

Net gen or not gen? Student and Staff Evaluations of the use of Podcasts/Audio Files and an Electronic Voting System (EVS) in a Blended Learning Module.

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Abstract: At the authors' institution, blended learning is defined as "educational provision where high quality e-learning opportunities and excellent campus-based learning are combined or *blended* in coherent, reflective and innovative ways so that learning is enhanced and choice is increased. Students are at the centre of this vision".

This paper outlines work undertaken to investigate the impact of integrating podcasts/audio file downloads and use of an electronic voting system (EVS) to transform module delivery from a traditional mode to a blended delivery. The purpose being to introduce a measure of flexibility in how, when and where students study; to increase interactivity and engagement in classroom sessions, and to enhance students' learning.

The student cohort is diverse in respect of age – the majority of students are direct entry students of the so-called net generation, whilst a significant number of students (35%) are mature students. Would age be an influencing factor on the students' preference for the learning methods employed, or their willingness or ability to engage with the technologies?

An interim student evaluation was undertaken at the midpoint of the taught module, to provide formative, illustrative data to the module leader and teaching team about student opinion of the teaching methods and learning technologies. Given the option of returning to the traditional delivery method, 77.5% of students either "agreed" or "strongly agreed" that the module should continue to run in its blended format.

The final evaluation discovered no discernable differences in the behaviour of the direct entry students compared to the mature students. Both groups accessed the podcasts easily, generally at home, and spent longer than if blended learning technologies had not been used. It was discovered that 16% of the mature and 24% of the direct entry students would have preferred lectures to podcasts, although the students were positive about the flexibility offered. Both groups of students were virtually unanimous on the benefits of the EVS to support learning. The teaching team concluded that the blended learning technologies increased the students' engagement with their learning.

Keywords: Blended learning; course design; evaluation of e-learning.

1. Background

This project was undertaken in a level 2 undergraduate module titled "Pathologies for Imaging", which forms part of a BSc (Hons.) Diagnostic Radiography and Imaging programme. The module offers achievement of thirty credits points (15 ECTS points), and in the researchers institution accounts for three hundred hours of effort by the average student. The module aims to move the student forward from understanding of the healthy human body to understanding how disturbance of homeostasis caused naturally by aging and human development, by illness or by trauma, will affect the individual and be manifested on the resultant radiographic image. The student sample size was 102 students, all of whom were enrolled on the module. The student group is diverse in terms of geographical location, ethnic origin and background, and age with 65% of the student cohort being direct entry (so called net-gen students) and 35% the student cohort being mature students. Many students also have considerable responsibilities to bear in addition to their academic studies. Some students have families or care for elderly relatives, and many also have part-time jobs to help fund their academic studies.

Tapscott (1998) described "Net Gen", or N-Gen, learners as young people who have grown up or are growing up in constant contact with digital media. Oblinger (2004) proposed that "Net Gen" learners

were born in or after 1982 and exhibit different characteristics than siblings who are just a few years older. She states that “Net Gen” learners tend to:

- *Gravitate toward group activity*
- *Believe “it’s cool to be smart”*
- *Are fascinated by new technologies*
- *They are racially and ethnically diverse (Howe and Strauss, 2000)*

Oblinger (2004, p2)

Prensky (2001) referred to these young people as “digital natives”, who have spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and other toys and tools of the digital age. Indeed, the degree of engagement with technology in their everyday lives has prompted authors to state that computers and attendant technology should no longer be considered as desirable adjuncts to education. Instead, they should be regarded as essential (Philip, 2007). In introducing learning technologies into the module design, the researchers were mindful of the possibility that mature students might feel disadvantaged because of their more traditional experiences of education, and they may not be as comfortable accessing and using learning technologies. Comparisons between direct entry students and mature students were built into the end of module evaluation.

Previously, the “Pathologies for Imaging” module had been taught during two two-hour lecture type sessions delivered in the morning and afternoon of the same day (timetabled on a Monday). In the experience of the authors, increasing student numbers and widening access has led to very diverse student cohorts, with a wide range of abilities and learning needs. This has led the authors to question the validity of the traditional lecture driven format. Many writers have taken issue with the use of lectures. Laurillard (1993) has said that perhaps lectures were defensible in the old university systems of selection of students on the basis of standardized entrance examinations. Today the more open access and modular courses make it unlikely that a class of students will be sufficiently similar in background and capabilities to make lectures workable as a principal teaching method. Brown and Race (2002) have added that despite the advent of readily available electronic means of delivery, lecturing is still seen by many as the most cost-effective means of delivering content in higher education. Considering available literature, the module leader made the decision to reduce the number and frequency of lectures, in favour of podcasts/audio downloads supplemented by small group seminars. Promotion of engagement and interactivity in the small group seminars was encouraged by the use of an electronic voting system (EVS).

1.1 Aims of the project

The aim of the project was to create a blended learning module, which allows some flexibility of learning location and time which will enhance student learning and understanding of the topics taught. On flexible learning, Van den Brande (1993) has said:

“There must be more flexibility to meet the needs of the learner, through adaptability to different learner needs, learning patterns and settings, and media combinations”.

Collis and Moonen (2001) also state that flexibility can involve options in course resources, in types of learning activities, in media to support learning, and many other possibilities.

There was an intention to identify whether students perceived the blended learning initiatives as a complement or a detriment and, because of the wide age range of the student cohort, to make comparisons between direct entry (“net gen” learners) and mature students. This was felt to be important as the introduction of technologies was aimed at increasing flexibility, and the module leader expressed concerns regarding mature students being able to access and use the resources. The methods of teaching delivery were significantly different from the previously traditional delivery and the perceptions of members of staff on the teaching team were explored in terms of module delivery and the level of student engagement with their learning.

2. Introduction of Blended Learning initiatives

The use of blended learning techniques takes advantage of the variety of learning experiences that can be offered by the use of a mix of learning environments (Reid-Young, 2003). At the authors' institution, blended learning has been defined thus:

"A cornerstone of our strategic vision is educational provision where high quality e-learning opportunities and excellent campus-based learning are combined or blended in coherent, reflective and innovative ways so that learning is enhanced and choice is increased. This is our view of Blended Learning (BL) and our students are at the centre of this vision."

(University of Hertfordshire Blended Learning Unit, 2007)

Contrary to the notion that education technology encourages campus based institutions to deliver more of their provision at a distance, research literature suggests that educational technology can have the effect of drawing staff and students closer together, both physically and virtually (Cairncross, 1997; Graetz and Goliber, 2002). This point was of concern to the authors. It was felt to be important to maintain cohesion within the module and to maintain good communication and dialogue between students and staff.

The learning technologies integrated into the module were podcasts/audio download files and use of an EVS. The technologies were introduced into the module at the start of the 2006/2007 academic year.

2.1 Module delivery

The initial lectures that would have been used to introduce topic areas were developed to be delivered electronically via the University's managed learning environment (MLE) as PowerPoint™ presentations which are accompanied by audio download files. These could also be accessed as stand alone podcasts. This was to give students the opportunity to access and use the resources at a time and place convenient to themselves as identified by Motteram (2006). These resources were designed to be used to undertake necessary preparatory background learning. The afternoon teaching session which followed was then delivered as small group seminars using activities and games which were designed to enhance and reinforce the learning.

2.2 The podcasts/Audio download files

Podcasting may be viewed as personalised on-demand multi-media content that is distributed to a subscriber's computer via the Real Simple Syndication (RSS) protocol (Laing et al, 2006). The audio download files were recorded using a digital voice recorder (DVR) which was capable of recording directly as an mp3 file format. The use of a DVR to record the MP3 audio files was a deliberate choice, as it offered a degree of flexibility of location for recording.

The audio recordings were all made without editing and corresponding directly to accompanying prepared PowerPoint™ presentations (each slide was numbered to allow student and researcher to be sure of the content being discussed). The opportunity was taken to suggest that the students reviewed their own knowledge as they listened to the podcast.

It was recognised that the module involved introducing a large amount of new vocabulary and concepts. This was identified as a challenge to learning because it was thought that in large groups students are less likely to ask questions. There is then a risk of losing some students' engagement and therefore their understanding. One of the initial slides in each presentation was a list of terms and concepts that may be new to the student. The next slide gave an overview of the topic, introducing relevant concepts to be studied, some of which would be new to the student. At this stage the recording was stopped and the students advised to take a break. The idea behind this was that they would have the opportunity to look up and learn new words and concepts that they would need to apply during the rest of the audio download file/podcast. This would help the students sequential understanding of the material contained within the audio download file/podcast. During the rest of the audio download file/podcast, images were presented alongside the audio file to allow the students to identify the appearance of abnormalities with reference to background information. Both the audio

download file/podcast and accompanying PowerPoint™ presentation were divided into 'chunks' generally lasting between twenty to thirty minutes. At the end of each chunk the content was summarised, the students are encouraged to take a break from studying, and when refreshed review any areas of the presentation where they felt their understanding was not complete. Questions were also posed within the audio files, and suggestions were made when discussing challenging topics as to what steps a student could take in areas where their understanding was less than complete. Examples include suggesting relevant topics the student could usefully review in order to enhance their knowledge and understanding. Additionally, during some podcasts preparatory work for the afternoon seminar was suggested, such as preparing an outline answer or drawings to a posed question for discussion.

On completion of recording the audio file, the DVR was connected to a computer and saved as an mp3 file. It was then easy to upload the mp3 file to the module website as a podcast, linking it to the prepared PowerPoint™ presentation under "teaching resources". Educause (2005) have stated that "podcasting allows students to use their technology-based entertainment systems (iPods, MP3 players) for educational experiences". Educause (2005) also suggest that podcasting broadens educational options in a non-threatening and easily accessible manner because students are already familiar with the underlying technology. However the authors were uncertain that the sample student cohort was all familiar with the underlying technology, and this was one area appropriate for investigation.

2.3 Using the electronic voting system

EVSs typically comprise four primary elements: a tool for presenting lecture content and questions (e.g. a computer, PowerPoint™ and a digital projector), electronic handsets that enable students to respond to a lecturer's questions, receivers that capture students' individual responses and EVS software that collates and presents students' responses (Kennedy and Cutts, 2005). The use of electronic voting systems (EVS) has been reported by Kennedy and Cutts (2005) as becoming more widespread in higher education.

During the sessions, one of the activities involved the lecturer presenting a multiple choice questionnaire (MCQ) based upon the current topic. Students are asked to respond to the questions using EVS handsets. Feedback on the learning process was then available to both students and staff (Kennedy and Cutts, 2005), and the lecturer was able to provide instant feedback and address any misunderstandings or misconceptions.

Part of the assessment for the module is a multiple choice examination. The use of EVS as a tool to support exam preparation has been documented. Draper and Brown (2004) have outlined the use of EVS to give medical students practice on a multiple choice questionnaire (MCQ) format exam. Within this module, the questions used in the MCQ were similar in nature to those to be found on the summative MCQ exam. It was thought that the EVS was particularly suited to the needs of the student with regard to the method of summative assessment (Kerres & DeWitt in Boyle, 2005).

3. Method of evaluation

The study employs a quantitative paradigm to investigate the perceived effects of the blended learning initiatives. (Robson, 1993, Polit & Hungler 1997). Reviewed literature was used to inform the choice of data collection (Walton et al, 2005, Ausburn, 2004). It was decided to conduct a survey in order to collect perceptions of students and staff to examine the impact of the blended learning initiatives. Data collection was conducted by means of questionnaire. The research was considered by a Local Research Ethics Committee (LREC) to ensure the research complied with institutional standards.

3.1 Student questionnaire

Two surveys were written, one for the students and one for the staff. Students were recruited on a voluntary basis and the questionnaire was administered at the end of a teaching session. The covering letter attached to the questionnaire stated that 'by returning the questionnaire consent is assumed'. The questionnaire was structured around the identified technologies of podcasting and electronic voting systems.

On podcasting the focus was primarily on the effectiveness of the podcasts in terms of accessibility. The students were asked to specify how long they spent studying with the podcast so that comparisons could be made to the previous traditional two- hour lecture. It was thought relevant to attempt to establish how many times the students listened to the audio file, and where and when they accessed them to establish to how much the students were utilising the flexibility of the initiative. The focus of the questions regarding the electronic voting system was to attempt to quantify how much the students identified the EVS as an effective learning tool.

3.2 Staff questionnaire

In the researchers institution modules are taught by teaching teams under the guidance of a module leader. An important facet of the research was to investigate the staff perceptions of the blended learning initiatives. It was identified that the teaching staff would be in an informed position to identify possible challenges and areas for future development. The small number of staff on the teaching team would make maintaining confidentiality problematic. This may lead to bias in the answers received. The decision was made to send the staff questionnaire to each individual via electronic means allowing them to complete the questions electronically. The focus of the questions to the staff was on the appropriateness of the technologies as learning tools and on the perceived level of student engagement.

3.3 Interim Student Survey

An informal evaluation was undertaken at the midpoint of the taught sessions as the researchers were mindful that some students could be finding the blended learning initiatives challenging to engage with. It was recognised that this could have the effect of prejudicing their opportunities for success across the academic year. From verbal feedback received, the podcasts rather than the EVS could be the perceived source of challenge and so the EVS was used for evaluation during one seminar session. The distinct advantage of this method was the anonymity afforded by the EVS although it is recognised that using EVS to evaluate blended learning technologies may incur bias. The primary purpose of the interim evaluation was to determine whether continuing with the blended learning technologies was in the best interests of the students.

The evaluation was performed using five MCQs and the EVS, see table 1 below.

Question	Agree strongly	Agree	Disagree	Disagree strongly
I have found the audio files a good way to learn	53.2	12.9	8.1	3.2
I would rather have the Monday morning lecture than the audio file	3.2	8.1	16.1	56.5
I feel that the small group sessions help to reinforce my learning	46.8	25.8	1.6	1.6
I would rather have 2 lectures than the current pattern of teaching	6.5	4.8	12.9	59.7
I think the module should continue in its current format	56.5	21.0	3.2	

Table 1. Results of interim student survey.

3.4 Discussion of interim results

The results were strongly in favour of the blended learning initiatives and therefore the researchers continued to use them in the module delivery. The timing of the evaluation may have been influential in the results obtained. Difficulties were experienced by some students, staff and the researchers within the first few weeks of delivery and these had generally been resolved by the time of the evaluation exercise. It is relevant to note that the module is delivered on a Monday. The podcast sessions took the place of the morning session; enabling the students not to attend the university on a morning when travelling, parking etc tend to be at their worst.

The strongest agreement for the pattern of delivery was for the use of small group sessions. This reinforces the researchers beliefs that small group work enhances learning, and that with cohorts of over 100 students delivery patterns should be sufficiently adaptable so that small group work does not become lost. The researchers are confident that the described combination of teaching delivery methods are a successful way of allowing small group work to continue with large cohorts.

4 Discussion of the Evaluation Results

Surveys were conducted among both the student group and the teaching team. Two separate surveys were given to each of the groups. The student questionnaire contained a higher proportion of closed questions than the staff questionnaire. High response rates were achieved from both groups with 75% from the student group and 100% from the staff group. The non respondents among the student group were those who were not present at the seminars all of the students present at the seminar completed and returned a questionnaire.

4.1 The Student Questionnaire

A total of 47% of the group started the programme straight from school and of these 68% rated their ICT skills as very good or good. A comparative 61% of the mature students rated their ICT skills similarly. Encouragingly 97% of the direct entry group and 92% of the mature students accessed the podcasts (audio files) regularly. There were no differences in how easy the two groups found accessing the podcasts (97% easy or fairly easy) or where the two groups accessed the information (95-97% at home). Approximately 50% of each group stated that they downloaded the files to an MP3 player or equivalent, an interesting statistic as it could be perceived that the mobile technology is more utilised among younger students.

When the students accessed the podcasts was also remarkably similar, with 66% of the direct entry and 65% of the mature students using the materials between Friday and Sunday. Similarly 39% of the direct entry compared to 35% of the mature students studied with the materials outside conventional working hours (after 5pm). Probably influential in these statistics are that the module is taught on a Monday and students perceived the weekends as time to prepare for the following weeks study. Initially it had been thought that more of the mature students would access the materials out of working hours than the direct entry students although this has not proved to be the case. The common perception that the younger age group would be spending more of the evening socialising than the older age group has not been reinforced. Although the differences are very small perhaps an alternative explanation is that the mature students have more family or work commitments during the evenings and so are not free to study.

An almost identical 94% direct entry and 95% mature students accessed the podcast either only once or twice leaving only 5-6% of the whole student group accessing the information more than twice. The researchers were disappointed with this statistic as it was thought the continuous availability of the podcast compared to a lecture was a significant advantage. It is possible that the timing of the evaluation was significant because it was conducted towards the end of the module but before the recognised time for exam preparation and revision. It is thought that perhaps more students would revisit the podcasts as part of their revision activities.

The average length of time spent studying with the podcasts was four hours for the direct entry group and 3.5 hours for the mature students although there was a much wider variation in the direct entry group with one hour being the minimum and twelve hours being the maximum compared to two and six hours respectively for the mature group. Although there are no significant differences between the two groups the statistics as a whole are taken as an encouraging sign of the students taking responsibility for the management of their own learning. The podcasts were designed to take the place of a two hour traditional lecture so it can be seen that the majority of the students spent more time studying with the new design than they would have if no changes to delivery had been made.

A slightly higher proportion of the direct entry group (24%) stated that they would have preferred the traditional two hour lecture to the podcast compared to the mature students (16%), with a majority of 76-84% expressing satisfaction with the podcasts as a method of teaching.

When asked to comment on the use of podcasts 65% of the students used the opportunity. Seven students commented on the length of time taken to study with the podcast of which 4 were direct entry. The researchers do not view this as negative because the taught element of the module is only....% of the recommended study time, and if the podcasts encourage the students to study for longer then this will be of benefit to them. This information will be used with future cohorts to inform students on the reality of using podcasts for studying. Of the comments that were not in favour of podcasts all four cited the lack of opportunity to ask questions. The researchers feel that this issue can be addressed through the small group activities in future years with inclusion of a specified time for questions on the podcast. Alternatively, a specific discussion forum could be set up on the MLE. Over 30% of the comments (n=23) were positive, and themes were the ability to pause the recording, the knowledge that information had not been missed and the benefits of being able to use them in self-study. Two respondents requested a lecture in addition to the podcast. The remaining comments were not specific to the questions asked, and have not been included.

The use of the EVS during the module proved to be very well received by both groups of students. It was easy to use (97% direct entry and 100% mature students), perceived as helping the students to learn (88% direct entry and 97% mature) and useful for exam preparation (88% direct entry and 85% mature students).

As with the comments on the podcast a high proportion (41%) of the students used the opportunity to comment on the use of the EVS with 83% of the comments being enthusiastic. The remaining 17% (n=7) included comments on the need for hard copies of the correct answers and discussion or wanting the questions, images and answers to be put on the MLE (which was done for revision purposes).

The positive comments are revealing; examples include having the opportunity to learn from ones mistakes while not being embarrassed at getting the wrong answer as the system is anonymous, such as the quote *'so you don't feel stupid when you get one wrong and you lie and say you got it right'*. Other comments included words such as *'interesting'* *'fun'* and *'different'*. Many of the students commented that its use helped their learning such as the comment *'let me know my weaknesses and helped me to learn what I needed to look up'*.

4.2 The staff questionnaire

The questionnaire to the teaching team had a greater proportion of open questions. The staff identified that the podcasts were influential in encouraging all of the student to be more engaged and self directed in their learning. All of the teaching team had directly seen the students enjoyment and interaction with the EVS and had used the module to learn how to use it themselves. The teaching team were in no doubt that the blended learning technologies had increased the students engagement with their learning although there was a suggestion from two members of staff that at some stages they had had to spend a significant time in preparing for the teaching sessions. It is interesting that only one member of the teaching team had experienced students approaching them for help with downloading the podcast at any time during the module. From the discussion site of the managed learning environment it was observed that there was a large amount of student peer support when any difficulties were encountered.

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