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# E-Learning and support tools for Information and Computer Sciences

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## ABSTRACT

The availability of Web 2.0 tools together with associated Open Educational Resources (OER) enables the creation of new social and collaborative learning spaces. This paper investigates student preferences (across three cohorts) in terms of openly and freely accessible Web 2.0 tools to provide a space where students can interact with each other and their tutor to discuss concerns that arise within their final year project-based learning. This intervention was planned since existing arrangements that support communication between tutor and distance learning students appeared insufficient to facilitate the necessarily intense episodes of interaction required for productive supervision. The findings suggest that different student cohorts are interested in using a variety of Web 2.0 tools. This paper gives initial feedback about intended usage of Web 2.0 tools for co-operative and collaborative learning for final year project work.

## INTRODUCTION

New social learning spaces can be developed through the association of Web 2.0 tools and Open Educational Resources (OER) (advocated by Smith and Casserly, 2006). The suggestion that social computing applications (Redecker et al., 2009) together with OER have the potential to encourage collaboration appears to be supported by a number of authors. Armstrong and Franklin (2008, p1) report that “Web 2.0 is being used in a variety of ways ... including ... collaborative working through collective development of artefacts...”. Redecker (2009, p9) asserts that “learning in a digital era is fundamentally collaborative ... social networks arise around common (learning) interests ...”.

This paper focuses on prospects for collaborative learning and working amongst students in Information and Computer Sciences (ICS). Drawing upon a study funded by the United Kingdom Higher Education Academy (UK HEA), the paper examines the use of Web 2.0 tools to support project-based work in the context of an ICS course taught at a distance. The project uses the community-oriented facilities available in OpenLearn (Open Content Initiative, 2006) the UK Open University (OU) OER repository. These facilities include the OpenLearn twin sites LearningSpace (<http://openlearn.open.ac.uk>) and LabSpace (<http://labspace.open.ac.uk>). The project also counts on the support of the Open Learning network (OLnet <http://olnet.org>), which is undertaking research into design, use and reuse of OER in order to share the findings with a worldwide audience. These latter two projects have been funded by the William and Flora Hewlett foundation

The social and community building features offered to students comprise of several tools that can be described as “integrating rather than integrated” (Culwin and Lancaster, 2004 p1): video conferencing, synchronous messaging, online journals and mind mapping tools. In addition, the environment offers learning clubs, which were designed as integrated tools created in the process of ongoing development of OpenLearn. A learning club starts from a premise of a space where social interaction is encouraged through Web 2.0 tools and the OER content can be drawn or pulled into that space. The combination of these social computing applications provides a space where students can interact with each other and their tutor to discuss concerns that arise within their project work.

This paper focuses on what has been learnt so far about students' preferences in relation to the types of social computing applications they would like to use to help them collaborate with their tutor and other students in their final year Information and Computer Science project-based learning.

## BACKGROUND AND RESEARCH CONTEXT

The OU course M450 *The Computing Project* (M450)

<http://www3.open.ac.uk/study/undergraduate/course/m450.htm>) is a level 3, 60 CATs points course taught at a distance over a period of 9 months (equivalent to 600 hours of self-study). Before undertaking their project students need to have studied at least one level-3 course. The students involved in this project have previously taken the third level course M364 *Fundamentals of interaction design* (<http://www3.open.ac.uk/study/undergraduate/course/m364.htm>) and have based their project in the main on that course. M450 provides opportunities for students to put into practice the knowledge gained in previous courses as well as their professional experience, which equates the course to a final year project in a face-to-face setting.

M450 is centred on a piece of project work in which students are expected to gain “practical experience of independent learning and reflective practice (...) [and] apply advanced principles and techniques to solve problems” (Open University, 2009). The course materials are all presented online on a dedicated, password-protected Web site. Tutorial support is also provided entirely online to groups of 6-8 students, each working in their own chosen topic or area. In addition to prompting and moderating discussions and providing individual, tailor-made support to students, tutors also mark and provide feedback on the 3 pieces of summative assignment completed throughout the course (Tutor-Marked Assignments or TMAs) as well as their examinable component, the project report (End-of-Module Assessment or EMA).

The aim of the overall project is to investigate the potential of social computing applications and OER to support students engaged in final year project-based learning at the OU in the area of Information and Computer Sciences. This approach allows geographically wide spread distance learners, in particular, who do not have face-to-face interaction, the opportunity to choose communication media and methods that suit the types of interaction they prefer to engage in.

This paper discusses students' preferences for the social networking tools they wish to use in collaboration with their tutor and/or other students for formal learning. The tutor is acting as a participant observer and evaluator, working along side a collaborator and external evaluator. The discussion in this paper draws on informal survey data collected from three presentations of the course (2008/9 and 2010) from a tutor's own students. For ease of analysis of the surveys and discussion across the three cohorts, numbers are converted into percentages (as although numbers are small, they do vary across cohorts). Five students were involved in 2008 (four female and 1 male), four in 2009 (all male) and five in 2010 (3 male and 2 female). The respondents' age range was from 25 to 49.

## MAIN FINDINGS

The students across the three cohorts (2008/09 and 2010) were asked by their tutor to report their preferences in relation to the types of Web 2.0 options they would like to use to help them study and collaborate with their tutor and/or other students on their course. They were requested to indicate their preferences by typing in 'yes' or 'no' next to each of the descriptive options presented below and to make additional comments.

The students were asked whether they would make use of:

- some sort of learning club for students;
- video conferencing between yourself and your tutor;
- video conferencing between yourself and other students;
- video conferencing between yourself, other students and the tutor together;
- instant messaging;
- a private online diary or blog;
- a public online diary or blog;
- mind mapping tools.

Students indicated a preference for a variety of different social networking applications. Two students in the 2008 cohort were interested in adopting five of the eight options whilst one student was interested in four of the options on offer. By contrast one student was interested in using two options and another in using just one (video conferencing with their tutor). In 2009 students expressed more of a consensus on the number of Web 2.0 options that were of interest to them (as compared to students in 2008 and 2010 and this may be gender related as all four participants were male). Three of the four students were interested in adopting four of the eight options and one student was interested in adopting six of the options on offer. The 2010 cohort responded with an interest in a range of different social networking applications. Two students were interested in four Web 2.0 options, one student in two options, one student in three options and one student in six options. These findings suggest that different student cohorts are interested in using various Web 2.0 tools and individuals may select between one and six Web 2.0 options for use in formal learning. The tools that appealed most to the students and their preference for whom they wanted to collaborate with is discussed below.

**Table 1 Student preferences for Web 2.0 tools across 2008/9 and 2010**

	2008	2009	2010	In order of popularity
Number of students involved	Five	Four	Five	
mind mapping tools	60%	100%	40%	1
video conferencing between yourself and your tutor	60%	50%	80%	2
video conferencing between yourself, other students and the tutor together	20%	75%	80%	3
instant messaging	40%	50%	80%	4
some sort of learning club for students	60%	75%	None	5
a public online diary or blog	60%	50%	20%	6
a private online diary or blog	40%	25%	60%	7
video conferencing between yourself and other students	0	25%	20%	8

A comparison of student preferences across the three cohorts (see Table I) suggests that learning clubs were important to both the 2008 (60%) and 2009 (75%) cohorts of students though unexpectedly were of less interest to the 2010 cohort of students. It is interesting that the students who opted for the learning club option did so without fully understanding the potential of the tool. Video conferencing between the tutor and the student on a one to one basis was similarly important across the 2008 (60%) and 2009 (50%) cohorts though much more important for students in 2010 (80%). Perhaps it is unsurprising that distance learning students would want to interact on a one to one basis with their tutor and increase contact with them. A student from the 2008 cohort suggested why s/he was in favour of using one to one video conferencing.

'... I've never used [video conferencing] but I think it would have been helpful particularly at the beginning when I was trying to get ahead by starting early ... and I didn't really have much idea of what would be an acceptable project. I think a two way conversation would have clarified what the expectations were at a much earlier stage so I may have got a better mark for my first TMA and improved my overall mark for the course. ... HCI ... has a strong visual element, ... [and] as the file size of my prototype designs was so large it wasn't easy to email to the conference or tutor without spending ages reducing the file size ... May be a video link would be better depending on the quality of the video image'.

This student suggests that a one to one conversation with the tutor by video would have been more helpful than the email exchanges s/he was involved in at the start of the course. Although students were keen to be in contact with their tutor they were unsure about using video conferencing with their peers together with their tutor. In 2008 only 20% made this selection, though this option was of more importance in 2009 (75%) and in 2010 (80%). Two students in 2009 made additional comments to clarify why they were keen to interact with other students if their tutor was also present.

'I believe that group tutorials would be very useful in this course, even if it were not face to face and used technologies such as live meeting or skype etc'.

The second student said:

'.... I felt it would have been a great help if as a group we had a few online chats about how our projects were going'.

This suggests that online tutorial group discussion would be very beneficial. It is clear though that none of the students were particularly keen to use video conferencing with their peers alone, thus indicating a lack of interest in collaboration with other students if the tutor was not involved (0% in 2008; 25% in 2009; and 20% in 2010). A student in the 2008 cohort indicated why collaboration with other distance learning students may not be so appealing.

'[I'm] not sure about [video conferencing between myself and other students without the tutor's presence] ... It would be okay if you had a lot of time to spare to get to know other students and discuss their projects. It may work better if the students had previously met up so they knew who would be ... best ... to conference with, otherwise you could spend a lot of time achieving very little'.

Instant messaging was similarly important across the 2008 (40%) and 2009 (50%) cohorts though much more important in 2010 (80%). Use of a private online diary or blog decreased between the 2008 (40%) and 2009 (25%) cohorts though increased to (60%) in 2010. A student from the 2008 cohort explained his/her lack of interest in using a private online diary or blog.

'I probably wouldn't have had the time to ... [keep a private diary or blog], unless there were marks attached to it, although it's a good idea'.

This latter comment is interesting since students were advised at the start of their project to keep a diary of their ongoing progress that they could refer to for reflective purposes which had marks attached. Use of a public online diary or blog (though more important than use of a private online diary or blog in 2008/9) decreased through the three years (in 2008 (60%); in 2009 (50%); and in 2010 (20%)). However the

students in the 2009 cohort were unanimous about their preference to use mind mapping tools to help them with their project (100%) as compared to 60% of the students in 2008 and only 40% in 2010.

These findings indicate that a wide variety of collaborative options with Web 2.0 tools are required to suit the needs of different student cohorts and that students would select a varying number of Web 2.0 tools for formal learning. However Smith et al., (2009) report that the use of social networking tools for undergraduate course work as compared to personal usage (age groups 18 to 40 plus) is much more limited. The majority of respondents in Smith et al's., (*op. cit.*) survey though from the Net Generation, report that they prefer only a modest amount of technology use in their courses. The findings in this study are in agreement with Jones et al., (2010) who also reports on the Net Generation suggesting that the landscape is complicated with small numbers of users often adopting a wide variety of technologies.

## DISCUSSION

In terms of overall popularity (across the three cohorts) the overall results suggest that the students would prefer to use the Web 2.0 tools in the order of popularity shown in Table I. Mind mapping tools appear to be just slightly more important than student and tutor one to one interaction. Interaction between the student, their peers and their tutor and instant messaging also feature highly. The public and private diary or blog rated fairly similarly when averaged across the three cohorts. The interaction that is obviously of less interest to the students across the three cohorts is interaction with their peers when the tutor is not available. However the 2009 and 2010 cohorts of students have shown an interest in working with other students as long as the lecturer was present. "Social networks arise around common (learning) interests ..." Redecker (2009, p9) and in time students may find generic aspects of their projects that they would like to discuss with other students.

This is still an early stage in the project when findings are tentative and more in-depth analysis of the wider variety of data being collected is required. There are interesting differences in students' expectations/preferences across cohorts (even though the numbers involved are small), and further data that will allow triangulation has been collected using semi-structured interviews.

In exploring, in particular, the learners' perspective of using OER within Web 2.0 online learning spaces, the project findings should be of special value as this is an area of research that is only in its infancy. This research (as it develops) will influence future deployment of Web 2.0 tools associated with OER content for project based learning at The OU and elsewhere.

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