor ensure that students are working towards developing the concepts of personal and professional codes of ethical conduct (the dialectical process) and developing moral reasoning? How can students be assessed fairly using group work? How can weaker students be identified early enough to enable appropriate intervention?

In previous years with smaller cohorts it was relatively easy to monitor individual progress even though students worked in groups. Larger cohorts have meant more groups and this approach to learning and assessment has become significantly more difficult to maintain. However it has been a major tenet of this module to continue with this approach to teaching and learning.

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2. COLLABORATIVE LEARNING IN PISE

Researchers have already identified the positive effects of social interaction during learning [1,2]. Furthermore, collaboration with other students has been shown to stimulate activity, make learning more realistic and to stimulate motivation. [3]

Research has also shown that moral dilemmas in computer ethics encourage group discussion and that teamwork encourages social facilitation, better learning and higher cognitive skills [4,5] and that groups can produce better solutions to moral and ethical problems than individuals can [6]. Because moral judgments are a social construct it could also be argued that the development of a personal ethical code is best achieved in a group situation.

At the same time there is a major problem with the use of group-based approaches when it comes to assessment. This is primarily due to the possibility of some individuals gaining more than they have input to the process, a term that has been called 'free-riding' [7]. Although research also suggests that groups need to be large to increase the advantages to members [3], this often increases the occurrence of free-riding due to the difficulty of monitoring large numbers of students.

In order to overcome the problems of managing larger cohorts and to ensure that the advantages of group learning were continued, it was decided to investigate the potential for using collaborative instructional tools in this module. Recent research supports this approach and also seems to indicate that a collaborative approach to learning supported by instructional technology could potentially lead to deeper understanding and new knowledge creation [8].

A further consideration in selecting a tool for use in PISE was whether to use synchronous or asynchronous tools. Research has shown that asynchronous tools can provide student groups with more options to think and reflect on information, to organise and keep track of discussions and to take part in group discussions compared to synchronous tools [3]. However some students on the module (particularly more mature students with other commitments such as childcare) required facilities that would allow for synchronous communication in 'virtual' tutorials.

After investigating a range of existing tools it was decided to focus on Blackboard (www.blackboard.com) as this system provided an integrated set of tools suitable for a variety of different uses including synchronous and asynchronous communication.

3. THE BLACKBOARD SYSTEM

The Blackboard system is an integrated set of web-based tools designed for the creation and management of a learning environment. These tools include course development and management tools; statistical tools; content management tools; communication and collaboration tools; assessment tools; personal information management tools; academic web resources; and system management tools. Using these tools the following facilities are available; publication of learning materials (including links to module related websites); publication of announcements; provision of a range collaborative tools including bulletin boards and chat rooms; communication tools including email. All files are stored on the Blackboard server (unless a server set of applications has been purchased by an institution). By using this 'shell' approach a lecturer can build up a course site for any module with different types of learning materials and can use a range of communication tools to assist with the management and assessment of the module. Students can share files and use communication tools to contact other students and the lecturer either synchronously or asynchronously. (The PISE implementation can be found by accessing the course website at: <http://www.blackboard.com/courses/CS4818>).

4. COLLABORATIVE TOOLS

The main collaborative work was carried out by students working in groups using facilities provided from the Group Pages (Figure 1). The Discussion Board provides asynchronous communication while the Virtual Chat provides the synchronous communication facility. Students could swap files and send emails to other group members using the File Exchange and Send Email tools. Only members of a particular group and the module tutor could access that group's page and tools.

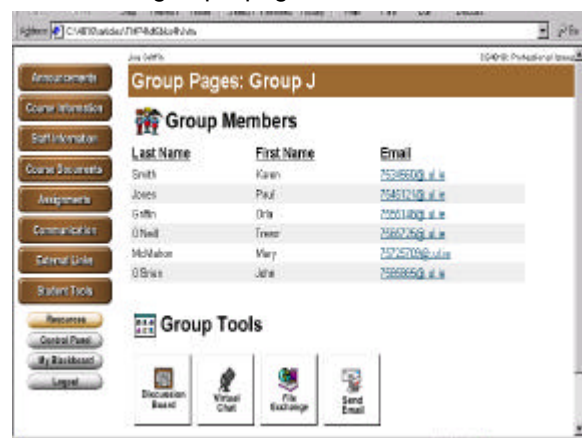


Figure 1 Group Pages (identities have been changed). Access to other parts of the CLMT is via the buttons on the left hand side

It had originally been expected that a significant number of discussion threads would develop in the group discussion boards while students worked on the moral dilemma scenario but this did not in fact happen. Approximately 52% of postings did not develop into threaded discussions. This is consistent with other recent research on the use of

asynchronous communication tools in higher education [9]. A possible reason for this, cited by students in this study, was the ease of face-to-face communication. However, face-to-face communication is difficult to formally assess and there is some doubt as to its educational value. One option, which might overcome this, is to use larger groups of students or to involve students from other institutions who are carrying out similar assessment tasks in similar modules.

As neither of these was feasible within this study it was decided to give students the option to submit for assessment that part of their group discussion board that related to the moral dilemma scenario, instead of the usual written report. For the written report individual contribution already had to be indicated clearly. For the threaded discussions, postings could be ascribed to individuals thus enabling measurement of individual contribution.

As a result of this change 30% of student groups elected to submit the moral dilemma scenario report in the format of threaded discussions. This then resulted in an increase in the number of threaded discussions by these groups but at the same time it became apparent that some students did not use threaded discussions appropriately.

Some postings that should have been in reply to earlier postings were submitted under new headings, others, which introduced new topics, were wrongly submitted as part of ongoing threaded discussions. It is not clear if this demonstrates a lack of ability in the dialectical process but feedback from students indicates that correct usage of asynchronous tools such as this needs to be formally taught

5.1 Some specific advantages

Some specific advantages of using the Blackboard CLMT have been identified

1. management of the cohort. The onus on forming into groups, topic selection and identification of slots for tutorials and presentations has been significantly eased. In the main students have been self-organising because they were aware of what others in the class were doing
2. communication between lecturer and student has been greatly enhanced with the use of the bulletin board (faqs have been generated reducing the level of tutor intervention)
3. inter- and intra-group collaboration took place and the system enabled this to be observed by the lecturer, who could join in discussions as required
4. the virtual chat tool has enabled virtual tutorials to take place thus facilitating involvement for

students who had difficulty always attending on campus

5.2 Problems

Problems

1. a major problem area has been the slow, and sometimes broken, internet connections which created frustration for some students
2. the volume of usage was much greater than was anticipated and due the number of levels in the system (e.g. to get to a group's discussion board requires the traversal of five levels) considerable time needed to be spent to ensure that the lecturer answered all communications in a timely manner. A flagging or notification system would improve this
3. encouraging students to use the system in an appropriate way and in a way that will enhance their learning experience was also been problematic. Early analysis of usage patterns indicated that the majority of postings elicited no replies and did not grow into threaded discussions.

6. CONCLUSION

Blackboard has contributed to the management and teaching of a large cohort of students in this module. There have been some problems but also some clear advantages for tutors and students. At the end of the semester the module was evaluated using an anonymous questionnaire and student views on the use of Blackboard were sought. 53 students responded and their responses were categorised as either positive or negative. Three responses contained elements of both so were excluded.

Overall 30 respondents submitted positive comments about the Blackboard CLMT and 20 submitted negative comments. Positive comments included the following:

- "... helped with communication within the group"
- "... kept a good list of all the discussion we had for future reference"
- "... gives you the chance to express your opinion without fear of humiliation because it is only viewed by 6 people"
- "...a very valuable tool for cooperating on projects"
- "... useful for the scenario, as ideas can be developed on it"

Negative comments were focused on the necessity for such a tool in groups that saw each other on a regular basis.

- "... our group... found face to face meetings were far better for getting our points across"

"... more useful... to students who don't have face to face contact"

Overall, the use of the Blackboard CLMT has been successful. Students have seemed to be more engaged in the module and average grades for this academic year (albeit a crude indicator) are higher than for previous years. Future research will use specific tools (e.g. the Defining Issues Test [10] or the Moral Judgment Test [11]) to more accurately measure the contribution of this CLMT to the development of moral reasoning.

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