

Title: Using Web 2.0 in large cohort project management education: Panacea or Empty Promise:

Keywords

Technology, Web2.0, VLE, Project Management,

Principal Author:

Fiona C Saunders, BSc (Hons), MBA, MIET, CEng

Teaching Fellow, School of Mechanical, Aerospace and Civil Engineering,

The University of Manchester, PO Box 88, Manchester M60 1QD

Tel: +44 (0)161 306 3738

Email: fiona.saunders@manchester.ac.uk

Co-Author

Professor Andrew W Gale BSc (Hons), PhD, CEng, FICE, MCIIOB, MACostE

Professor of Project Management, School of Mechanical, Aerospace and Civil

Engineering, The University of Manchester, PO Box 88, Manchester M60 1QD

Tel: +44 (0)161 306 4236

Email: andrew.gale@manchester.ac.uk

Abstract

Many Higher Education Institutions regard the use of technology in teaching and learning as a key tool in the pursuit of efficiency savings. Simultaneously a new generation of students are arriving at university confident with technology and well versed in the many collaborative and social tools that fall under the broad umbrella of web 2.0. These students have high expectations of academic teaching faculty.

This paper investigates whether the selective use of web 2.0 technologies can enable teaching faculty to meet these *NetGeneration* students where they are and deliver an enhanced student learning experience. The development and evaluation of a compulsory project management course which is taught to 270 3rd year engineering undergraduates at The University of Manchester is used as a case study. The course retains the benefits of face to face contact with students through weekly key-note

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

lectures, but supplements this with the extensive use of a Virtual Learning Environment (VLE) and key web 2.0 applications.

The key findings are that technology is not a panacea: face to face contact with teaching staff remains the priority for most students. New learning technology may also lead to an increased incidence of strategic learning with students preferring the tools that are most closely aligned with the assessment process. Nevertheless the use of web 2.0 tools and the VLE was found to enhance the student learning experience in terms of communication and feedback. The greater challenge of using new technologies to increase collaboration in learning remained an elusive goal, with further work by the authors focussed on this objective.

Introduction

Net Generation students - those born from the mid 1980s onwards (Oblinger and Oblinger 2005) - continue to stream into Higher Education, where they crash headlong into teaching faculty, a significant proportion of whom have often only recently progressed from “chalk and talk” to the use of PowerPoint slides in lectures. The Net Generation, also known as Digital Natives (Prensky 2001), Millennials (Howe and Strauss 2000) and Homo Zappiens (Veen and Vrakking 2006) have grown up with web 2.0 as a way of life – utilising online collaboration sites such as Facebook, Twitter and various blogs, to communicate, collaborate and organise their lives. Surveys in the United Kingdom suggest that 90% of UK students are regular users of social networking sites on entry to Higher Education (Melville, Allan et al. 2009). As undergraduate students, the Net Generation demands continual feedback, increased interaction with teaching faculty and extensive collaboration in learning (Oblinger and Oblinger 2005). How then should Higher Education Institutions, driven by financial and government pressures to accept ever increasing student numbers

evolve the student learning experience to meet the expectations of the Net Generation? Didactic teaching in ever larger lecture theatres may not constitute the optimal approach. Recognising this many universities have seized on new technologies in teaching and learning as a source of cost and efficiency savings. Universities have invested in Virtual Learning Environments, sought to encourage and cajole teaching faculty to use new technology, without necessarily understanding whether the use of these technologies can deliver enhanced teaching and learning.

Addressing this question, this paper investigates whether the selective use of web 2.0 technology can enable teaching faculty to meet Net Generation students where they are and deliver an enhanced student learning experience. The particular context of this study is the delivery of project management teaching to cohorts in excess of 250 engineering students, where a proportion of students view management as uninteresting, irrelevant and less rigorous than the more mathematical elements of their undergraduate course. This study describes the development and evaluation of a semester long, core project management course which is taught to 270 3rd year Civil, Mechanical and Aerospace Engineering undergraduates at The University of Manchester. The course challenges engineering students to think about how companies operate, how they produce their products and services, and how they remain ahead of the competition. The course has retained the benefits of face-to face contact with the student cohort through weekly key-note lectures, but has supplemented this with student centred learning embedded through the extensive use of The University of Manchester's VLE. Rather than using the VLE simply to replicate elements of face-to face teaching (Blin and Munro 2008), for example by posting PowerPoint lecture notes on the VLE, the authors have focussed attention on the web 2.0 tools provided by the VLE also, for example podcasting, and have also linked the VLE to a course Facebook group.

The impact of the use of web 2.0 technology within the VLE on the student learning experience was assessed using a quantitative survey of the 2008/2009 student cohort (N=146). The aim of the research was to evaluate the extent to which the use of web 2.0 technology can enhance the student learning experience in large cohort teaching, as well as understanding which tools were accessed most often and which were ranked as most effective by the students.

The findings of this case study are something of a patchwork. On the one hand the surveyed cohort was overwhelmingly of the view that the faculty's use of web 2.0 within the Virtual Learning Environment had enhanced the student learning experience. However, the most effective tools for learning remained the face to face keynote lectures, the ability to download the lecture notes and the provision of quizzes and case studies to test and embed the students learning. Key discussion points from the findings are that:

- Technology is not a panacea, with the most effective learning tool for the majority of students remaining the face to face keynote lectures
- Technology can encourage strategic learning within the student cohort
- Take up of specific web 2.0 tools such as podcasting and the social networking site Facebook was lower than expected.
- However the use of technology did enhance the student learning experience

Literature Review

The effectiveness of learning technology in enhancing the student learning experience

The debate over the effectiveness of using technology, such as Virtual Learning Environments, to enhance the student learning experience in Higher Education

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

Institutions has been a long and protracted one, with neither advocates nor detractors, as yet, able to claim a decisive victory. Proponents of the view that technology can be used to enhance teaching and learning are convinced that using technology appropriately can both enrich the student learning experience and improve the effectiveness of student learning (Collis and Moonen 2001), (Davidson and Orsini-Jones 2002); (Laurillard 2002), (Sharpe, Benfield et al. 2006), (Mason and Rennie 2008) and (Matulich, Papp et al. 2008). Collis and Moonen contend that learning technology allows students to make the transition from a learning process centred on knowledge acquisition to one founded on participation (Collis and Moonen 2001). Mason and Rennie support this view by arguing that effective learning is not just a matter of a lonely learner internalizing knowledge but of participation in a community of learning (Mason and Rennie 2008). Laurillard makes the connection between use of technology and learning experience more explicit still, stating that

“technology is an engaging and highly responsive medium; it can gather content according to interest; it can respond to individual needs of pace and level; it fits with the style and forms of youth culture; it can link the classroom to the workplace and in doing so allows teachers to provide much more of what only they can do for their students” (Laurillard 2007).

Today's students require learning to be student paced with significant elements of peer to peer learning and engagement in the learning process. Technology, for example, using the VLE to post material in flexible formats, or creating group based wiki's of particular topics can help achieve these lofty aims (Matulich, Papp et al. 2008).

Detractors of technology counter that *“technology makes no significant difference”* (Russell 2001) and that *“technology does little to improve learning”* (Kvavik and Caruso 2005). Others claim that the use of new technology can lead to a strategic learning approach, whereby learners direct their learning to achieve specific course

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

outcomes (Saunders and Klemming 2003). The Joint Information Systems Committee Student Expectations (JISC) Study of 2007 reported that face to face contact with faculty was valued most highly by students, and that learning technology was viewed only as an adjunct to effective face to face teaching (Ipsos 2007).

One challenge that the proponents of learning technology face is that of measuring the improved learning that occurs directly as a result of using learning technology. How much of any measured improvement in performance is generated by the new tools themselves (e.g. podcasts), and how much is more a secondary effect of using technology to increase students' engagement in the teaching and learning experience, thereby leading to improved learning. Is the relationship between the use of technology and the improved effectiveness of learning a direct causal one? Can we measure the effectiveness of learning at all? If we use students' grades as a measure of learning then there is a risk that we are only measuring the strategic learning of students to achieve the desired course outcome and not capturing the full extent of the students' learning.

This debate has given rise to a proliferation of research into the use of learning technology as a tool for learning in Higher Education Institutions. Much of this research has been empirical, with case studies published on the effectiveness of VLEs in enhancing student learning across a range of disciplines, including Accounting (Broad, Matthews et al. 2004) History (Rogers 2004), Operations Management (Greasley, Bennett et al. 2004), Engineering (Nortcliffe and Middleton 2008) and Foundation year studies (Turney, Robinson et al 2009). These studies range from initial experiments with early versions of proprietary VLEs such as *Blackboard* (Greasley, Bennett et al. 2004) to the specific use of a single aspect of learning technology such as audio feedback to engineering students (Nortcliffe and Middleton 2008). The findings of these empirical studies, in the main, support the

view that the student learning experience, but not necessarily the student's grade is enhanced by the appropriate use of learning technology. A consensus does seem to be emerging that technology can be used to achieve more constructivist pedagogical principles (Mayes 2001) and (Rogers 2004). This position however demands that pedagogy comes first in course and learning design. Academic staff are first required to understand the principles of constructivism (Biggs 1999) that they wish to implement in their teaching and only then is it recommended that they reach for the appropriate technology or tool to achieve this.

One limitation in all of these empirical studies is that the average student cohort is 60-70 in number. However, class sizes can now, typically, measure in the hundreds. There are no peer reviewed studies of the use of a VLE to enhance the student learning experience within much larger (250 plus) cohorts. Face to face teaching of these large cohorts of students has always been a challenge for teaching faculty. It is very difficult to engage effectively with students in a one to many relationship in vast lecture theatres. Most students are unwilling to ask questions to test their understanding; feedback is very impersonal, if given at all, and learning through collaboration a logistical challenge. In addition, any minor problems concerning the delivery of material or the assessment process are magnified by the large cohort size. In direct response to these challenges, this paper describes the implementation of web 2.0 tools within a large cohort project management course and evaluates the extent to which the use of web 2.0 technology can enhance the student learning experience. The paper does not attempt to measure any improvement in the effectiveness of student learning via measuring student grades.

Unpacking the jargon of web2.0

The expression web 2.0 was originally coined in 2003 as a response to the rebirth of a number of novel web-based applications following the bursting of the dot-com

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

bubble back in 2001 (O'Reilly 2005), (Anderson 2007). These web 2.0 applications are web-based rather than PC based; they provide a user friendly and interactive environment and critically they provide collaborative or participatory facilities for the users of those applications (Elliot 2007). Web 2.0 has always been easier to describe by example than by definition with applications such as Wikipedia, Facebook and Flickr being typically quoted examples of archetypal web 2.0 technology. The earliest definition of web 2.0 was provided by Shirky in 2003 "*Web 2.0 – the social web: Software that supports group interaction*" (Shirky 2003). In this respect the key distinctive feature of web 2.0 is that it encourages, and indeed requires, user participation in generating, editing and sharing content. Users of the software become "prosumers", rather than consumers (Tapscott and Williams 2008) as they are producers of web content as well as consumers of web services. Currently the most familiar web 2.0 applications for today's students include blogging, online chat services such as MSN, sharing of video and music files and social networking, including the eponymous Facebook and Myspace (Melville, Allan et al 2009).

The majority of students entering UK universities today are familiar with and in many cases prodigious users of web 2.0 applications (Livingstone and Bober 2005), (Mason and Rennie 2008), (Oblinger and Oblinger 2005). A recent independent Committee of Inquiry into the changing learner experience in the UK highlighted the "*complete normalization and integration of web 2.0 into the day-to day lives of the current generation of young people*" (Melville, Allan et al 2009) For them the web is a key life tool – both a social and an educational one, that teaching faculty can tap into to enhance the student learning experience.

Web 2.0 as an extension of the Virtual Learning Environment

Over the last 10 years VLEs have been introduced in many universities as a means

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

of using technology to increase the effectiveness of teaching. Drivers for this have been the efficiency savings required by government of university administrators and the ever increasing numbers of students entering higher education (Mayes and Fowler 1999). A Virtual Learning Environment is “a software system designed to support teaching and learning” (Ho, Higson et al 2009). VLEs comprise a number of tools enabling the electronic delivery of course material, management of assessments, and staff- student or student to student communications features (McGill and Hobbs 2008). VLEs are predominantly web-based, enabling access on and off campus. They are however closed systems, only accessible to registered staff and students in the host institution. This has led to the view that VLEs do not form part of the web 2.0 revolution as they are not truly collaborative (Melville, Allan et al 2009). This argument holds some merit, in that one of the benefits of web 2.0 collaboration is that users are free to collaborate with whomever they wish, and this is not possible within the closed VLE. However, VLEs do provide a consistency of user experience; essential to teaching faculty in maintaining standards, even if this stands in contradiction to the endlessly customizable user generated tools and content available in pure web 2.0 applications (Craig 2007). The authors of this paper contend that although the VLE web 2.0 tools may be inferior to their pure web 2.0 equivalent (for example Wimba podcasting in Blackboard vs. Feed for all or Audioblogger) the VLE may still be viewed as an effective mechanism for introducing web 2.0 technology into the student learning experience. The great advantage of using the institution’s VLE to dip ones toe in the water of web 2.0 as a means to enhance the student learning experience is that the infrastructure, support and tools are available within the institution.

Using the web 2.0 tools within a university’s Virtual Learning Environment should allow today’s Net Generation students to experience the interactivity and collaboration in learning that they crave (Mason and Rennie 2008). Web 2.0 tools

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

implemented within the controlled environment of the VLE allow teaching faculty to combine the advantages of the VLE (that of a consistent user experience, institutional support and control to the teacher) with many of the additional advantages of web 2.0 - a richer range of tools, and using the same tools that students are already familiar with (Elliot 2007). The use of these web 2.0 tools should therefore result in a win-win situation for students and teaching faculty alike.

Web 2.0 technology: panacea or empty promise in the context of large cohort project management education? The University of Manchester case study

All Civil, Mechanical and Aerospace undergraduate engineering students at The University of Manchester undertake a compulsory spine of project management courses, one in each year of their four years of undergraduate studies. Each course is delivered to a single cohort comprising approximately 270 Civil, Mechanical and Aerospace Engineers. It is the 3rd year project management course which forms the basis of this case study. The typical age of this cohort is 21 years. The course aim is to challenge the students to think outside their engineering discipline about how companies operate, how they use projects to produce their products and services, and how they stay ahead of the competition.

In previous years feedback on the project management spine had been mixed with lack of academic challenge, large class size and poor feedback listed as the most problematic issues. In response to this in 2009 the authors undertook to use The University of Manchester Virtual Learning Environment, Blackboard Vista, and in particular web 2.0 tools such as podcasting and the social networking site Facebook to enhance the student learning experience on the course. The structure of the course on the VLE is shown in Figure 1 overleaf.

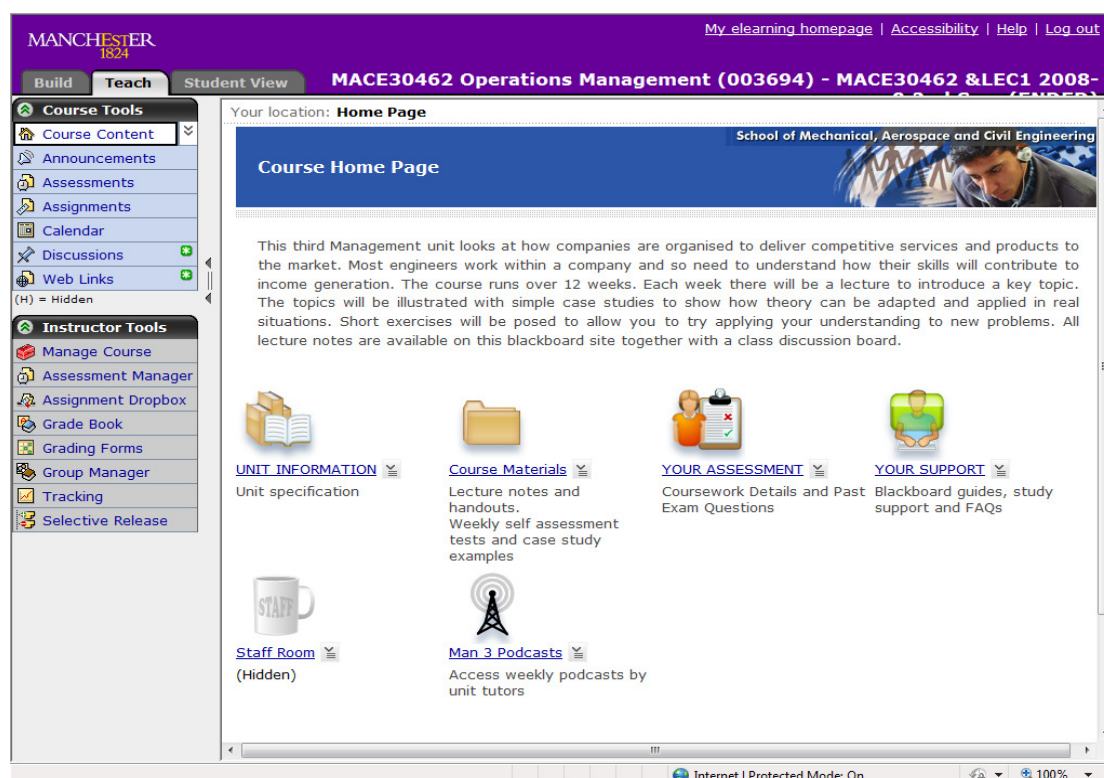


Figure 1: Screenshot of Course Unit Home page in Blackboard Vista

The key features of the course Virtual Learning Environment are described below:

Course Materials Here students can access and download all course materials including lecture notes and presentations. Students can also complete weekly non-assessed Multiple Choice Quizzes on the material covered in the previous week's key-note lecture and investigate case studies from a variety of companies. There are also links to weekly directed readings from the course text book.

Your Assessment: The VLE was used to organise the unit coursework. Students were asked to sign up on Blackboard to self selected groups of three, which could be either single discipline or multi-disciplinary. The assessed coursework, which took the form of a group poster analysis of a project management problem allowed the students to collaborate both virtually and physically, and to draw on a range of on-line resources to produce the required poster. All 90 posters were displayed on the

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

course unit Facebook group which was administered by the course lecturers. Here students could view each others work, provide feedback, and invite friends and family to view their finished work. These posters also provide a rich source of case-study material, and they will be available to future cohorts as exemplars of project management in the context of the company operation.

Feedback: The course lecturers recorded weekly 5 minute podcasts, which were delivered via the VLE to provide direct feedback to the cohort on their performance in weekly Multiple Choice quizzes. These Multiple choice quizzes were designed to test the students' understanding of the face to face lecture material and help embed the concepts introduced in the lectures. The quizzes were automatically marked by the VLE and the authors were able to see which questions had caused the cohort difficulty. This allowed targeted rapid audio feedback to be provided to students. The podcasts were simple to record using the standard podcasting tool provided by Blackboard, and there were no technical glitches throughout the semester. A class discussion board was also provided within the VLE as a mechanism for students to discuss and resolve their own problems, or to pass questions to the course lecturers.

Key Findings on the use of web 2.0 tools within the VLE

At the end of the semester the 2009 cohort of 270 were surveyed by questionnaire. The questions asked included how often students had accessed 8 different elements of the course (including the keynote lectures and the web 2.0 tools). Students were asked to rank the main eight elements of the course unit in order of effectiveness as a learning tool as shown in Figure 2 overleaf.

2) Please rank the following in terms of effectiveness as a learning tool:

1 being the most useful and 8 being the least useful

a) Attendance at weekly keynote lectures.....	<input type="checkbox"/>
b) Accessing lecture notes on Blackboard.....	<input type="checkbox"/>
c) Accessing MC quizzes and case study questions on Blackboard...	<input type="checkbox"/>
d) Accessing the podcasts for feedback on quizzes.....	<input type="checkbox"/>
e) Using the class discussion board on Blackboard.....	<input type="checkbox"/>
f) Directed reading in the course textbook.....	<input type="checkbox"/>
g) Viewing the Facebook poster presentation.....	<input type="checkbox"/>
h) 1:1 discussion time with course lecturers.....	<input type="checkbox"/>

Figure 2: Excerpt from Cohort Questionnaire 2008/2009

The hypothesis that selective use of web 2.0 tools within the VLE enhanced the student learning experience was tested through data gathered using the following questions.

3) The course tutors' use of Blackboard and other web2.0 tools enhanced my learning experience

Strongly agree agree no difference disagree strongly disagree

4) The course tutors' use of Blackboard and other web 2.0 technology should be replicated in other University of Manchester course units

Strongly agree agree no difference disagree strongly disagree

Figure 3: Survey questions relating to the enhancement of the student learning experience

In total, 146 questionnaires were completed, providing a response rate of 56%.

Respondents' demographics can be broken down into 84% male and 16% female,

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

with 95% of respondents being under the age of 25. 66% of questionnaire respondents describe themselves as regular users of web 2.0 tools and content – interestingly this figure is much lower than the 9 out of 10 of UK students quoted by (Melville, Allan et al 2009) as being familiar with social networking sites on arrival at university. The lower figure obtained by the questionnaire survey is probably explained by the fact that UK students comprise only 2 out of 3 in the student cohort.

The questionnaire survey results were enlightening; respondent anonymity ensured open feedback and clear distinctions could be made between the course features that the students found to be effective tools for learning and those that were not. Blackboard usage statistics also revealed that students experimented in the early weeks of the course with all the available tools, before limiting themselves to those they found most useful. In this regard the majority of students behaved as rational strategic learners, focussing their time and energy on the tools with the most benefit to them.

Figure 4 overleaf shows the most accessed tools on the course unit and Figure 5 shows the respondents ranking of the effectiveness of these tools in enhancing the student' learning.

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

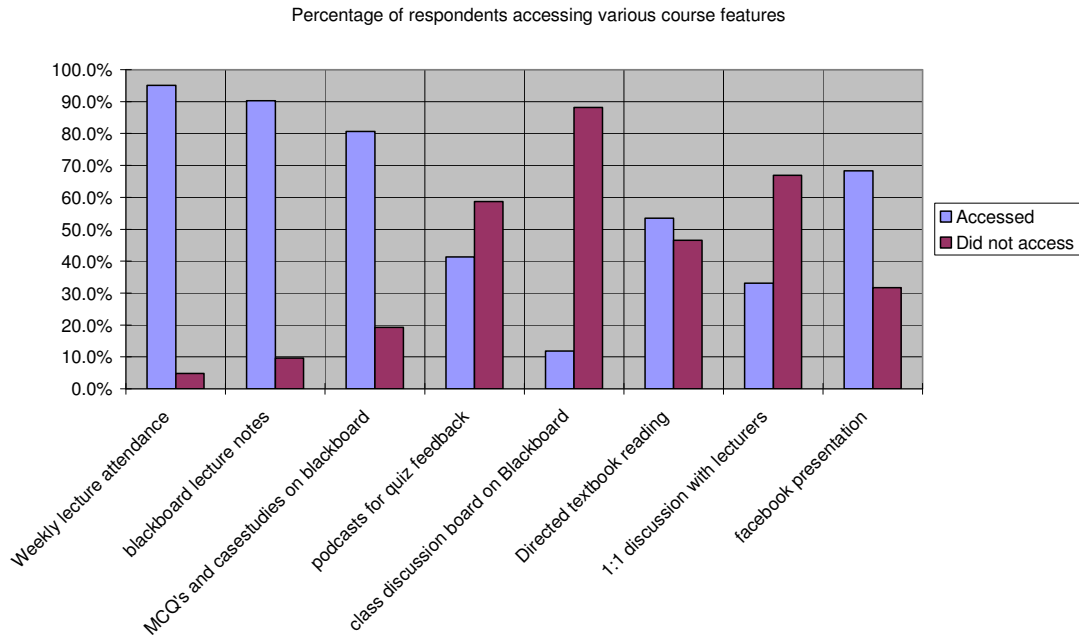


Figure 4: Percentage of respondents accessing various course features

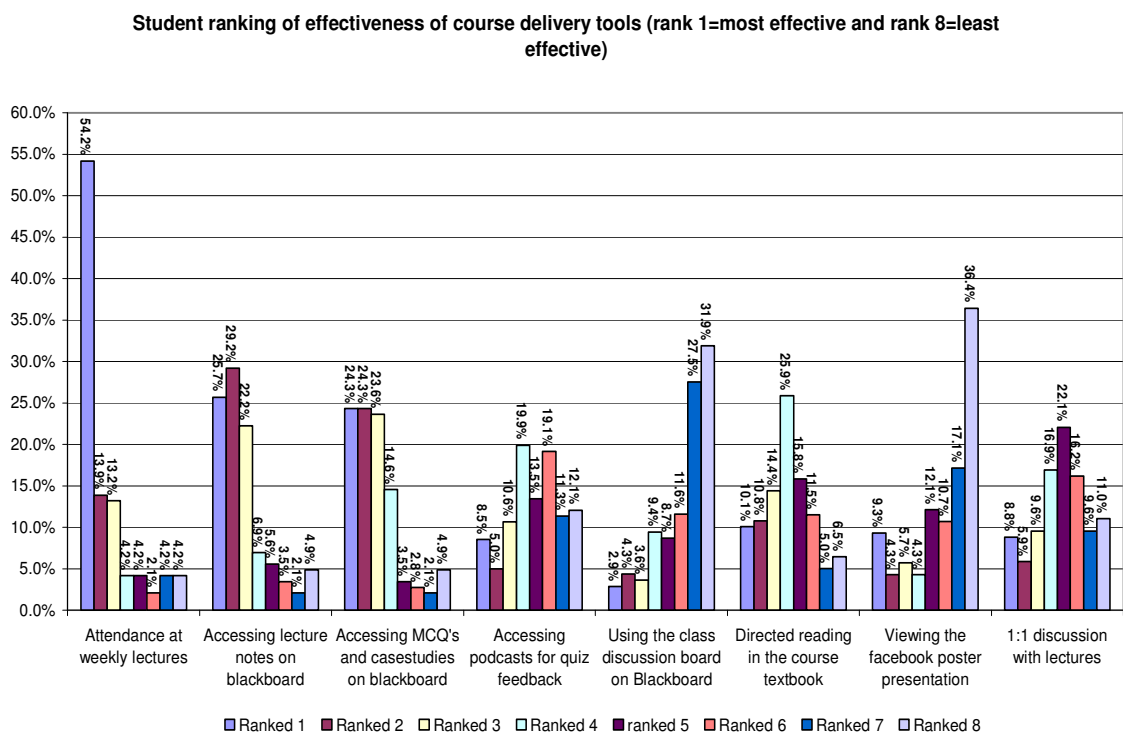


Figure 5: Respondents' ranking of effectiveness of various technology tools

Taking a weighted average of the rankings in Figure 5 allowed the different technology tools to be ranked in terms of their effectiveness to students. This ranking

is shown in Figure 6.

Learning Tool	Student ranking of effectiveness
Face-to-face weekly key-note lectures	1
Lecture notes available on VLE	2
Multiple Choice Quizzes and Case studies	3
Directed Reading in Course Textbook	4
1:1 discussions with teaching faculty	5
Podcasts of Multiple Choice Quiz feedback	6
Facebook Poster Presentation	7
VLE class discussion board	8

Figure 6: Overall ranking of effectiveness of various technology tools

The most effective and most accessed course unit feature remained weekly attendance at the key note lectures, with over 90% of respondents attending some or all of the time. In addition 54% of respondents ranked the weekly key note lectures as being the most effective tool for learning (Figure 5). This high ranking of the traditional face to face lecture demonstrates that, however large the cohort size, the delivery of keynote lectures by teaching faculty remains the cornerstone of Higher Education teaching. This finding is consistent with the view expressed by the JISC Student Expectations Report of 2007 which reported that face to face contact with lecturers was valued most highly by students (Ipsos 2007).

The next most effective and most accessed features were the facility to download lecture notes from blackboard and the ability to reinforce learning through Multiple Choice Quizzes and case study analysis. This was a clear demonstration of strategic

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

learning by the cohort as the format of both multiple choice questions and case study analysis would be replicated in the end of semester examinations.

Less popular but still accessed by a majority of respondents were the text book directed reading and interaction with the Facebook course group. 68% of respondents used Facebook to view each others coursework; to comment on it and invite other friends to view it. However, Facebook's effectiveness as a learning tool was ranked 7th out of 8 by the cohort. The additional comments section of the questionnaire also revealed that a proportion of students were not convinced of the usefulness of Facebook as a site for a virtual poster presentation. These students would have preferred to see the posters remain in the Blackboard environment. This reticence to engage with Facebook may be due to the cohort viewing Facebook as their own group space, not to be entered by teaching faculty (Locke 2007).

40% of respondents accessed the podcasts and just over 30% took the opportunity to have 1:1 discussions with the course lecturers. The effectiveness of the 1:1 discussions with lecturers and the podcasts were broadly similar in terms of effectiveness as a student learning tool being ranked 5th and 6th out of 8 respectively. The relatively low scoring of the podcasting was a surprise to the authors as, prior to the questionnaire survey results, it was believed that the podcasts were a valuable source of additional feedback to students. One explanation for this is that the majority of students were satisfied with the level of feedback provided in the automatic marking of the quizzes and did not require further explanation, leaving only a minority requiring the podcasts. Podcasting will be continued next semester but only following further discussion with the cohort over its content and format.

Only a small minority engaged with the VLE based virtual discussion board and it was ranked bottom in terms of effectiveness as a learning tool. When faced with a

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

range of communication options it would seem that students prefer to ask a question face to face to a lecturer at the end of a lecture rather than to post a question on a public virtual discussion board.

Support for the authors' hypothesis that the use of web 2.0 tools within the VLE enhanced the student learning experience was overwhelmingly positive. 84% of respondents agreed or strongly agreed that the use of web 2.0 tools within the VLE had enhanced the student learning experience. Only 2.1% disagreed with this statement. Survey comments such as *"Very impressed with how much material there is online to enhance and help prepare for the exam"* and *"I think the use of blackboard and web 2.0 tools of this course is very good and useful. Much better than the other modules we are doing"* were generally very positive towards the authors' use of web 2.0 tools within the VLE. However, the comments still show a propensity for strategic learning in that the most commonly posted comment was a request to make the multiple choice quizzes repeatable to aid in examination preparation. There were a number of negative comments posted too, for example *"technology shouldn't take away from face to face contact with lecturers"* and *"stick to lectures this isn't supposed to be a distance learning programme"*. There were also a small number of respondents who described the VLE variously as *"clunky"* and *"not user friendly"* and more extremely *"I think 'web 2.0 technology should be used but Blackboard is a complete nightmare to use. It's really slow, it only runs properly on IE, and requires Java plug-ins."* This view confirms the one of the criticisms of VLEs, that in most cases the VLE offers an inferior web 2.0 tool than the pure web 2.0 alternative (Craig 2007).

The students' response to the question "should the course lecturers use of web 2.0 within the VLE be extended to other courses at The University of Manchester?" was emphatic too. 90% of students agreed or strongly agreed that the use of web 2.0

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

should be replicated in other courses, with only 1.4% disagreeing with this statement. Whilst it may be argued that the phrasing of this question was somewhat leading, the response was still overwhelmingly positive. Additional student comments such as *“if you are going to use it, it should be used school wide. Management is the only course that utilises blackboard to full effect.”* have been fed back to other teaching faculty.

Discussion

The findings of this case study are something of a patchwork. On the one hand the surveyed cohort was overwhelmingly of the view that the faculty’s use of web 2.0 within the Virtual Learning Environment had enhanced the student learning experience. However, the most effective tools for learning remained the face to face keynote lectures, the ability to download the lecture notes and the provision of quizzes and case studies to test and embed the students learning. Nevertheless, there are a number of hypotheses and conclusions that we can draw out of the case study findings to inform current teaching practice and to identify lines of future enquiry in pursuit of the holy grail sought by university hierarchies – that of delivering cost effective and efficient, yet at the same time excellent teaching to large student numbers.

1. Technology is not a panacea. The survey response showed emphatically that the most effective learning tool for the majority of students remained the face to face keynote lectures. Technology was seen as an adjunct to the weekly face to face lectures and in no sense a replacement for it. This finding is in broad agreement with the earlier findings of the JISC Student Expectations Study (Ipsos 2007). Technology should be carefully selected to meet the required pedagogical outcomes of the course – in contrast to the at times scattergun approach taken by this study’s authors.

2. Technology can encourage strategic learning. There was evidence in the questionnaire responses that the use of web 2.0 technology within the VLE was fostering an element of strategic learning. Students focussed more time on the tools, (for example, downloading lecture notes and practising Multiple Choice Quizzes) that were most explicitly aligned with delivering the desired course outcomes – i.e. passing the course.

3. Take up of specific web 2.0 tools such as podcasting and social networking site Facebook was lower than expected. The findings of the survey revealed a reticence amongst the student cohort to engage with the Facebook group poster site. This lends weight to the notion that students view Facebook and other social networking sites as “their” space – a private domain in which teaching faculty are generally not welcome (Locke, 2007). The authors will not be repeating the use of Facebook in the next academic year.

The relatively poor take up of the weekly feedback podcasts was also surprising to the authors, given previous work on the positive results of delivering feedback to engineering students using audio (Nortcliffe and Middleton 2008). It may be that the podcast delivery was uninspiring, or that the one size fits all feedback did not add value to the individual students.

4. The use of technology did enhance the student learning experience. The evidence of this case study clearly shows that the use of web 2.0 and the VLE enhanced the student learning experience in large cohort engineering management education. This confirms the view of Sharpe et al that “*Student response is overwhelmingly positive to the provision of on-line course information to supplement traditional teaching*” (Sharpe, Benfield et al 2006). This case study provides further

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

empirical evidence that technology used appropriately within a university's Virtual Learning Environment can overcome some of the challenges in large cohort teaching. – that of providing improved feedback, ensuring all students have access to core course material and tools to test their understanding of course materials, and improving student interaction with teaching faculty.

Less conclusive was that technology promoted increased collaboration amongst the student cohort. This was probably due to inappropriate choice of web 2.0 tool – in that the course Facebook group was not used extensively by students for collaboration. To this end future work will be focussed on exploring more effectively the use of web 2.0 as a vehicle for promoting collaboration.

Conclusions and Future Work

The findings of this study demonstrate both the benefits and the limitations of the selected use of web 2.0 tools within the Virtual Learning Environment in large cohort engineering management education. Technology is not a panacea but implemented alongside traditional teaching methods it has been shown to enhance the student learning experience.

The authors now wish to build on the learning from this case study and explore more effectively the use of web 2.0 as a vehicle for promoting collaboration. To this end the use of wiki's for assessed group coursework in large cohort project management education will be tested during 2009/2010. Locke classifies wiki's as publishing space and hence a wiki is perceived as a public rather than a private space (Locke 2007). We hope the use of wikis will overcome any remaining barriers to students using web2.0 as a collaboration tool for assessed coursework. Future work will investigate cultural barriers to the adoption of web 2.0 in overseas dominated post-graduate taught programmes at The University of Manchester.

References

- Anderson, P. (2007). What is web 2.0? Ideas, technologies and implications for education, Joint Information Systems Committee.
- Beetham, H. and R. Sharpe (2007). Rethinking Pedagogy for a Digital Age. London, Routledge.
- Biggs, J. (1999). Teaching for Quality Learning at University. Buckingham, Society for Research in Higher Education and Open University Press.
- Blin, F. and M. Munro (2008). "Why hasn't technology disrupted academics' teaching practices? Understanding resistance to change through the lens of activity theory." Computers and Education **50** 475–490.
- Broad, M., M. Matthews, et al. (2004). "Accounting Education through an Online Supported Virtual Learning Environment." Active Learning in Higher Education **5**(2): 135-151.
- Collis, B. and J. Moonen (2001). Flexible Learning in a digital world: Experiences and Expectations.
- Craig, E. (2007). "Changing Paradigms; Managed learning environments and web 2.0." Campus wide information systems **24**(3): 152-161.
- Davidson, A. and M. Orsini-Jones (2002). Motivational Factors in Students' Online Learning. London, Kogan Page.
- Elliot, R. (2007). "What is web2.0?" Retrieved 25th February, 2009, from <http://sqa.org.uk/sqa/22941.html>.
- Greasley, A., D. Bennett, et al. (2004). "A Virtual Learning Environment for Operations Management." Journal of Operations and Production Management **24**(10): 974-993.
- Ho, W., H. Higson, et al. (2009). "Measuring Performance of Virtual Learning Environment System in Higher Education." Quality Assurance in Education **17**(1): 6-29.

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

Howe, N. and W. Strauss (2000). Millenials Rising: The Next Great Generation. New York, Vintage.

Ipsos, M. (2007). "Student Expectations Study: Findings from Preliminary Research [online]." Retrieved 11th August, 2009, from www.jisc.ac.uk/publications/documents/studentexpectationsbp.aspx.

Ipsos, M. (2008). "Great Expectations of ICT [online]." Retrieved 11th August, 2009, from www.jisc.ac.uk/media/documents/publications/jiscgreatexpectationsfinalreportjune08.pdf.

Kvavik, R. and J. Caruso. (2005). "Study of students and information technology: Convenience, connection, control and learning." Educause Centre for Applied Research, Research Study

Retrieved 18th May, 2009, from

<http://www.educause.edu/ir/library/pdf/ers0506/rs/ers0506w.pdf>.

Laurillard, D. (2002). Rethinking University: A Conversational Framework for the Effective Use of Learning Technologies. London, Routledge.

Laurillard, D. (2007). Foreword of Rethinking Pedagogy for a Digital Age. Oxford, Routledge.

Livingstone, S. and M. Bober. (2005). "UK Children Go Online." Retrieved 11th August 2009, from www.york.ac.uk/res/e-society/projects/1.htm.

Locke, M. (2007). "Six Spaces of Social Media." Retrieved 11th August 2009, from www.test.org.uk/2007/08/10/six-spaces-of-social-media/.

Mason, R. and F. Rennie (2008). E-Learning and Social Networking Handbook: Resources for Higher Education, Routledge(Taylor and Francis Group).

Matulich, E., R. Papp, et al. (2008). "Continuous Improvement through teaching innovations: A requirement for today's learners." Marketing Education Review **18**(1).

Mayes, J. and C. Fowler (1999). "Learning Technology and Usability: A Framework for Understanding Courseware." Interacting with Computers **11**: 485-497.

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

Mayes, T. (2001). Learning Technology and Learning Relationships. London, Kogan Page.

McGill, T. and V. Hobbs (2008). "How Students and Instructors using a Virtual Learning Environment perceive the fit between Technology and Task." Journal of Computer Assisted Learning **24**: 191-202.

Melville, D., C. Allan, et al. (2009). Higher Education in a web 2.0 World, 2009.

Nortcliffe, A. and A. Middleton (2008). "A three year case study of using audio to blend the engineer's learning environment." Journal of Higher Education Academy **3**(2): 45-57.

O'Reilly, T. (2005). "What is web 2.0." Retrieved May 18th 2009, from www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web20.html.

Oblinger, D. and J. E. Oblinger (2005). Educating the Net Generation. Boulder, CO, Educause.

Prensky, M. (2001). "Digital Natives, Digital Immigrants." On the Horizon **9**(5): 1-6.

Rogers, G. (2004). "History, Learning Technology and Student Achievement." Active Learning in Higher Education **5**(2): 232-247.

Russell, T. (2001). The No Significant Difference Phenomenon: A Comparative Research Annotated Bibliography on Technology for Distance Education, North Carolina State University.

Saunders, G. and F. Klemming (2003). "Integrating Technology into a Traditional Learning Environment." Active Learning in Higher Education **4**: 74-86.

Sfard, A. (1998). "On two metaphors for learning and the dangers of choosing just one." Educational Researcher **27**(2): 4-13.

Sharpe, R., G. Benfield, et al. (2006). The undergraduate experience of blended e-learning: A review of UK literature and practice. A Report to the Higher Education Academy.

Shirky, C. (2003). "Social Software and the Politics of Groups [online]." Retrieved 11th August 2009, from www.shirky.com/writings/group_politics.html.

Using Web 2.0 in large cohort project management education: Panacea or Empty Promise

Tapscott, D. and A. Williams (2008). Wikinomics: How mass collaboration changes everything. London, Atlantic Books.

Turney, C., D. Robinson, et al. (2009). "Using Technology to Direct Learning in Higher Education." Active Learning in Higher Education **10**(1): 71-83.

Veen, W. and B. Vrakking (2006). Homo Zappiens: Growing up in a digital age, Continuum International Publishing Group Ltd.