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Awareness of the capabilities and use of social software attributes within and outside the educational context: moving towards collaborative learning with Web 2.0

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Key words: *Social Software, Collaborative Learning, Web 2.0*

Abstract:

This paper reports early findings of an ongoing study to determine the use and impact of social educational software at undergraduate level. It summarizes the theoretical background to the educational use of social software and suggests directions for future research.
The primary aim of the study was to capture and describe the extent and patterns of use of educational software and Web 2.0 technologies among first year undergraduate technology students taking the Web Development module. Results indicate [1] great variations in the ways in which students engage with both social and content-centred educational software environments; and [2] similarities in the ways of using social software within and outside the educational context.

1 Introduction

The emergence of Web 2.0 technologies promotes the growth of service-based applications and greater user-control over content and connection (O'Reilly, 2005). The rapid growth in membership of social spaces such as MySpace, Flickr, del.icio.us and many others are evidence that web-based networking facilities are becoming an important part of our daily life (Jacobs & Polson, 2006). Given that people are apparently willing to collaborate, work and spend leisure time engaging with Web 2.0 technologies, it seems likely that educational interests may also benefit from adapting teaching practices, curricula and educational tools to exploit the social process and network benefits provided by Web 2.0.

Due to the diversity of educational theories and practice, it is unlikely that any single model for Web 2.0 educational use will emerge. However, this study aims to contribute towards understanding the widely popularized but unproven impacts of using Web 2.0 technologies in education.

2 Aims and objectives of the research

The main aim of this research is to study the patterns of use of both 'external' social software and educational social software within a collaborative learning environment. The purpose of such a study is to suggest possible administrative, educational and technical ways by which the levels of student engagement and learning experience may be improved. The detailed objectives of the research are to:

- Compare the use of educational social software with conventional educational tools.

- Identify the most common patterns of use of educational social software.

3 Collaborative environments and the social aspects of learning

The importance of discussions and exchange of ideas during the study process are widely established. According to Dewey (1916), learning is a social and interpretive activity in which learners collaboratively construct explanations and understandings of materials and artifacts. Followers of Vygotsky attach great importance to social context and collaborative activities for learning (Cole, 2003).

Acceptance of a social dimension to learning led to the concept of Collaborative Learning or Cooperative Learning. This describes a form of active learning by which students work together in small groups toward a common goal (Gokhale, 1995). This form of learning utilizes group discussions, long-term group projects, and group testing (Castor, 2005). Roger and David Johnson, the exponents of collaborative learning, state that the exchange of ideas and opinions promotes critical thinking and increases motivation (Johnson & Johnson, 1998). Moreover, according to Samuel Totten, it is essential for the development of critical thinking, that students take responsibility for their own learning by participating in discussions (Totten, Digby & Russ, 1991). Many authorities on educational practice recognize the importance of social interchange; Resnick, Pea and Perkins presented their view on learning as a “dialogical process involving the social distribution of intelligence” (Schrire, 2006).

4 Collaborative software tools

Advances in web technologies continue to improve the communication, sharing and distribution of information. Attributes of Web 2.0 include greater integration of RSS/Atom feeds, cloudtags, mashups and rich internet applications as well as new ways and tools for managing content and delivering services. By supporting openness, collaboration and information exchange, Web 2.0 level weblogs and syndication provide the foundation for the growth of popular social spaces (Downes, 2004).

These recent developments in web-based services and the enhancement of collaborative tools have fueled the demand for similarly-specified educational software and services. Many schools and universities across the world now deploy blogs, ePortfolios and educational social software for use by the academic community. But despite the widespread promotion of these learning tools (Downes, 2005), there is little information to validate the extent of their utilization by institutions, tutors and students, or evidence-based guidance on best practices for promoting learning. Shedding light on these areas will help educators make informed decisions concerning appropriate software tools and to modify teaching practices as necessary.

5 Pedagogical and technical platform for the research

This study is based on the concept of collaborative learning and openness. It follows the educational philosophy of Dewey and Vygotsky and adopts a model of collaboration and cooperation among students and teachers. This is based on principles of social constructivism and the social nature of learning (Popkewitz, 1998). While any learning process that is delivered within an effective collaborative environment can promote higher-level reasoning, process gain and transference of knowledge (McConnell, 2002), Web 2.0 has the potential for extending the collaboration to the level of using blogs, file exchange mechanisms and

personalization. Hence, we can assume that a collaborative learning environment, enhanced by social software, can support the development of an effective collaborative learning environment and learning community.

5.1 Technology behind the pedagogy

In order to create the necessary environment, a set of tools was identified, evaluated and then selected for their appropriateness for collaborative learning. These included the open-source software Elgg version 0.65, which allows "… users to establish personal digital-identities and connect with other people, collaborate with them and discover new resources through their connections" (Elgg 2004). Elgg possesses much of the typical functionality of social software and provides access to Web 2.0 features such as weblogs, RSS, tagging, mashups, personalization and file-sharing mechanisms. It therefore satisfies many of the technical requirements for this research, namely promoting information sharing, open collaboration, reflection, feedback and a sense of community.

The Moodle version 1.6 open source Virtual Learning Environment (VLE) was also selected on the basis of a student-centric architecture, again, aligning with principles of social constructivism. Core VLE and other functional modules extensively used during preliminary studies included: features for managing and distributing course resources, messaging course members, course planning and administration. The use of the Moodle system was coupled with the Elgg social software through a module called ePortfolio. All core course content and many additional materials and resources were provided on both Elgg and Moodle.

Most students (86%) attended the formal and introductory lecture on the technology, philosophy and principles of working with Moodle and Elgg. Support for learning tools is ongoing and is provided both in-class and electronically.

5.2 Openness and reduced competition

Openness is an important part of collaborative learning (McConnell, 2002) and believed to be desirable for reasons such as encouraging learners to: share ideas and accept new ones; be intellectually-open and accept the possibility of change; be frank in self or peer assessment and to build healthy relationships. This study, bounded by the concept of collaborative learning, was designed to ensure that the necessary infrastructure is available. Competition can often hinder willingness to share information and work as a team, and so it was important to reduce competitiveness among the students. The competitive assignments and individual projects were mainly replaced by group projects and selective assignments encouraging peer review and mutual help.

5.3 Assignments and assessment

To promote reflection and information sharing, a set of tasks was developed and offered to students throughout the course. Initial tasks took the form of "mini-assignments" and were intended to serve as icebreakers as well as provide students with an opportunity to introduce themselves to each other and to share their personal and professional interests. These tasks are considered to be essential for creating a sense of community during the early stages of group formation (McConnell, 2006). The rest of the assignments were mainly concerned with educational content. It was suggested to the students that they could share completed assignments and learning experiences with the rest of the community, by uploading content to a personal or a common-file area or to a weblog.

The distribution and the nature of the assignments changed as the module progressed. In the early stages, tasks consisted of small, individual assignments. Later activities were based on group work and more complex tasks. For the group work, students were given freedom to form/join the groups. The group assignments were intended to promote online collaboration, and it was requested that the progress of group work was posted on an Elgg shared community space.

To observe the natural uptake of the software, student's personal space, artifacts and online activities were not subject to summative assessment. The course leaders specified that although online-participation was optional, it was nevertheless highly desirable. Whenever required, facilitators provided feedback of a formative nature on any student work in-progress. Suggestions were made for improvements to solutions by means of public weblogs as well as the more conventional forums available within Moodle.

6 Methodology, data analysis and target group

The main analysis was based on observing student access and use of educational tools as well as on the anonymous recording of student experiences of using other social software in a non-educational context, such as MySpace and LiveJournal.

Membership:	***Number:***
- HND (1 group):	14
- BSC (2 groups):	30
- Tutors:	2
- Observer:	1
- Administrator:	1
Participants Total:	48

Table 1: Membership of groups participating in the study of the use of collaborative software.
Notes: [1] Subjects were first-year undergraduates attending a module on web development technologies; [2] Reported results are based on observations made between 22 September and 22 December 2006.

The adopted research methodology was based on the following data collection techniques:

a) Preliminary questionnaire – to record student experiences of using social software outside the educational context, prior to the study.
b) Third party web statistics tool – to record frequencies of accessing integrated educational software systems throughout the study period.
c) Recording students' posts, comments, level of personal customization, friends network, use of RSS and tagging throughout the study period.
d) Recording independent comments received from and critical issues raised by students throughout the study period.
e) Use of a web-access statistical plug-in integrated with the content-centered system as additional evidence for triangulation with the adopted third party web access tool.

The data analysis included:

a) Comparison of web-access statistics of content-centered system and social software.
b) Comparison of student experiences of using social software outside the educational context with that observed throughout the course study period.

c) Mapping individual comments received from students regarding integrated educational software with their patterns of using the systems.

6.1 VLE versus social software

Students' access to both the VLE and the social software was monitored and logged. Due to the lack of a logging mechanism in the Elgg system and for the purposes of ensuring consistency of logged data for both Moodle and Elgg systems, a third party service – Google Analytics – was chosen for monitoring the access to the web software. Google Analytics (2005) is a free service that tracks the number of visits, pageviews, and IP addresses, and analyzes them along with many other parameters.

During the three-month period of observation a total of 1,092 visits and 2,509 pageviews were recorded for the Moodle VLE. During this time Elgg received only 234 visits and 351 pageviews. The fact that the number of visits and pageviews for Moodle were 4.6 and 7.1 times greater respectively than for Elgg demonstrates much less activity for social software than for the more conventional VLE.

Graphs 1 and 2 provide timeline summaries for daily access to Moodle and Elgg platforms.

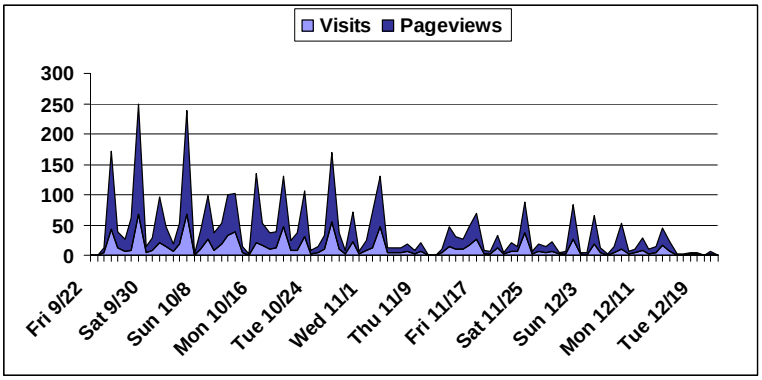

Figure 1. Timeline summary of student pageview and visit frequency for the Moodle platform.

Both graphs show that activity and presence on both Moodle and Elgg systems was greater before 6th November than afterwards.

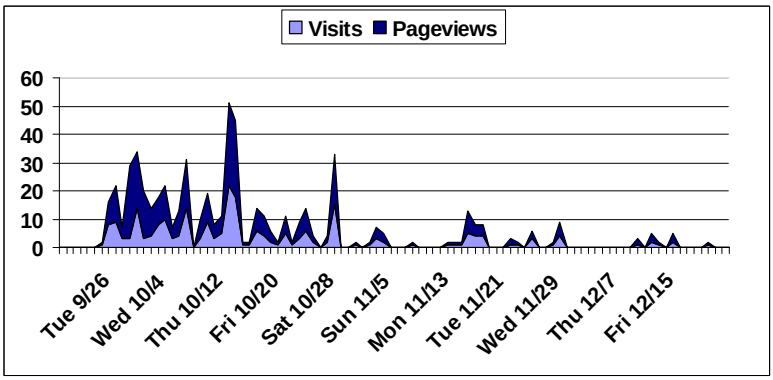

Figure 2. Timeline summary of student pageview and visit frequency for the Elgg platform.

An attempt was made to explain why the social educational software (represented by Elgg) was not accessed as frequently as the Moodle VLE and why students were using the system more actively in the first half of the course and not in the second half.

It is likely that the frequency of access was influenced by changes in the type of exercises given to students during the period of observation. During the first half of the course there were six relatively small assignments, whereas in the second half there were two much longer and more demanding assignments comprising a group project and work towards an assessment. Both the Elgg and Moodle systems were visited some 4.34 times more frequently during the period when shorter assignments and intensive facilitation were provided. During this initial period students were frequently notified about approaching due dates and a much greater level of individual feedback was provided.

Another interesting finding demonstrates the similarity between the pattern for accessing educational resources and submitting shorter assignments. While shorter assignment submission required access to Elgg only, the logging tool records that there was also a significant number of visits to educational resources on Moodle during this period. It shows that during the period of working on shorter assignments, students were accessing educational materials on Moodle more often than during the period of working on larger group projects. According to Moodle logs, during the period of working on shorter assignments, the learning resources were accessed 3.8 times more frequently than during the group-work period. Although a comparison of web-access patterns with curriculum-based educational activities such as the number and nature of the assignments was not included in the research objectives, the observed facts suggest further research into the impact of the distribution and types of assignments on the uptake of such software.

6.2 Comparison of learners' behavior with previous experience

At the beginning of the course a questionnaire was issued to determine the level of prior experience of social software and Web 2.0 technology. This was mainly to determine whether or not the group were generally familiar with the use of weblogs and social software, thereby gauging how prepared they were for using these technologies in a learning environment.
The results of 32 valid questionnaires showed that while the majority of participants lacked specific experience of social software attributes such as RSS and tagging, many of them had general experience of working with social software. Only 16% of students were either unfamiliar with any social software or had not knowingly been exposed to these technologies. The most popular social software (56% of students) was MySpace followed by YouTube (31%). However, according to the questionnaire the number of weblog users was comparatively low. Only 50% of students had a registered weblog while 31% of students were not familiar with the notion of a weblog (see Table 2).

	Previous Experience		***Observed Behaviour***	
Behaviour	*Num. of Students*	*%*	*Num of Students*	*%*
Have no weblogs or do not know what it is	16	50	11	25
Customized the environment	20	63	31	70
Have friends/are friends	23	72	30	68
Do not run any community	24	75	40	91
Run 1-2 communities	6	19	4	9
Use RSS	1	3	0	0

Have ever used tagging	12	38	17	39

Table 2: Comparative summary of questionnaire data (prior experience of non-educational social software) against log data (activity in the Elgg environment of educational social software).

The questionnaire revealed that most of the students do not usually use many of the attributes provided by social software such as tagging or RSS feeds. The majority of students (97%) were either unaware what a feed is or had never used it. Tagging, however, was used always or frequently by 19% of students and only 34% were unaware of what tagging was. Tagging was used at least once by 38% of students.

Results from the questionnaire also indicated the characteristics of their social networks. The students were mainly divided into two groups, one group having significantly large networks, the other having very small or no network at all. Of the sample, 56% had more than 15 friends listed in their social software, while a smaller group of 28% did not network with any friends. The questionnaire also revealed that 75% did not run communities, in contrast to 25% who established and ran mainly 1 or 2 communities.

The observation and analysis of data recorded on student engagement with educational social software showed that no one used the RSS syndication available in Elgg. Only 39% of students used keywords for tagging their posts, and only 9% of registered students started at least one community. However, in contrast to the low demand for RSS, 70% of participants customized the appearance of their social space and provided personal information on their profile.

Table 2 shows the similarities between percentages for prior experience of using social software and the use of similar features in Elgg. This suggests a correlation between prior experience of using social software and engagement with educational social software. The Chi-square test performed on the data presented in Table 2 does not reveal a significant distribution at the 0.05 level and therefore shows that similarity exists. With a degree of freedom 6, the Chi-square equals 6.60, which is less than the value 12.59 required for significant distribution at the abovementioned level. Given the limitations of the study, including the lack of functionality of social software, the small target group, and the anonymity of the questionnaire (which prevented comparison between previous and observed used of the social software), we suggest the results are used with caution.

Given the range of patterns and reported similarities of behavior with prior experience, it seems likely that an introductory lecture giving a basic overview of integrated technology might not be sufficient for optimal engagement with the software. A more intensive and longer period of formal support might be required to embed these technologies and the desired learning behavior associated with them into teaching practice.

7 Research restrictions

In contrast to Moodle, the Elgg social software has a shorter development history. As a result the specifications of the two technologies are not always easily comparable. The records of independent comments received from students revealed that most students were disappointed with the lack of e-mail notification functionality in Elgg. The version of Elgg used for this study does not send notification of important events such as the posting of public or community messages, adding participants as friends or when new members join the community. Students and tutors often favored Moodle forums because of the provision of

automatic email alerts for spreading important information or requesting feedback. Additionally, Elgg has relatively limited functionality for managing users and monitoring their actions. It is therefore possible that the lesser popularity of the Elgg environment was affected by the limitations of its technical specification.

As recorded earlier, the number of students who participated in the research was relatively small, which does not allow for generalizations. Another limitation was that the anonymity of the questionnaire, which prevented a one-to-one comparison of previous and observed use of social software to triangulate the results.

8 Conclusions and future research

The results of these preliminary studies suggest that within the student group there are [1] great variations in the awareness of the capabilities of social software and in the use of features (tagging, RSS feeds etc.) both within and outside the educational context; [2] similarities in the ways in which learners engage with and utilize attributes of the social educational software.

Further research directions suggested by this study include that: [1] it is important to establish why the VLE software (Moodle) was found to be a more popular platform than the social software (Elgg). The level of prior experience with social software is one possible factor, suggesting a need for a fuller and formal induction for educational use. However, it may also be that students found the social software to be less functional than the conventional VLE, for example due to the absence of an email-alert mechanism; [2] given variations in engagement with VLE and social software, there is a requirement for a more detailed understanding of patterns of use of educational software, thereby ensuring the development of appropriate teaching practices for utilizing these technologies across all styles of engagement and learning.

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