

IS THE JURY STILL OUT ON "BLENDED LEARNING"?

Use of a Web-based Collaborative Teaching Platform

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Abstract: Web-based collaborative platforms appear to show controversial potential for improving teaching and learning productivity and flexibility at Third Level. A pilot study was conducted at Trinity College Dublin (TCD) to explore pertinent operational, andragogical, support and social issues with a view to providing insights for the future. While a blended solution, i.e. a mixture of traditional and eLearning is often suggested, it appears that student support for it is not very high and proved disappointing in this study.

1 INTRODUCTION

This research initiative focuses on the impact of online synchronous learning using a web-based collaborative platform with part-time, mature, evening Information Systems university students, in full-time employment. However there was some asynchronous learning in that the students could recall the saved lectures and replay them at a later date.

There is a dearth of research material in the area of web-based online synchronous delivery of learning in traditional universities "*Considering the massive adoption of e-learning, what is surprising and cause for concern, is that we know so little about the use of this medium to facilitate learning*" (Gilbert, 2000)(Garrison, 2003).

The Trinity College Dublin (TCD) project was funded under the European Union GENIUS (Generic E-Learning Environments for the new Pan-European Information and Communication Technologies Curricula) programme (Dolan, O'Connor, Mullally and Jennings, 2003) (Dolan, O'Connor, Mullally and Jennings, In press). The overall purpose of the project was to explore the real-life practical issues associated with applying a web-based collaborative platform embodying both

synchronous and asynchronous dimensions. One of the goals was to assess the efficacy of the course presentation via web-based collaborative platform versus the traditional lecturing approach. A pilot study was carried out using the Web-based Collaboration platform, LearnLinc (parsecinfo, 2005) in TCD. It was envisaged that this would provide a basis for more substantial studies with these technologies in the future.

The purpose of this pilot study was to investigate practical and operational aspects and issues to do with using such a tool-set. A TCD staff member (DD) presented a course entitled "IT and the Enterprise" to a group of mature, evening attendance, computer-literate, undergraduate Information Systems students. Of this cohort of students more than 76% worked with computers greater than 30 hours per week.

2 MATERIALS AND METHODS

The use of LearnLinc as a collaborative web-based platform was a requirement of the overall GENIUS project. LearnLinc provides two separate environments, the virtual "campus" and the virtual "classroom". The virtual campus is modeled on a

physical college campus in that it provides administrative functions with registration of students for courses, course creation, class creation, adding of course materials and assigning lecturers to lectures. The virtual classroom provides an environment with whiteboard area, synchronized web browser, application sharing, text chat, hand raising, questions and answers, feedback, attendance list and an agenda for the class.

A participating student should be equipped with a computer conforming to at least the minimum specification as set out by LearnLinc and a network connection fast enough to support the LearnLinc server connection (Dolan, O'Connor, Mullally and Jennings, In press). Students were also required to have downloaded the client software. The students in a computer laboratory environment were issued with headsets (microphone and earphones) so that they could listen and speak to the lecturer without sound distortion and acoustic feedback from such a noisy environment. The individual student could communicate with the lecturer through text chat either privately, where only the lecturer sees it, or publicly where everyone in attendance sees the message. The student can also communicate by symbolically 'raising the hand' on the interface. The lecturer sees the indicator for the hand raise and can then give the floor to that student. A photograph of the student appears and he/she can speak to the lecturer and the class.

3 PILOT STUDY

Forty two Information Systems second year undergraduate students (average age was 29 years, about 75% male) of the Trinity College Dublin, Computer Science Department completed all three questionnaires in this pilot study. The students had full-time jobs and attended lectures in the evenings from 6 to 9 p.m. They were given a (sub)-course in "IT and the Enterprise" by a TCD lecturer (DD) using LearnLinc. This course, consisting of 4 weekly 2-hour evening slots, was part of a larger 22-week course. The whole 22-week course was examined conventionally, with one question devoted to the aspects of "IT and the Enterprise" covered in the web-based contribution. The students were distributed across various locations, at home, on campus (in computer laboratories) or at places of business. Three questionnaires were used in the TCD studies.

3.1 Questionnaire One

This questionnaire was presented on the first night of term to the students after the Lecturer had advised the students of the forthcoming teaching collaboration project. Questionnaire 1 was used to gather information about the availability of student computers with the required specification to partake in online lectures. Ideally students were to use either a computer in their workplace, in their home, or in a College computer laboratory, whichever location suited best. The main purpose of this questionnaire was to find out technical requirements and support information so that a support team, administrative issues and a computer laboratory could be made available for the students. Forty six students completed Questionnaire 1.

3.2 Questionnaires Two and Three

Questionnaires 2 and 3 were designed to capture the before and after mindset of the students. The questionnaires were in two parts, Section A and Section B. Section A had twenty seven quantitative questions (see Appendix) and Section B had ten qualitative questions. The twenty seven quantitative questions used a nine-point Likert scale varying from 1 (Strongly Disagree) to 9 (Strongly Agree). Forty nine students completed Questionnaire 2. Questionnaire 2 was used to assess the students' expectations of the upcoming online eLearning experience before the experiment started. It contained the core twenty seven questions and the ten qualitative questions. Forty nine students complete Questionnaire 2.

Questionnaire 3 was used to assess the students' opinions on the performance of the eLearning experience after the experiment finished. It contained the twenty seven core questions, the ten descriptive questions as in Questionnaire 2 and an additional twenty one questions focusing on the use of the facilities and functions of LearnLinc as used in the online lectures. These two questionnaires were used to assess the effectiveness of the use of Internet technology to create a virtual classroom to support or enhance the learning experience within the course 'IT and the Enterprise'. Forty two students completed Questionnaire 3.

4 RESULTS

The results and conclusions below are a summary of the main quantitative findings (Jennings, 2005). The differences between the questionnaire question response means for the Performance (Post Experience) (Questionnaire 3) and the Expectations Pre Experience (Questionnaire 2) question response means are given in (Jennings, 2005) and the following Tables 1 - 4. The findings are discussed under four headings: Operations, Andragogical, Support and Social, four areas into which 26 of the 27 questions may be grouped. The following Tables give the Performance Means from Questionnaire 3 less the Expectation Means from Questionnaire 2 for each question (i.e. P - E (means)).

4.1 Operations

Table 1: Performance-Expectations Mean Response.

Questions	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Mean Response	7.4	7.8	7.6	7.6	7.4	7.2	5.3	6.2	5.8	6.9
S.D.	1.6	1.3	1.6	1.6	1.6	1.7	2.0	2	2.1	1.6
P-E (mean)	0.3	0.5	0.1	0	-0.3	-0.2	-2.0	0.2	-0.4	0.3

Table 1 indicates that the students found ease of access to computing facilities (Q1), found the technology easy to use (Q2), they also found access to a quiet space (Q3). They were happy with the ISP that they used (Q4), but had higher expectations of it. They were happy with the technical competence (Q5) and fast response time from support and they had a high level of confidence in the systems being used even though their expectations were higher than performance (Q6). Q7, which concerns disaster recovery, wasn't put to the test during the experiment, so perhaps that is why the score is low, 64% of the Performance Questionnaire respondents versus 94% of the Expectations Questionnaire respondents. The difference between the Performance mean minus the Expectation mean is -2, perhaps students' understanding of what was meant by disaster recovery was different. Q8 concerns the system response time and indicates that the performance exceeded expectation. Q9 concerns technical training and students seem disappointed with the level of training, 74% Performance versus 84% Expectations. Disaster recovery (Q7) and training (Q9) account for the difference in the

overall percentage of students' expectations, 92%, for the Agree-Strongly Agree scale 5 - 9, and the percentage of students' performance, 88%.

A student commented: "It was the first time that I used technology for education purposes so maybe that was the reason why I felt anxious and a bit unsure what to expect from the project. Also my class were the first to use the software so I expected LearnLinc to be troublesome and felt the class were the "guinea pigs" in trying to find bugs etc., in the program. Even though I had negative thoughts I was excited in using the software for the first time. It was something new and it was going to be a break from the traditional classroom lectures."

4.2 Andragogy

Andragogy deals with adult learners (Infed 2005).

Table 2: Performance-Expectations Mean Response.

Questions	Q13	Q16	Q18	Q19	Q20	Q22	Q23	Q24	Q25	Q27
Mean Response	7	6.3	6.4	5.9	4.4	5.2	4.6	4.2	5.8	5.2
S.D.	1.6	2.8	1.4	1.9	1.8	2	2	2	2.1	1.9
P-E (mean)	-0.3	-0.4	-1	-1.4	-0.8	-0.7	-1	-1.1	-0.6	-1

Table 2 indicates that, in the main, the students did not find it, compared with Expectation (Questionnaire 2) to be a positive learning experience. Their commuting time was reduced (Q16), but the standard of presentation was not as high as expected (Q18), nor was the session as stimulating as expected (Q19). It was harder to concentrate (Q23), 73% down to 48%, and they participated less than in a face-to-face lecture (Q24), 67% down to 40%. There was no great difference in enriching the learning experience (Q25). The expectations in the use of technology improving productivity (Q27) dropped from 82% to 60% after performance. When examining P - E (mean) figures they are all negative. Q18 - the standard of presentation - can be linked back to the removal of animation and colour images from the PowerPoint slides (to reduce the bandwidth load). Obviously the use of the synchronised Web Browser, Question & Answer facility didn't enhance the learning environment. Q19 - not more conducive to learning - can be related back to the newness of the virtual classroom environment and the short length of the experiment. Q23 - harder to concentrate - can be

linked to the abuse of the text chat facility in the virtual classroom. Q24 – participated less than in face-to-face lecture – can be related back again to being comfortable with the environment and the newness of the technology. Q27 – improving productivity – the lecture was shorter, only an hour long, so perhaps students felt they had lost out, even though the lecturer was of the opinion that he covered material faster.

A student commented: *“It was obvious also that it is necessary to develop a degree of comfort with using the learning tool, and that this comfort must be acquired by both the lecturer and student. The first lecture was delivered at a speed which far exceeded what was usual, but by the final lecture the delivery was much more attuned to an appropriate pace for the particular learning environment.”*

Another commented: *“I was surprised to observe that I didn’t recall the content of the lectures as well as those which had been delivered in the traditional manner. I think my recall is partly tied up with visual cues received from the lecturer and in absence of more experience with remote learning this is difficult to assess. I also didn’t take any notes to which I could refer later. This wasn’t a conscious decision, as I came prepared for taking notes. I believe it was a consequence of engaging with this particular medium. At least temporarily, engaging in a cyber-space environment altered my behaviour.”*

Veneema and Gardner (1996) have commented *“...students might seem engaged but understand little because their response reflects more an attraction to the medium rather than an understanding....”*

4.3 Support

Table 3: Performance-Expectations Mean Response.

Questions	Q8	Q9	Q10	Q11	Q21
Mean Response	6.2	5.8	6.9	6	5.5
Standard Deviation (S.D.)	2	2.1	1.6	2.4	2.1
Performance-Expectation(mean)	0.2	-0.4	0.3	-0.4	-1.1

As can be seen from the summary tables students were more negative about the actual support experience compared to their expectations. When analysed further, the students were happy with the training (Q9), response time of the system (Q8) and response time from support staff (Q10). The students

were not so happy with the level of documentation to support training (Q21), expectations 90% down to performance of 69%. While the LearnLinc environment does not require a great deal of training, it does depend on the level of computer literacy and comfort with working with computers

A student comment commented on the support and the role of the ListServ email forum: *“This forum allowed students the opportunity to ask questions regarding their technical difficulties. It was apparent to me that a lot of the technical advice came from fellow students, thus promoting a sense of ownership and involvement by the students.”*

Another student commented: *“The LearnLinc experiment fell very appropriately into our Information Systems and the Enterprise course because we could see first hand the approach, the planning and the implementation methods adopted by the Trinity LearnLinc management team to ensure the smooth installation of the process. The value of seeing our own team in action, understanding the planning, test issues and people’s reluctance to change was a worthwhile experience, as someday it will be us implementing a similar concept within our own organizations.”*

4.4 Social

Table 4: Performance-Expectations Mean Response.

Questions	Q12	Q14	Q15	Q17
Mean Response	4.9	5.3	6.3	2.9
Standard Deviation (S.D.)	2.3	2	2.0	1.9
Performance-Expectation (mean)	-0.3	-0.1	-0.2	-2.5

The mean responses for all questions were negative relative to expectations. As can be seen the students felt that the technology reduced the interactive experience (Q12), but less than was expected, 61% down to 52%, just over half the participants. Some people changed their mind with regard to working on their own (Q14), and were comfortable with using the technology to communicate (Q15). They also felt that after using the technology they didn’t need time to learn the environment that they thought initially they would, Q17, 69% down to 17%, which gives a very low average score.

One student commented negatively: *“I found the stifled silence of the computer labs distracting as I forced myself in vain to find a point of interest whilst I digested the information being fed to me.”*

Personally I felt that I was not taking part in the chat area throughout each class. That said, I do not regret my participation in such an experiment, I found it to be of some value."

Perhaps if the student had been in a position to benefit by accessing the lectures at home or at work, this isolated feeling would be eroded by that benefit (Hara and Kling, 1999).

Another student commented on the experience – *"Watching a match on television can't compare to "being there" in terms of experience, but it's warmer, you can watch replays and you don't have to leave your house. In some ways eLearning is the very same."*

Another student commented on the social impact: *"There are also social implications; the traditional evening course generates enormous pressure on families, while the mother or father attends a lecture for a few hours the other partner stays at home to look after the children. This can lead to marriage problems...."*

5 BLENDED LEARNING

Blended Learning can be defined as learning events that combine aspects of online and face-to-face instruction. It has been claimed that blended systems have been very effective (Spot+ 2004).

A blend of traditional University teaching, pedagogies and strategies coupled with the use of emerging web-based collaboration platforms, both synchronous and asynchronous, would appear to offer significant potential for a blended eLearning solution at Institutional, Faculty and Student level.

This research describes the implementation of a blended learning environment, with the emphasis on implementing and evaluating the online experience that took place under the GENIUS project.

All course modules delivered in the degree course in Information Systems, up to now, were delivered in a traditional face-to-face lecture hall environment. This project involved a change to the delivery process for the part-time mature evening students. In effect the students would be participating in a blended learning approach. Where initially lectures would be delivered in a face-to-face environment, they would then partake in the series of online lectures and then revert to face-to-face delivery. It was hoped that the majority of students would

partake in the course off campus in a learning environment was to be 'Same Time Different Place.'

Online students are more likely to feel isolated and require more support in that area. When students have a problem, its seriousness multiplies because they feel they are on their own, and it becomes much more frustrating (Hara and Kling). To enable a sense of community students should be encouraged to help each other, by using a facility like a Listserv or chat room. This also gives a feeling of belonging to a community.

The results of a question (Questionnaire 3 Section B Question 23) on Blended Learning is as follows:

Table 5: Would you like to experience a blend of this type of learning and traditional learning in your future years at TCD? (Question after experiment).

Comment	%
If there is a good reason for it	2
Lecture time to be extended to cover material adequately	2
Only if technology/internet connection runs smoothly	6
Only in certain subjects	11
No, I prefer to attend college. Traditional method	13
Only to same extent. A few lectures a year. In moderation.	15
Yes, I would like to experience a blend of this type of learning and traditional learning in the future	51
	100

In answering this multi-part question, the respondents were restricted to choosing just one of the options. In evaluating the responses from this questionnaire, the results are not particularly supportive of blended learning. An interesting question in hindsight, but not asked at the time, was how much blending is desirable? In this study the eLearning component of the blended learning course comprised 18% of the total course.

A student commented: *"My final thoughts on the project and in using LearnLinc are very different from my initial thoughts. I would like to use it again but only as a supplement to the traditional classroom lectures."*

A smaller group preferred the traditional face-to-face environment and found face-to-face more conducive to learning. Marjanovic (1999) endorses the importance in having some face-to-face sessions before starting the online delivery sessions. This was found to play an important role in nurturing

interaction and for students to understand the style of lecturing that the lecturer uses. It also helped to open up dialogue when moving to the online mode. This was one of the benefits of the blended learning approach.

Students expressed the view that they would not like to have online delivery all the time, but rather a blended solution of traditional and online. This is in line with what was found in the SPOT+ Survey of two thousand students in twelve European universities: "The 2,000 students surveyed in SPOT+ Project were interested in the use of ICT for information exchange, but expressed a stronger preference for traditional education methods" (SPOT+ 2004).

6 CONCLUSIONS

The key issues found under the four factors in this pilot study are as follows:

Operational

Students seemed disappointed with the level of training. The Performance was lower than Expectation for Q9.

Andragogical

The students didn't think the use of this internet technology improved productivity, Q27.

The main findings were that the session was not as stimulating as expected nor as conducive to learning as expected for these 10 categories. Students found it harder to concentrate and they felt that they participated less than in a face-to-face environment. They were also disappointed that the Internet technology did not improve productivity.

Support

Students would have liked better documentation to support technical training, Q21.

Social

Students felt that the technology reduced the interactive experience, Q12. Students felt that they didn't like the idea of working on their own away from fellow students, Q14. Students also felt that they didn't need as much time to learn the technology environment as they thought they would, Q17.

Other Issues

From a number of items of feedback, broadband is essential for good performance.

How much blending is desirable? 10:90; 20:80 or even higher? The students attend their course for four years, three nights per week. If one of these nights could be taken from home, it may give them appreciable relief.

What types of course are suitable? This question needs to be explored further.

What learner situations are suitable e.g. distance learning, commuting, home problems, remediation? Blended learning is suitable for adults doing travel for business and those with domestic responsibilities. Some students in this pilot study attended from the UK, Seattle and South Africa for instance. It is also suitable for revision because the course lectures are saved and can be reprised later.

How best to overcome the deficiencies of the e-learning model, assuming that each one can ever be overcome?

Blended learning is not cheap. Considerable resources in terms of finance, time, staff (lecturing, support and training) were necessary to get this pilot study up and running.

What are the real advantages of the traditional face-to-face situation that we are overlooking?

Further Work Needed

Four sessions are probably too few to overcome the novelty effect for the students and also for the lecturers to move sufficiently further along the learning curve for this new medium. Longer courses and more courses are needed. Longer courses would allow more familiarity with the system and equipment for lecturers, support staff and students. More courses would also identify which courses and material were more suitable. The issue of further andragogical implications and their evaluation need to be addressed in the longer term. A full examination of the economic implications of this medium is needed.

It is obvious that some, but not all, of the issues which gave rise to problems in this study will diminish or disappear as Broadband and computer equipment continues to speed up.

However many other issues will not go away so easily. In particular, a lot of students preferred the traditional lecture over web-based presentation

(Dolan, O'Connor, Mullally and Jennings, In press). The main advantage for students is reduced travelling time to lectures. However most of these students spend quite a large percentage of their time in front of computer screens at their work already and report that they see little advantage, other than reduced travel, in having the course material presented by screen. A blended approach, that is a mix of traditional lecturing with web-based presentation is probably what is needed with the blend, perhaps, being 90:10 in favour of traditional at present.

A better evaluation template for the process with the use of a control group is needed. A cross-over study with half the students getting traditional teaching for half the course while the other half get the web-based collaborative platform for that half, and vice-versa for the remainder of the course is needed in a more complete study. It is also necessary to measure the relative effectiveness of learning performance in both of these approaches.

The eLearning paradigm provides opportunities for the facilitation of individual differences. In future applications, this issue could also be addressed (Redmond and Parkinson, 2003) (Parkinson and Redmond, 2005). In terms of learning, not all personality and cognitive styles are amenable to this type of instructional medium.

This pilot study illustrates the difficulties of exploring virtual student/lecturer interactions in eLearning environments. One unexpected result is a much deeper appreciation of how much is involved in the "traditional" lecturing environment and how difficult it is to replicate it in a virtual classroom.

The term "blended" in blended learning seems to imply that both traditional and eLearning can be easily integrated. From these results it would appear the blending may have more of the characteristics of trying to blend oil and water.

The jury is not still out on blended learning. The answer from this pilot study is that blended learning needs considerable improvement before students will readily accept it, except in situations of necessity and in relatively small quantities.

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APPENDIX

Questionnaire 3 A - Performance - Section A (Abridged somewhat).

1.	I found ease of access to computing facilities for this project.
2.	I found the internet technology to be easy to use.
3.	I was able to access a quiet space in which to use this technology at home/work/TCD.
4.	I found the internet service I used was able to support the use of this technology.
5.	I found a high degree of technical competence from college systems support staff.
6.	I had a high level of confidence in the systems I used
7.	I found that there was a provision for disaster recovery/fall-back position.
8.	I had excellent system's response time.
9.	I received excellent technical training.
10.	I had a fast response time from support staff to remedy problems
11.	I was in touch with my peers through the use of the e-mail support facility.
12.	I found the use of this technology reduced the interactive experience of the classroom.
13.	I found this learning experience to be positive
14.	I liked the idea of working on my own away from my fellow students
15.	I was comfortable communicating with others using this technology during live sessions.
16.	I found the use of this technology reduced my commuting time.
17.	I needed to find the time to learn the systems I used.

18.	I found a high standard of presentation of course material
19.	I found these sessions to be intellectually stimulating.
20.	I found this learning environment to be more conducive to learning than the traditional classroom.
21.	I had excellent documentation to support technical training.
22.	I found the use of this technology enhanced my ability to learn.
23.	I found that participating in the online sessions on my own allowed me to concentrate better.
24.	I participated in discussion more freely in the virtual classroom than in the traditional lecture theatre
25.	I found the use of this technology enriched my learning experience.
26.	I understand that the benefits derived by myself from the systems I use are being measured
27.	I found the use of this internet technology improved my productivity