

Student Perception of On-line Lectures within a Blended Learning Environment for Security and Digital Forensics

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Abstract

Educational institutions are increasingly moving towards enhancing learning through the use of integrated information technology. Blended, or augmented, learning, aims to support the traditional learning environment – where the instructor blends online learning with the traditional face-to-face teaching. This may take the form of centrally Managed Systems (LMS), for example, or Instructor-led content such as online video, quizzes and activities. This paper investigates student preferences within a Computer Security and Digital Forensics module, regarding the integration of lecture using narrative-plus-PowerPoint within a traditional educational infrastructure. It thus assesses student perceptions in the usage of on-line lectures for security and digital forensics material, with a specific focus on whether students actually prefer the on-line version to the traditional lecture situation, and on how they use the on-line lecture material.

1 Introduction

Educational institutions are increasingly moving towards enhancing learning through the use of integrated information technology. Blended, or augmented, learning, aims to support the traditional learning environment – where the instructor blends online learning with the traditional face-to-face teaching. This may take the form of centrally Managed Systems (LMS), for example, or Instructor-led content such as online video, quizzes and activities. This paper aims to investigate student preferences within a specific subject area (Computer Security) regarding the integration of lecture using narrative-plus-PowerPoint within a traditional educational infrastructure.

There are many models progressed for the integration of on-line material within a learning environment, and these often depend on the level of achievement required, and the subject area. This paper argues that the addition of online material is a valuable contribution to students, in terms of gains in flexibility and assessment preparation, but that the face-to-face lecture, and the associated related printing material, is still the focus of the module content. It outlines current practices and methods of blended learning and discusses the results of a post-module survey of student opinion.

There are many anecdotes related to the future of online learning, including one which proposes that the future will be of students who never actually attend any

lectures, and record them for future playback, of which the lecturer has setup a video cast of the lecture, and thus never needs to actually attend the lecture.

2 Literature Review

There are many viewpoints related to the usage of on-line material within academic environments. This literature review aims to: identify some of the key issues, including the methods used for blended learning; the attitudes of students to on-line lectures; student attendance issues; and staff perception of the usage of on-line lectures.

2.1 Defining methods of blended learning

Increasingly, educational institutions are engaging in a shift in pedagogy to a more learner-centred approach, enabling student autonomy, of which one approach is blended learning. This method of learning is generally taken to mean a blend of traditional lectures, in addition to material made available online, and which supplements the traditional lecture, but does not necessarily replace it. There are various methods of complimenting traditional lectures, from the traditional text-based lecture summaries or audio presentations, to more recent multimedia, typically animated and interactive, teaching materials. The most recent innovations include podcasts, and teaching through virtual reality gaming. Indeed, Copley (2007) believes more institutions are moving toward m-learning (mobile learning), which allows students to make use of mobile devices, such as i-Phones and MP3 players, to review educational material whilst *on-the-move*. Walls et al (2010) however, cautions that students, contrary to popular belief, were not *ready* for m-learning via podcasting, and some did not have a mobile device, and many still have little experience of podcasts.

2.2 Student attitude to online learning

This paper will focus mainly on the availability of online material to students who are on-campus as opposed to distance students. In terms of benefits to the students, in addition to flexibility, Hove (2008) found that psychology students who accessed online lecture presentations achieved appreciably higher grades than students who did not have similar access. This has also been found by Brecht's (2008) study that evaluated online content for screen writings (/mark-ups) viewed together with an audio narrative, as opposed to a videoed lecture. The findings of the study showed that the module's failure rate was found to be lower compared to a module which had no additional content. Students on this study also reported more understanding of complex subjects, and usefulness in preparation for homework, mid-term and final exams.

Unfortunately there is currently little research regarding student preferences to the various types of online content, however, one study, Grabe (2008), found that students did not find audio-only recordings helpful, and preferred text lecture summaries. Copley's (2007) study of audio versus video podcasts confirms this, and found that, whilst both forms were popular, slightly more respondent students (61%) preferred video podcasts rather than the audio alone. One caveat though is at

the time of the study (2007), where very few of the respondents had media players capable of video playback, and were using the podcasts on home PC's.

One of the most common methods of integrating on-line lectures is for the lecturer to simply record their usual lecture. Whilst this may be useful to students, live recordings such as those recorded by Lectopia, may encounter elements that are liable to distract, such as background noise, sound quality and interruption, making this type of recording less than perfect, (Ho 2009, McNeill et al 2007). Ho, (2009) noted that despite the sound problems, students found that the ability to pause the live lecture and replay it was particularly helpful in their understanding of the topic and for exam preparation. The subjects in these studies had no option to choose between online, recorded, lectures and other types of multimedia content such as PowerPoint presentations, and thus these findings are only useful as a comparison between some online content and not.

There is little doubt, though, that students find the use of additional online material helpful and particularly in the use of the podcast lecture. This additional material can allow students to pace their learning, and Copley (2007) believes that this may be of particular use for dyslexic and foreign students, and enable them to take notes in their own time.

Online-only learning requires a great deal of orientation and support, particularly in terms of technical issues, Choy et al (2009) found that all of the students in their survey had some difficulties in this area, such as for broken audio and slow connections.

2.3 Attendance

Students, unsurprisingly, felt that one of the main advantages of online learning was flexibility in terms of time and geography, (Choy et al 2009). This is a progressively important factor as many students may also be employed or have other commitments, as well as studying. There are, however, some concerns from academics with regards to whether attendance levels would drop if lecture material is made available, (Chang 2007). However, despite the concerns of academic staff there appears to be no conclusive proof of reduced attendance in current literature. Most studies reported no or little change in lecture attendance, including: Davis et al (2009) Nast et al (2009) and Copley (2007), Larkin (2010). Indeed, Larkin and Preuss (2008) found that attendance increased, and although no conclusive reason can be given, Larkin concluded that this may have been due to students increased confidence in their subject and teacher, after listening to the recordings.

For many students the experience of attending a lecture brings with it interaction with the lecturer and also the social implications of the university experience; sharing the learning experience with one's peers, is, after all, part of the overall experience. Students are of the opinion that live lectures offer value and motivation from the lecturer, (McNeill et al 2007). Larkin's (2010) study found that, although respondents found the recorded lectures useful, they clearly valued the traditional face-to-face lecture and were adamant that they not wish to see traditional lectures replaced by video/audio recordings.

However, these results must be viewed with caution as they may reflect the other factors such as lecturers' personal style and popularity, disciplinary differences, and the type of module being taught. In particular, Holbrook (2009) found that entry-level students were much more likely to skip classes when the material was available online as opposed to advanced level students. There appears to be few negative perceptions of availability of online material, other than a minority of students who felt that perhaps it might encourage them not to attend classes, however, this was a minority and there are always students who need little excuse to miss lectures. Overall, most students felt that while additional material was helpful the lecture added to their learning experience. Kehoe et al (2004), found that students, in particular in terms of distance students, embraced the online lectures enthusiastically – feeling more involved and feeling as though they had attended an actual lecture.

2.4 Staff perspective

Whilst the majority of students find the addition of online material useful, many academics are reticent. An understandable problem for busy academics is increased workload, Euler (2009) described this as significantly increased. Some of the time consuming activities were stated as: providing online solution material; Web site maintenance; and more time devoted to monitoring online activity, such as discussion forums. Phillip's (2007) study compared students/staff perceptions on Web-based teaching and learning (WBLT), and found that whilst nearly all students found this useful, approximately half of the staff found it to be a positive experience. The main reason they cited for making the material available was to 'support students who couldn't come to class' Very few (3.6%) thought that 'students learn just as well using WBLT compared to face-to face lectures.' Some of the staff concerns raised by this paper include the possibility of decreased attendance (for which there was no evidence) and the reduction in the student experience associated with this. Most of the respondents also stated that they had not changed the structure of their units to fit WBLT, and if this caused problems, WBLT would be discontinued.

3 Module definition and methodology

The module trailed is Security and Forensic Computing (Security and Forensic Computing, 2010), which is a BSc/BEng level module, and which contains a wide range of on-line material. It includes full on-line one-hour lectures for its delivery, where students can playback the lectures at any time. The key fundamental material covered includes encryption, authentication, network security, software security, and so on, and thus contain some fairly in-depth concepts, which often requires students to play-back material, or ask questions within the lecture environment.

At the core of the module is a teaching pack, which is available in a printed form or a PDF version. Students then are timetabled for two hour lectures each week, and a two hour tutorial (within a computing lab). As a core, students can take the module on a face-to-face basis, but students are also allowed to take it in a blended and distance learning mode. All of these modes, though, are synchronised to follow the

same teaching schedule, so, as much as possible, all students get the same learning environment.

At the end of the module, an on-line survey was undertaken, and the results have been analysed within this paper. A key focus for the questionnaire was to determine student's perception of using an on-line environment to support, and/or replace the traditional face-to-face environment, and in how they used the material.

4. Results

Table 1 summarizes the results of a 44% return of students on the module (with 22 questionnaires returned). All the percentages have been rounded to the nearest whole number.

4.1 On-line lectures: Supporting or replacing?

Reference: Q1, Q2 and Q3 (Table 1)

There are worries by many academics that on-line lectures could actually replace face-to-face teaching, in that a lecture could be recorded once, and then played back many times, over many years. This could, of course, lead to a de-humanisation of the learning environment, where there is very little engagement between students and the academic environment. While this could be efficient in cost terms for institutions, there are many questions about whether this has any advantages in developing engagement and lacks key interactive elements.

When asked how useful the on-line lectures were, the results show that 95% found them either useful or extremely useful, and only 5% had a neutral option. A similar viewpoint is seen when asked if all modules should have associated on-line, with 81% strongly agreeing. One major worry for many academics is that the traditional face-to-face lecture will be replaced by on-line versions, and thus reduce the amount of engagement between academics and their students. While there is a minority who reckon that on-line lectures should replace traditional ones (15%), most students (55%) reckon that traditional lectures should not be replaced by on-line ones. Perhaps a strange observation is that 30% of students reckoned that they were neutral about whether on-line lectures should replace traditional ones. This shows, perhaps, that there needs to be increased focus on engaging students within the teaching environment.

4.2 Should the on-line lecture match the face-to-face one?

Reference: Q7 (Table 1)

There is a great deal of debate about whether on-line lectures should just contain snippets of a lecture, or whether they should be the full versions. In the questionnaire, 84% of students on the module thought that the on-line version should match the face-to-face version. This perhaps shows that students want to playback the lecture in the way that it was delivered, and is perhaps especially important for supporting distance and blended learning students, in that remote students can feel that they are part of the same environment that campus-based students have.

4.3 Attending lectures or not?

Reference: Q6 (Table 1)

An important issue for many academics is that will students attend their lecture if the students know that there is an on-line version? Academic must also think about whether they should put the material on-line before the lecture (and allow students to prepare for the lecture) or after it (and thus use them to catch-up on material, and in studying towards assessments). In the survey 5% of students said that they missed lectures all the time, and 16% said they missed it on many occasions. Where there is a significant majority who never missed lectures, there are still some students who will miss a lecture, purely because it is on-line. These could, though, also be students who have poor attendance lectures.

4.4 How do you use on-line lectures?

Reference: Q13, Q14, Q16, Q17, Q18, Q19 (Table 2)

An important factor in the learning environment is how students use on-line lectures. Do they watch the lectures before the actual lecture, or do they catch-up on things that they missed either directly after the lecture, or before any form of assessment? In the questionnaire, over 80% of students identified that they used the lectures to catch-up on material that they did not quite understand in the main face-to-face lecture. Along with this, they identified that they mainly used it to catch-up on material before an assessment. It can thus be concluded that, for this survey, students were using the on-line to revise for their assessments.

A worry is that many students might not be able to watch full versions of the lectures, but the results of the questionnaire shows that no student identified that they had problems watching the on-line lectures. When asked about whether they watched the complete lecture, there was a significant difference of opinion, where 23% dipped into the lectures, and 68% watched the whole of the lecture, while 9% were neutral on this. A change of opinion can be seen in identifying whether students only read the teaching package, and never watch the on-line lectures. In this case only 5% identified that they would only read the teaching pack, and avoid the lectures. This shows that students are much more engaged with using electronic methods than in the past.

4.5 Voice-over, talking head or slides?

Reference: Q.20 (Table 3)

There are many different ways that educational institutions have integrated on-line lectures, including: recording the lecturer on video as a talking head, with PDF slides, audio podcasts, or with a voice-over to slides. In this survey it can be seen that only 5% prefer the video'ing of the lecture environment, while 81% preferred the voice-over the slides. There was also a significant number (19%) who still prefer just getting the slides in a PDF form. It should be highlighted that a great deal of effort was put into making the slides engaging in this module, and thus the additional of a talking head might not add to the content.

4.7 Improving or not?

As an interesting viewpoint of the questionnaire was found when students were asked whether the on-line lectures enhanced the reputation of their programme/university/School. In this 54% strongly agreed that it did, and only 4% disagreed.

15. I believe the on-line lectures enhance the reputation of my programme/university/ School.

Strongly disagree:	0%	Disagree:	4%
Neutral:	18%	Agree:	23%
Strongly agree:	54%		

This perhaps shows that, in an age where the material presented within modules can be often reviewed by others around the World, the provision of on-line lectures can be seen as a way to make students feel proud of their environment, and thus to promote external peer assessment of the *quality* of their learning environment, in a way that has never been possible in the past.

4.6 Are they useful?

As a final wrap-up question, the students were given binary choices for whether the on-line lecture helped them prepare, review and replace the face-to-face lecture. Overall 55% students reckoned that they found that they helped them review the material before the lecture, whereas 95% used it to review after the lecture. This shows that student tend to use the material after the lecture, than before. In a final question the students were asked whether they thought that the on-line lecture actually replaced the actual lecture. The result of this show that 75% said no, but worryingly 25% said it did.

26. Did you find that you use the on-line lecture to prepare before the actual lecture? Yes=55%, No=45%

27. Did you find that you use the on-line lecture to review after the actual lecture? Yes=95%, No=5%

28. Did you find that you use the on-line lecture to replace the actual lecture? Yes=25%, No=75%.

5 Conclusions

The academic environment is currently changing more than it has done at any time in the past, and academics must engage with the current trends in using the on-line material, but need to be careful that they do not end-up with students feeling disengaged, and end up in a de-humanised environment. As the literature review has outlined, for many students the experience of attending a lecture brings with it interaction with the lecturer and also the social implications of the university experience. It is thus important that the on-line provision of the lecture situation does not replace the face-to-face lecture.

The main concluding points of the paper is that students still seem to think that face-to-face lectures are still the main focus for a module, and that the on-line lectures are most useful in catching-up with material directly after a lecture, and when revising for assessment. In this study the most preferred method of presenting the on-line lecture, was to use a recording of the PowerPoint slides with a voice-over from the lecturer, which fitted for this module, but may not be the best for other modules, where just audio podcasts could be the best and most efficient method of getting material on-line.

Finally, the external perception of module material, through on-line lectures should not be understated, especially as students can feel proud of their academic environment, if the on-line material is seen to be of the highest quality, and can compete with other academic environments.

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Table 1: Results

	Extremely unuseful (%)	Not useful (%)	Neutral (%)	Useful (%)	Extremely useful (%)
1. How useful is/were the on-line video versions of the lectures for your studies	0	0	5	38	57
	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
2. Do you think that all modules should have associated on-line lectures?	0	0	5	14	81
3. Should on-line lectures replace traditional lectures?	25	30	30	0	15
4. For guidance in performing practical work in the lab, how useful are on-line step-by-step video captures of the lab?	0	0	0	42	58
5. How useful do you find Web-CT in helping support your learning?	0	5	14	38	43
	Never	Once or twice	Sometimes	Many occasions	All the time
6. Did you find that you did not attend a lecture, as you knew there was an on-line version?	37	37	5	16	5
	There should be no match	Not important	Neutral	Important	Extremely important
7. How important is the match of the material in the on-line lecture to the actual lecture?	0	5	11	68	16
8. How important is a printable teaching pack in the delivery of a module?	0	5	20	40	35

	Poor	Fair	Good	Very Good	Excellent
9. How would you rate the provision of a network simulator in your learning?	0	0	15	55	30

Table 2: Results

	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
11. The traditional classroom lecture is the focus of a module, and on-line lectures should re-enforce this.	0	5	10	45	40
12. I often miss lectures as I know there is an on-line version.	35	30	10	20	5
13. The on-line lectures allow me to catch-up on things that I did not quite understand in the lecture.	5	0	14	23	59
14. I mainly use the on-line lectures to catch-up on material before an assessment.	0	0	15	35	50
15. I believe the on-line lectures enhance the reputation of my programme/ university/ School.	0	4	18	23	55
16. I find it difficult to watch on-line lectures.	59	41	0	0	0
17. I watch the full versions of the on-line lectures from start-to-finish.	9	14	9	32	36
18. I often just watch parts of the on-line lecture, which I am unsure about.	14	9	9	55	14

19. I never watch the on-line versions of the lectures, as I prefer to read the material from the teaching pack.	59	23	14	4	0
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Table 3: Results

	Video recording of the lecture (%)	Playback of the PowerPoint with a voice-over (%)	Playback of the PowerPoint with no voice-over (%)	PDF of slides (%)
20. The most useful form of support to a lecture is:	5	77	0	18