eLearning: A Solution in a Crisis: Don't Forget the Pedagogy

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Abstract

On 22 February 2011 Christchurch was shaken by an earthquake that caused significant loss of life and wide spread destruction to roads, buildings and infrastructure throughout the city. At the University of Canterbury many teaching spaces and office spaces were lost, either permanently or for the majority of the semester which had only begun one day before the earthquake. The purpose of this paper is to present an in progress case study of how a number of the first year courses in the Bachelor of Commerce adopted aspects of eLearning to ensure the courses could continue to be delivered.

A model currently named the "eLearning Engagement Increasing with Maslow and Bloom" is presented to depict a number of the issues that emerged as the extent of eLearning engagement increased across the 4 courses.

Conclusions are drawn as to the helpfulness of these models when needing to use aspects of eLearning as part of the solution to the crisis that was faced in response to the earthquake that appeared to have been carried out with a reasonable degree of success.

Keywords

eLearning, Crisis, Pedagogy

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Introduction and Methodology

The aim of this paper is to present how the lecturers in four papers in the first year of the Bachelor of Commerce at the University of Canterbury adopted eLearning approaches in the wake of an earthquake on the second day of the first semester of the academic year. The earthquake left many teaching spaces and staff office spaces unusable for much or all of the semester, and to enable the academic year to continue a decision was made that the papers that make up the core of the first year of the Bachelor of Commerce would commence online delivery as soon as possible.

There were many challenges involved in enabling delivery to commence with many of these surrounding the lack of experience of some of the staff in delivering papers online. The staff involved with the coordination and delivery of four key first year papers were interviewed with the aim of analysing the approach taken to ensure that pedagogy was not forgotten in the midst of a crisis in which the adoption of eLearning came about at very short notice.

A literature review is presented that outlines a number of models covering aspects that highlight what good eLearning is, with the results of the interviews being analysed in the light of these models.

The methodology adopted in the paper is a combination of Case Study Research (Yin, 2009); Action Research (Cohen, Manion & Morrison, 2007) in which changes are made on an ongoing basis; and Design Based Research as described in Barab & Squire (2004), Bell (2004) and Wang & Hannafin (2005) where the emphasis is on conducting experiments in changing contexts where it is not always possible to replicate the context.

Literature Review

The literature review that follows covers a number of different models of what constitutes good use of technology in education. Initially some studies exploring the use of technology to solve real problems in teaching and learning scenarios are explored; with this being followed by a brief summary of the characteristics of good learning; the need to balance technology, pedagogy and content; and finally the importance of creating a community of learners amongst groups of students.

Solving Real Problems in Teaching and Learning Scenarios

In a study conducted by Draper & Brown (2004) it was highlighted that there are a range of empirical indications supporting the concept that learning benefits are more dependent on putting the pedagogy as the focus as opposed to the technology. In a prior study by one of the authors (Draper, 1998) it was highlighted that those uses of technology that did increase the quality of learning were those that identified a deficiency or a problem in a teaching and learning scenario and then sought to use technology to address the particular problem. An implication flowing from this identified in Draper & Brown (2004) was that researchers should look at the teaching and learning scenarios around them to try and identify the inherent problems, and then seek to discover how technologies can be used to address them.

Characteristics of Good Learning

An area of relevance to this particular scenario was identified as being the importance of structuring what the students were doing so that learning could take place. This included the particular activities and tasks that the students were taking part in and the conditions that are needed for learning to be effective.

The inclusion of authentic learning activities was highlighted in Herrington, Reeves and Oliver (2006). A model was developed that included a number of design principles: including real world relevance; requiring students to define the tasks they need to accomplish; tasks that need investigating over a period of time; opportunities to examine the tasks from different perspectives; opportunities to collaborate and reflect; potential integration across different subject areas; seamless integration with assessment; creation of products and artefacts that are useful in their own right; and diversity of outcomes.

Characteristic of Effective Learning	Brief Description
Active	Learning includes a combination of cognitive activity and psychomotor activities, with the combination of these contributing to create personalised learning that is more meaningful to the learner.
Cumulative	Utilising previous learning is significant in enabling learners to make sense of new information; create links between old and new ideas and to enhance existing knowledge

Individual	All learners are different in the way they learn and in the past experiences they bring to each new learning experience
Self-Regulated	At advanced levels learners can have an awareness of how they learn best and as a consequence can organise aspects of their own learning, in particular how the learning fits into different contexts
Goal Oriented	Learners need to see why they are doing what they are doing and how it contributes to some sort of overall goal

Table 1 – Summary of Characteristics of Effective Learning (Goodyear, 2002)

A model setting out five characteristics of effective learning was developed by synthesising other literature by Goodyear (2002), with the model being briefly summarised in Table 1.

Balancing Pedagogy, Technology and Content

When new technology is introduced into a learning situation where the content and the pedagogy already existed it is important that all three aspects of technology, content and pedagogy are kept in balance.

The TPACK Framework developed in Koehler & Mishra (2008) and adapted in Harris, Mishra & Koehler (2009) is shown in Figure 1. The idea behind the TPACK Framework is that it can be used to help understand the knowledge that teachers need to integrate technology into their teaching. The framework focuses on the connections between technology, content and

pedagogy, and how they can interact with each other. The three components are all required by teachers integrating technology into their teaching. The interactions are important to ensure that, for example, the introduction of technology is not at the expense of good pedagogical approaches and that the technology instead supports good technological approaches.

Students as a Community of Learners
The importance of the social context and social nature of learning was highlighted in Vygotsky (1978).

A number of case studies were presented in Nesbit (2008) in which factors contributing to the development of a community of learners or a community of practice amongst the students was employed. Factors that were identified in this study included that:

- Students having passion to deepen their knowledge and interact with others about the topic are more likely to form a community of practice.

- Students who already know each other, or who are given a chance to get to know each other in person, are more likely to form a community of practice.

- Familiarity with the technology, and more importantly, familiarity with using the technology to socially interact is an important factor in the formation of a community of practice.

- Students from similar contexts and with similar or share experiences are more likely to form a community of practice.
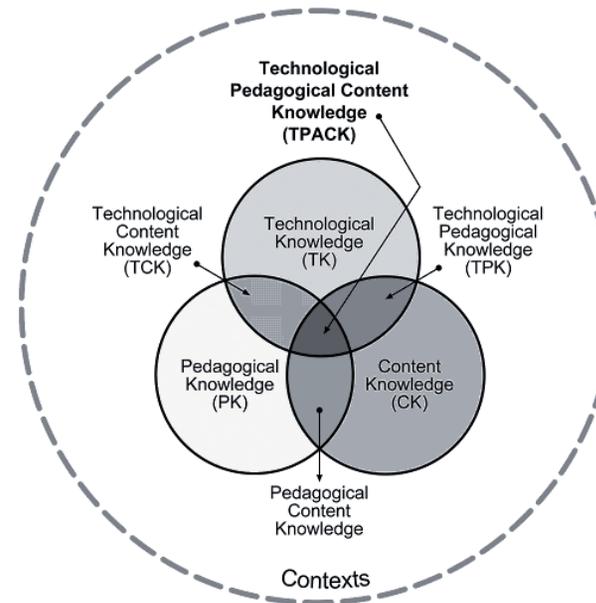

Figure 1 - The TPACK Framework Developed in Koehler & Mishra (2008) and Adapted in Harris et al (2009)

Martin & Nesbit (2009) presented a Transformational Model for eLearning in which a number of factors were identified as being significant with these including the overarching importance of social communication, and within this, the importance of communication and credibility. The model developed in Martin & Nesbit (2009) is shown in Figure 2.

Nesbit (2011) coined the term Prevailing Personal Social Communication Technologies (PPSCTs) to represent technologies that are personally owned

and/or used by a large percentage of students in a given context, where the students frequently use those technologies for personal and social communication. This is consistent with one of the factors identified in Nesbit (2008) which was that "familiarity with using the technology to socially interact is an important factor in the formation of a community of practice".

Summary of Literature Review
Four important threads that emerged from the literature review included firstly, that the technology that needed to be adopted in the situation needed to be technologies that addressed the specific problems being faced as per Draper & Brown (2004) and Draper (1998).
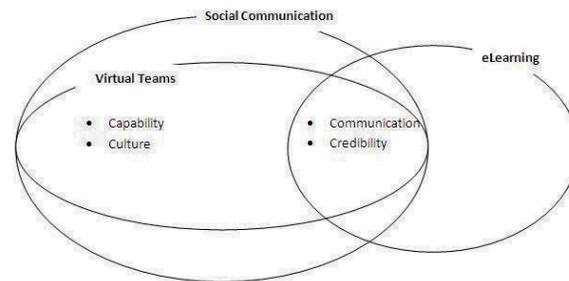

Figure 2 – Transformational Model for eLearning Developed in Martin & Nesbit (2009)

Secondly, attention needed to be paid the characteristics of good learning which involves the learning being active, cumulative, individual, self-regulated and goal oriented (Goodyear, 2002) and the importance of the students being involved in authentic learning activities that related to the real world (Herrington, Reeves and Oliver, 2006).

The third thread is the importance of balancing technology, content and pedagogy from the perspectives of both the lecturers and the students as per Koehler & Mishra (2008).

The fourth and final thread is the importance of building a community of learners as per the work of Nesbit (2008) and Martin & Nesbit (2009) and the roles that PPSCTs (Nesbit, 2011) can play in this.

Design of Interviews
Lecturers involved in the delivery of four (4) key first year courses in the Bachelor of Commerce were interviewed, with the courses being shown in Table 2.

Code	Name
ACCT102	Introduction to Accounting and Finance
ACCT152	Introduction to Commercial Law
INFO123	Information Systems and Technology
MGMT100	Introduction to Management

Table 2 – First Year Courses Covered

The design of the interviews was based on a combination of the methodologies adopted for this study and the key aspects identified in the literature review. In particular the Action Research aspects (Cohen, Manion & Morrison, 2007) and Design Based Research aspects as per Barab & Squire (2004), Bell (2004) and Wang & Hannafin (2005) resulted in some questions relating to changes being made as the semester progressed and how they impacted on what

was being done. Other questions related to specific aspects emerging from the literature review.

The questions that were the initial basis for each interview are reproduced in Table 3.

Were there things that were tried and refined as part of the process and what were they ?
What things did you get the students to do with technology? Why?
Did you find that you had to make any trade-offs between content and technology?
Did you find that you had to make any trade-offs between pedagogy and technology?
In the first couple of weeks, what forms of social communication were there between students?
In the first couple of weeks, how different was it to create credibility in the eyes of the students?
What did you use for first face-face communication with the students for?
Did you use the context of the earthquake as part of your content?
What things did you do differently that you will continue with in future semesters?

Table 3 – Questions Used as Basis for Each Interview

Results of Interviews

The following sections record a summary of the interviews that took place with the lecturers involved with ACC102, ACCT152, MGMT100 and INFO123.

Things that were Tried and Refined

In ACCT102 the 'voice over powerpoint' approach that is available in Powerpoint was used. This created files that were too large for some students to download, particularly when they were in parts of the city where internet connectivity was not possible or very limited in the early stages. Audacity was then used which was a bit better from that perspective, however involved a bit more learning in comparison to the 'voice over powerpoint' approach. Communication via email and the University's Learning Management System (Moodle) were experimented with and refined as there was a high level of email traffic and some important details were being missed by some students.

Up until the previous year ACCT152 has been a course taught in the "old ways" with the students buying a "paper reader" which lecturers updated every year which was seen as being an inflexible way of delivering material for the students as it required it to be prepared four months before the start of the course and it could not be changed or completed once printed. In the previous year the "paper reader" was replaced by the use of Moodle as a document repository that reduced some of the inflexibility of the previous model.

The limited use of Moodle in the past in ACCT152 meant that a number of things that had become relatively common in other papers were now needed to be done as the Moodle site became much more important in how the paper was being delivered. New things that were done included:

- Lecture notes, Powerpoint slides together with a number of reading documents were made available on Moodle.

- As students did not have access to the library a number of extra documents were scanned and loaded on to Moodle which had the potential to create copyright issues.

- Audio recordings were created of lectures and were made available on Moodle which included some weeks when there were no or limited lectures.

- Tutorial questions were made available online with students submitting them online. Not all students were personally assessed, however the tutors wrote a report summarising the strong and weak points of each submission.

In MGMT100 it was decided very early on to get started with online delivery by making it as simple as possible for the lecturer. This was done initially using 'voice over powerpoint' and keeping things as simple as possible. This was enhanced over time by creating pop-ups in the Powerpoint presentations.

In INFO123 some experimentation took place in the initial weeks to create Powerpoint slides incorporating audio recording of the lecturer's voice and video of the lecturing talking. This was carried out using Camtasia and proved reasonably useful apart from the very large files that were created. This was partly dealt with by dividing up the lecture into 10-15 minute chunks, with the video of the lecturer talking only being on the first file and last files for each lecture. The removal of the video aspect made these files significantly smaller. Once the files had been created they were made available to the students in MP4 format so they could be played on computers, mp4 players and dvd players, which was quite significant in the early stages with many students not having reliable internet connections. Once face-face lectures commenced, Powerpoint slides for the lectures were created and audio recording of the face-face lectures were made. Once discussion tutorials were able to commence, audio recordings of these were made, with one recording from each week being made available to all the students.

In the early stages of INFO123 it became apparent that communication with the students had to be fast, accurate and personable as there was a large degree of uncertainty, and some aspects (especially timetabling) were changing on a daily basis.

What Students Did with the Technology
In ACCT102 online quizzes were used to keep the students engaged particularly when contact time was limited. Students needed to be proactive in accessing Moodle, particularly those who were not returning to the city until halfway through the semester. A mid-semester test was converted to 'take-home' test that students completed online. Sufficient online material was provided to the students so that those who did not return to the city until half way through the semester were not too disadvantaged by not being onsite.

In ACCT152 students were required to download their tutorials and submit them online, which was seen as not being too difficult for them from a technology perspective, however there were many questions from students in the initial weeks as they came to grips with using Moodle. An issue faced by a number of students was in some cases not finding out for a period of time that they needed to access the Moodle site for the course. The ACCT152 tutorials were only going to be online until face-face tutorials were possible, however the online versions continued well into the second half of the semester as many students were still geographically dispersed.

In MGMT100 much more emphasis was placed on the use of online forums in Moodle, with the lecturer specifically initiating more of them with the purpose of enabling students to form their own study groups.

In INFO123 students used Moodle to download lecture materials in the form of Powerpoint slides, audio recordings and pdf chapters of textbooks that had been provided by publishers due to the circumstances of the earthquake. Over 40% of the students enrolled in INFO123 joined the facebook group that was created for the students in this paper, and as such could use web enabled mobile phones to access 0.facebook.com for free using two of the major mobile phone networks. The students were also able to call the 0800 free phone number for the university and get put through to a mobile phone that was turned on from 9am to 5pm each weekday. These aspects were seen as being particularly important with many students lacking internet connections and some only having their mobile phone as a means of communication. Online 'lab tutorials' were held in the initial weeks so that students who were working through practical work for the course at home could receive help from a tutor or lecturer who was online at the time. These online tutorials took place in a combination of Moodle and facebook.

Trade Offs Between Content and Technology
In ACCT102 rather than creating trade-offs between content and technology, the reverse appeared to apply, with the technology creating a broader learning environment for the students.

The experiences in ACCT152 and MGMT100 did not appear to create any significant trade-offs between content and technology.

In the case of INFO123 being an information systems and technology course, the introduction of new technology into the course was consistent with one of the aims of the course in that students were able to gain experience in using different forms of information technology. Similarly to ACCT102, this served to create a broader learning environment for the students.

Trade Offs Between Pedagogy and Technology
The conversion of the mid-semester test in ACCT102 to a 'take-home' test was seen as not being an effective assessment mechanism in that it didn't provide the opportunity for the better students to excel and had the potential for weaker students to get a higher grade than may have otherwise happened. However, in the circumstances, which included significant numbers of students being out of the city, and the possibility of not having sufficiently large enough spaces for holding a traditional test, the decision to use a 'take-home' test would probably be made in the future.

In ACCT152 students discover law methods for the first time and need have some guidance on how to proceed with a legal reasoning. Tutorials are normally provided to give this guidance; however as students were doing this online they did not have this guidance in the normal way. Lots of guidance was provided online and in writing but this was not as effective as face-face guidance, with lecturer commenting that "It's like learning to ride a bike – you can read all the theory but you need to actually just jump on the bike – Only they were jumping on the bike but no one was holding them and so lots of them fell many times and it was very difficult and painful".

In MGMT100, the approach taken initially of keeping it as simple as possible for the lecturer resulted in the delivery of content becoming more informative as opposed to application of theory than is normal in the course. It was also seen as important for the technology to be as simple and friendly to use as possible for the students.

In INFO123, one of the assessment changes that were made was to replace a mid-semester test worth 35% with several smaller online quizzes that were done in the students' own time. This had the potential to create a situation where the assessments were not as reliable the mid-semester test. This was partially dealt with by having an in-class quiz in the last week of lectures and a final exam that covered all of the content that had been in the quizzes, and by having a minimum mark requirement across the in-class quiz and the final exam. The cognitive level of the questions in the smaller online quizzes increased as the semester progressed, with the first quiz being entirely multi-choice, with the latter quizzes having some case study based longer answer questions, and others having questions that required students to "compare and contrast" and discuss different scenarios.

Initial Social Communication between Students
In ACCT102, online forums were set up for students wanting to create study groups. Aside from this, most of the social communication took place after face-face lectures commenced.

In ACCT152 the students were encouraged to work on their tutorials in groups and to submit their work as groups. This was done with the intention of creating some social interaction and of creating mini-study groups. Some of these groups met in coffee shops and in each other's homes, however other students had left the city or country and were quite isolated. Once face-face lectures commenced, the students were provided with some time to communicate between themselves.

In MGMT100 increased use of the online forums and use of email took place with the aim of increasing social communication. Also, of particular interest to some students was the creation of informal coffee sessions in one of the tent-based cafes that were created on the campus.

The facebook group that was created for the INFO123 students provided an opportunity for those that wanted to have a degree of social communication with each other. The lecturers and tutors for the course were also members of the facebook group and frequently posted messages on the group wall and participated in some of the conversations that took place. Care was taken to ensure that all official communication was made via the Moodle site for the course as over half of the course did not join the facebook group, with some students indicating a strong preference to not creating a facebook account. The positive aspect of this was that a very interactive group of students formed around the facebook group and proved very useful for providing feedback to the lecturers.

Creating Credibility
In all of the courses there were issues associated with not knowing from day-day what facilities would be available for any class contact, including what type of facilities (tents, classrooms, churches etc), the timing (early morning, evening) and the days of the week (including weekends) that these would be available. In

the initial weeks the timetable for the following week was being released on the university website late on the Friday evening, which was problematic for students who did not have internet access due to the earthquake.

In ACCT102, the building of credibility with the vast majority of students was relatively easy, particularly as most students understood the issues that were being faced by the university and as a consequence there was a lot of good will. This was also attributed to the openness in communication

In ACCT152, the process of building credibility improved as face-face lectures were introduced particularly as there had been little experience in delivering this content online.

In MGMT100 the lecturer had already had one lecture with the students before the earthquake had happened which had enabled some connection to be created between the lecturer and the students. The lecturer also used visual representations in Powerpoint slides from their own experience

The use of the facebook group for INFO123 enabled the lecturers to build some connection with some of the students enrolled in the course prior to face-face lectures commencing. It was felt that it was important that the students could 'put a face' to the names they were receiving emails from due to not having had any face-face content with the students prior to the earthquake. With the students mainly being in their first semester, they had only had two days experience of being a university student and as such had little experience with Moodle and the university's email system.

Initial Face-Face Communication
The initial face-face communication in ACCT102 was used to make sure that everyone was keeping up with what was required in the course, and to make sure that students knew where to get help or information from.

The initial face-face communication with the ACCT152 students was used to provide reassurance to the students that the paper would be able to continue in such a way that they would not be too disadvantaged by the situation.

Once face-face lecturers recommenced, in MGMT100 they included re-introductions as the students had one lecture prior to the earthquake; reassurances that "everything was under control"; and an overview of the theory that was to be covered in the course as a whole.

The initial face-face lectures in INFO123 were used for the lecturers to make personal face-face contact for the students and to make sure that the students understood what was expected of them in the course. This included the lecturers and the tutors for the course introducing themselves to the students, which was particularly important as the vast majority of students did not know who the lecturers and tutors were. It was pointed out in the first lecture that many of the students did not want to specifically enroll for an eLearning course, and that as such the lecturers would do as much as possible to make the paper work for them.

Using the Earthquake as Content
In ACCT102 and ACCT152 the earthquake itself was not used as part of the content of the course, however in MGMT100 and INFO123 the earthquake was used to contextualise some aspects of the content.

In MGMT100, the recovery process from the earthquake was related to management theory including long term strategy and opportunities for individuals, businesses and the city as a whole. Maslow's Hierarchy of Needs (Maslow, 1968) was also used to outline some of the decisions that individuals and groups were facing. For example, "how important is to purchase a new textbook when you need to purchase clean water for drinking?"

In INFO123 there were a number of aspects of the course that could be related to the earthquake. These included the use of collaborative information systems by the university in the weeks after the earthquake; the concepts of cloud computing and how they could be of benefit to organisations losing their physical premises; and a range of aspects relating to information security.

Changes the will be Continued with in Future
The experiences in ACCT102 of audio and video recording the lectures are something that is planned to be continued into the future as these continued even after traditional lectures resumed. Continuation of the weekly online quizzes is currently being contemplated as they appeared to be successful in encouraging continued student engagement.

For ACCT152, the increased use of Moodle would continue into the future.

In MGMT100 the use of audio recordings will be continued with, particularly in response to feedback from international students. The increased use of the online forums for students to form their own study groups will also remain as part of the course into the future.

The replacement of the mid-semester test in INFO123 with a number of smaller online quizzes is being considered for continued us at the time of writing as it appears to have improved the students' capacity for writing longer answer questions in a way that the previously used mid-semester exam did not always do. This decision is being left until final marks are available at the end of the semester. The use of the facebook group for the course is something that had been contemplated for this particular semester, but was only introduced after the earthquake – it is something that is seriously being considered for use in future occurrences of INFO123.

Analysis and Discussion
Given that a number of things were tried and refined across the four courses that were part of this study, this indicates that the approach that was adopted had a degree of consistency with Action Research (Cohen, Manion & Morrison, 2007) and Design Based Research as per Barab & Squire (2004), Bell (2004) and Wang & Hannafin (2005). Of particular note were the situations in which lecturers had started using the 'voice-over-powerpoint' facilities and then moved on to products like Audacity and Camtasia. All four courses underwent changes from how they had been traditionally delivered (pre-earthquake) to how they were delivered immediately after online delivery commenced; and then to how they were delivered once timetables returned

more or less to how they were before the earthquake. That the lecturers for all four courses are at least strongly considering continuing with some of the changes that were made points to this study being a good fit with both Action Research and Design Based Research.

Students across all four courses had to adapt to using technology in ways that they had been prepared for prior to enrolling. One of the case studies in Nesbit (2008) indicated that students who do not choose to be enrolled in an eLearning delivered course will sometimes react adversely to being forced to learn in this mode. Students found themselves using online discussion forums (based on Moodle or facebook) to different extents across all of the courses and were required to submit work electronically to a much higher degree than previously. In some cases this resulted in a lot of extra email traffic than previously had been the case.

Trade-offs between content and technology did not appear to have taken place across the four courses that were part of the study, and in the case of two of them, the increased introduction of technology into the courses were either consistent with the aims of the course or server to provide a broader learning environment. This was consistent with the importance of the Technology-Content aspects of the TPACK Framework (Harris et al, 2009).

The increased introduction of technology into the delivery of the courses appeared to create some issues when it came to the use of online assessment and in one particular case the loss of guidance of students studying particular methods for the first time. In spite of this the lecturers would probably take the same approach again in the same circumstances. It was also seen as being very important to keep the technology as simple as possible. In one case the use of regular online quizzes with increased cognitive level over time had the potential to better prepare students for final exams. The awareness of these issues demonstrated the importance of the Technology-Pedagogy aspects of the TPACK Framework (Harris et al, 2009).

The use of technology in all four courses was focused on solving problems that were created by the earthquake, with this problem solving aspect being consistent with the work of Draper (1998) and Draper & Brown (2004).

Across all four papers that are part of this study it was apparent that social communication amongst the students was an important factor in getting the students to work together, whether it was to create study groups or to create an environment (coffee sessions, facebook) where the students could connect with each other and the academic staff involved. The importance of social communication is consistent with the Transformation Model for eLearning that was developed in Martin & Nesbit (2009).

The importance of building credibility with the students was acknowledge by the lecturers involved with all four papers that are part of the study, with a number of different approaches being identified and most of these related to either content, communication and explaining the issues that were at hand. This is consistent with the credibility and communication aspects of the Transformational Model for eLearning developed in Martin & Nesbit (2009).

Across all four papers the initial face-face communication once classes resumed was used to enable students to connect with each other; enable lecturers to connect with the students; and to reassure students that the papers would be able to continue and build a sense of trust. The importance of face-face communication amongst students in an eLearning context was acknowledged in Nesbit (2008).

It was appropriate in two of the papers to use the earthquake as content as it was able to be made relevant, with this being consistent with the cumulative and individual aspects of the characteristics of effective learning identified in Goodyear (2002) and the importance of real world relevance put forward by Herrington et al (2006).

In all four papers changes that were necessary because of the circumstances are being contemplated for use in the future. These include providing audio recording of lectures; continuation of online quizzes and the use of social media platforms such as facebook to provide interaction with the students. That changes were made that will in some cases be used into the future is consistent with the educational research methodologies of Action Research (Cohen, Manion & Morrison, 2007) and Design Based Research as described in Barab & Squire (2004), Bell (2004) and Wang & Hannafin (2005).

Emerging from these experiences is the proposed "eLearning Engagement Increasing with Maslow and Bloom" model displayed in Figure 3. This model shows that as delivery moves from face-face engagement to eLearning engagement that there is a relationship with moving through Maslow's Hierarchy of Needs (Maslow,

1968). The model also shows the move from face-face engagement to eLearning engagement having a relationship with moving through Bloom's Taxonomy of Learning (Clark, 1999). The concept that students at the lower end of Bloom's Taxonomy of Learning need to be part of community of learners in an eLearning context because of their learning needs and that students at the higher ends of Bloom's Taxonomy need to be part of a community of learners in a eLearning context was put forward in Nesbit (2008).

Students being at different levels of Maslow's Hierarchy of Needs can be observed and addressed while in a face to face environment because students and their environment can be observed with ease. Bloom's Taxonomy of Learning can be viewed as needing communication and credibility as the scale increases because it is assumed the instructor is correct in what they say, without question.

Communication and credibility are essential in eLearning engagement at the lower end of Bloom's Taxonomy because more advanced learners have the ability to work independently thus removing the need for high amounts of communication. The credibility is less relevant at the higher end of Bloom's Taxonomy as the credibility has already been established so the learner can believe the instructor 'knows their stuff'. As communication reduces due to more independent learning, the instructor has no idea whether even the basic levels of Maslow's Hierarchy of Needs are being met in the students study environment as this cannot be observed via eLearning.

In the situation that was faced after the earthquake it was not possible to make even basic assumptions about

students meeting even the lower levels (eg physiological) of Maslow's Hierarchy of Needs.
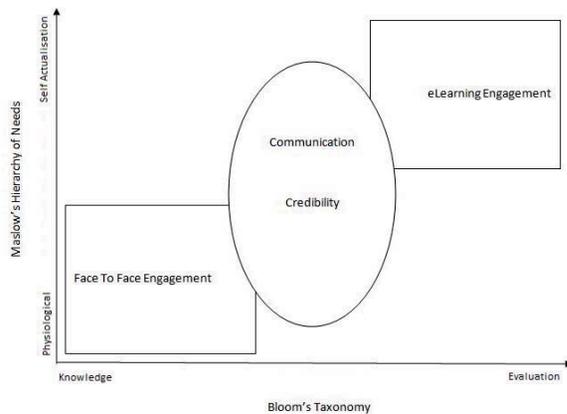

Figure 3 – eLearning Engagement Increasing with Maslow and Bloom

This new model could be tested further both in situations emerging from a crisis and in general scenarios in which eLearning is implemented.

Conclusions

The approaches taken in the delivery of the four first year courses that were part of this study demonstrate the usefulness of a number of eLearning models in the literature. These include the suitability of the research methodologies of Action Research (Cohen, Manion & Morrison, 2007) and Design Based Research as described in Barab & Squire (2004), Bell (2004) and Wang & Hannafin (2005) in the implementation of eLearning in crisis situations.

eLearning models and generic learning models that proved useful in evaluating what was done with the four papers were the TPACK Framework (Harris et al, 2009); using technology to solve problems in learning scenarios as per Draper (1998) and Draper & Brown (2004); the Transformational Model for eLearning (Martin & Nesbit, 2009); and the Characteristics of Effective Learning (Goodyear, 2002).

The "eLearning Engagement Increasing with Maslow and Bloom" model (see Figure 3) emerging from the Analysis and Discussion section of this paper highlights the importance of communication and credibility as eLearning engagement increases, particularly in the contexts that were face resulting from the earthquake. This model could be tested in further studies, not necessarily just relating to the use of eLearning in a crisis situation.

The approaches taken to get these four papers running using eLearning approaches appears to have been reasonably successful based on the interviews of the lecturers involved. At the time of writing lectures were taking place in lecture theatres; some tutorials were still taking place in tents; and many of the lecturers were working from home. As to the success of the delivery from the point of view of the students and their satisfaction, retention and results, that can be left to a further study.

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