Asian Journal *of* Distance Education

http://www.AsianJDE.org

ISSN 1347-9008 Asian J D E 2017 vol 12, no 2, pp 75 - 80

E-learning and Emergency management in tertiary educational settings - The case of University of Canterbury

Kofi AYEBI-ARTHUR
Department of Mathematics and ICT Education, University of Cape Coast, Cape Coast, GHANA
kofiayebi@ucc.edu.gh

ABSTRACT

In the Pacific Rim, Higher Educational Institutions cannot avoid the possibility of natural disasters that could close one or more structures on a campus and impact their ability to continue teaching, learning and research practices. This paper presents the emerging findings in a case study of a University that was impacted by seismic events in New Zealand. A qualitative intrinsic, nested single case study design was chosen for the study using a non-probability purposive sampling technique. The results indicated that the University was not prepared to use e-learning prior to the first earthquake in 2010. The response of the University to earthquake one and two in September 2010 and February 2011 varied respectively. Recovery of the University with respect to e-learning only began after the June 2011 earthquake. In conclusion, the study found out that the increased adoption of e-learning in the University was influenced by seismic events.

Keywords: change; e-Learning; resilience; tertiary education.

INTRODUCTION

Societies have long been afflicted by natural disasters and man-made crises, forcing humans to cope with the aftermath through the prevention of future destruction when possible. Natural disasters such as earthquakes, flooding, and snow storms can interrupt the activity of an academic institution. In disasters of large scale and scope, formal plans break down in unexpected ways as the disaster unfolds and the impact can be felt for many years. There is increasing recognition of the need for disaster planning and restructuring educational institutions so that they become more resilient to challenges including natural (Seville, Hawker, & Lyttle, 2012).

In 2010 and 2011, a series of earthquakes stimulated rapid adoption of social media, including *Facebook* and websites, by the executive leadership in the University of Canterbury, New Zealand to enhance their communication within and beyond the University. This led to a directive to increase e-learning in all colleges of the university. The September 4, 2010 earthquake occurred when students were on vacation, before the start of Term 4 in Semester 2. The University was closed for two weeks because of the earthquake, which had less impact on the use of e-learning due to its timing. The University received support from national and international suppliers that offered free access for staff and students to tens of thousands of e-books, online journals and global databases in the aftermath of the September 2010 earthquake (PVC Learning Resources, 2010).

The February 22, 2011 earthquake occurred on the second day of the1st semester and had a great impact on the University. All initial teacher education students on Flexible Learning Option were on campus for "on-site intensives" when the earthquake occurred. On-site intensives is a two week-week period where all students on Flexible Learning Option are camped on the University campus. The students are taken though the use of the Learning Management System, *Learn*, (University of Canterbury offering of Moodle), *AdobeConnect* and other e-learning tools. The University was closed for three weeks due to the earthquake.

The problem

Disaster management is the creation of plans through which communities reduce vulnerability to hazards and cope with disasters. Drabek (1991) suggests, from an emergency planning perspective that, disasters are characterized by most emergency planners as sudden and overwhelming events and are seen as events occurring in a single location and as having a limited duration. Although a disaster may be limited by time and location, it may take a significant amount of time after a disaster to recover. This may be as a result of physical structures having to be rebuilt, reassuring people that plans have been put in place to mitigate the effects of future disasters. Some victims of a disaster may not fully recover.

In New Zealand, the Civil Defence Emergency Management Act (CDEM Act) 2002 provides a framework for The National Civil Defence Emergency Management Strategy (NCDEMS). Lifeline utilities that provide essential infrastructure services to the community such as water, wastewater, transport, energy and, of relevance to this study, telecommunications are required by the CDEM Act 2002 and National Civil Defence Emergency Management Plan (NCDEMP) to ensure that they are able to function to the fullest possible extent, even though this may be at a reduced level, during and after an emergency. Higher Education Institutions are therefore, evolving to be resilient to carry out their mandate of teaching, research and community service.

There has been little research into the development of e-learning following such disruptions even though it is well known that disasters have long term impacts. The focus of the study was to determine how the University has evolved with e-learning in the aftermath of the seismic events of 2010 and 2011. The study sought to investigate the actions of the University of Canterbury in the aftermath of the 2010 and 2011 seismic activities in the Canterbury Region. The study was culled from the overarching question of the author's doctoral thesis: How has the University changed with e-learning in the wake of seismic activities?

LITERATURE REVIEW

In reviewing the literature to introduce their self-study research, Mackey, Gilmore, Dabner, Breeze, & Buckley (2012) noted that flexibility, creativity, resourcefulness, and resilience are recurring themes, especially in relation to using technology to do things differently in crisis situations. E-learning provides a platform by which an affected institution can recover from such crises. Innovative uses of technology have provided resilient solutions to combat disruption and enable people to work, socialize, and communicate virtually by replacing face-to-face interaction with online interaction in times of crisis (Sharma, 2001; Mackey et al., 2012). When the physical environment constrained people, information technologies provided people with alternatives to continue to act in both their physical and virtual environments. Majchrzak, Jarvenpaa, & Hollingshead (2007) reported how, within hours of Hurricane Katrina's landfall in Louisiana and Mississippi, a *KatrinaHelp Wiki* emerged. The *Wiki* provided lists of shelters, government resources, animal rescue resources, the latest health and safety information. Dabner (2012) described how the University of Canterbury was successful and responsive in the use of web environments and social media to provide information and support following a natural disaster, illustrating the ways the University effectively utilised the tools, features and resources available through their web site and the social networking site *Facebook*, for information and support purposes.

The theoretical framework

The framework of readiness, response and recovery matrix for disaster management ((Federal Emergency Management Agency (FEMA), 2004 ; Ministry of Civil Defence and

Emergency Management, 2002) was used to summarise the data collected for the study. The readiness, response and recovery matrix for disaster management also provided a basis to compare the three case studies of University of Canterbury (UC), College of Education (CoE) and College of Business and Law (CoBL).

METHODOLGY

A qualitative intrinsic, nested single case study design was chosen for the study (Gray, 2009). Sources of data included interviews and documents and the University's websites. The University of Canterbury was purposively selected because it is a research-based Higher Education Institution in New Zealand that was affected by seismic activities. The institution had adopted e-learning in its teaching, with very little Distance Education outside the College of Education.

Non probability purposive sampling was employed to select the sample for the study (Cohen, Manion, & Morrison, 2007) as I was interested in sampling faculty who used e-learning to engage students in the aftermath of the seismic events of 2010 and 2011 in UC. Ethics approval was sought and granted from the University. Permission and approval were sought from the University's Educational Research Human Ethics Committee (ERHEC) to carry out the research and all protocols prescribed by the ERHEC were adhered to. Information sheets and consent forms for participants of the study were prepared and sent to ERHEC. These included detailed statements containing information about the nature of the research. Issues of confidentiality and anonymity of participants in the study, methods of data collection, usage and storage were addressed.

Data collection began with a search on archived websites UC *Restart* and UC *Progressive Restart*. The websites were setup after the seismic events of 2010 and 2011 respectively to provide information on how the University was responding to the seismic events as they continued to occur. Descriptive content and 17 themes emerged from the data which were used to describe processes of increasing resilience with e-learning in the aftermath of the seismic events in 2010 and 2011.

RESULTS AND DISCUSSION

The strategic findings from the case study of UC in relation to the literature on e-learning during crises is discussed. The findings provide an answer to the research question: How did the University evolve with e-learning in the aftermath of the seismic events of 2010 and 2011?

Readiness, response and recovery framework

The framework of readiness, response and recovery matrix for disaster management provide a means of comparing UC, CoE and CoBL response to e-learning in the aftermath of the seismic events of 2010 and 2011 as shown in Table 1.

Table 1: Readiness, response, and recovery matrix of disaster management with respect to e-learning

Matrix	Readiness			Response			Recovery		
	EQ1	EQ2	EQ3	EQ1	EQ2	EQ3	EQ1	EQ2	EQ3
UC	Not prepared	Inadequa-tely prepared	Partially prepared	Not adequate	Partially adequate	Partially adequate			Partially adequate
CoE	Partially prepared	Partially prepared	Largely prepared	Partially adequate	Partially adequate	Largely adequate			Partially adequate
CoBL	Not prepared	Partially prepared	Partially prepared	Not adequate	Partially adequate	Largely adequate			Partially adequate

An explanation is now provided for each cell in Table 1 and this is using the occurrences of the earthquakes for each of the phases in turn, Readiness, Response and Recovery. Within each phase the UC case is described, then the CoE case and lastly the CoBL case.

Readiness

Data from Marshall (2009) of the e-Learning Maturity Model Capability Assessment of e-learning in UC indicated that the University was not prepared to use e-learning prior to the first earthquake in 2010. The report indicated that the documentation supplied to students consistently failed to convey how courses would support their learning. In addition, where objectives or outcomes were stated, they generally addressed a range of cognitive outcomes. Also, the report showed that facilities such as the Library, *Learn* and student support were not aptly integrated within course activities so that there appeared to be a presumption that students would know automatically when and how they need to use these additional services. Furthermore, the UC Teaching and Learning Plan 2011-2013 had few instances indicating where e-learning was used.

Data collected for the study indicated the College of Education was partially prepared to use e-learning prior to the first earthquake. The Report indicated that for courses in CoE, an explicit plan linked e-learning technology, pedagogy and content used in courses. Also, a project for revitalisation of the College's Flexible Learning Options resulted in only one *Learn* course site for each course, regardless of the range of offerings.

The eMM Capability Assessment of the UC report indicated the explicit plan that linked e-learning technology, pedagogy and content used in courses was not adequate in CoBL (Marshal, 2009). Also, in the College of Business and Economics Strategic Plan 2010-2012, there was no mention of e-learning. In the aftermath of the second earthquake in February 2011, there was evidence that the University was inadequately prepared to use e-learning because the information that UC would be using e-learning to complete the academic year had not been received by all academics. Also, access to most of the electronic resources received from publishers in the aftermath of the earthquake in 2010 had been revoked when the main library was reopened. Some courses did not have a presence on *Learn.* Some academics were not skilled adequately in the use of e-learning (Todorova and Bjorn-Andersen, 2011). Furthermore, there were not enough Flexible Learning Advisors to support academics in their use of e-learning. The needs of UC when the February 2011 earthquake occurred was on how to complete the 2011 academic year without extending it (as students did not want the academic year extended in the aftermath of the September 2010 earthquake) thus the Colleges in UC adopted e-learning to complete the academic year.

The College of Education was partially prepared to use e-learning in the aftermath of the February earthquake in 2011 because on-campus students were encouraged to use the materials that had been developed for students studying in the distance mode. The College of Business and Law was partially prepared to use e-learning in the aftermath of the February earthquake in 2011 because some academics that had their lectures manually captured in the 2010 requested that those lectures be made available to the current students. The University was partially prepared to use e-learning in the aftermath of the third earthquake in June 2011 because academics and students had become aware of the use of e-learning from the previous earthquakes in 2010 and early 2011.

The needs of UC when the June 2011 earthquake occurred was how to conduct examinations without putting staff and students at risk of an earthquake by keeping large numbers of students in a room for summative assessment. In the College of Education, academics used a variety of assessment strategies already used for their distance students and these were adapted for their on-campus students. In the College of Business and Law, academics used online quizzes and electronic submission of assignments to assess their students thus the College was partially prepared to use e-learning in the aftermath of the June 2011 earthquake.

Response

The response of the University to earthquake one in September 2010 was not adequate. This was because the University had to configure the EZproxy server in order for academics and students off-campus to utilise the gift of electronic resources from publishers. EZproxy is a web proxy server used by libraries

to give access from outside the library's computer network to restricted-access websites that authenticate users by IP address.

The CoE response to the September 2010 was partially adequate as the College produced the Flexible Learning Guidelines that recommended the inclusion of short videos and illustrations to complete aspects of course content in the *Learn.* Data collected for the study did not find that CoBL made any response in relation to the use of e-learning in the aftermath of the 2010 earthquake.

The University response in the aftermath of the second earthquake in February 2011 was to increase support for e-learning technologies such as *AdobeConnect*. Off-campus access to the *QuickTime* streaming server was implemented. The University commissioned more servers to increase capacity in the aftermath of the February 2011 earthquake. In CoE, all students enrolled in on-campus primary and early childhood programmes continued their learning via FLO model for semester one in 2011. Academics in CoBL increased their use of *Learn*. In addition, a number of academics also used *Facebook*, *Camtasia* and *Audacity* to engage with their students.

The response of UC in the aftermath of the third earthquake in June 2011 was partially adequate. This because the University had begun pilot use of *Echo360.* In the CoE, the Flexible Learning guidelines following the first earthquake included guidelines for assessment practices to improve their efficiency by using the *Gradebook* in *Learn*. That work following the first earthquake led to improve preparation for the third earthquake so that little need for response to the third earthquake. In the College of Business and Law, academics used cumulative assessment such as quizzes and online submission of assignments instead of cumulative assessment to assess their students.

Recovery

Recovery of UC, CoE and CoBL with respect to e-learning only began after the June 2011 earthquake. The IT infrastructure in the University has been enhanced including establishment of an increased number of wireless hotspots over the campus. Also, the Free Internet Allowance for postgraduate students has been increased from 20 GB to 40 GB. The University had also established the e-Learning Advisory Group which has a goal to develop an e-learning strategy for the University. In addition, Library resources have been integrated into *Learn*. In CoE, the FLO Working Group recommended updating the Computer/Internet Access and Course Material on the *Frequently Asked Questions about Programme Entry* to reflect the use of broadband internet access for distance students. In addition, the FLO Committee had become Blended Education Advisory Committee covering all modes and courses in the College. In CoBL, the College has developed new courses and programmes for implementation in 2015 that involve significant use of e-learning. In addition, interviews in 2014 with a member of the College Executive in CoBL indicated that e-learning had been incorporated into activities such as large classes having their lectures captured in the College.

Implications from the findings

Higher Education Institutions in countries around the Pacific Rim, i.e. Japan, Philippines, Indonesia, New Zealand that have occurrences of disasters such as seismic events, tsunamis and bushfires may include e-learning in keeping their institutions opened for academic activities when such disasters occur.

CONCLUSION

The increased adoption of e-learning in the University was influenced by seismic events and is expressed most coherently in the strategic planning and academic services for staff and students. However, those took time to evolve and this discussion starts with the most urgent developments following an earthquake, which are the strategies that universities use to communicate about a crisis as it develops.

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ACKNOWLEDGEMENTS

This research was supported by a UC College of Education PhD scholarship and supervision by Distinguished Professor Niki Davis and Associate Professor Una Cunningham. We would also like to thank the participants and the University for permission to use relevant data.

Dr Kofi AYEBI-ARTHUR is a Senior Lecturer & Head, Department of Mathematics and ICT Education at the Faculty of Science and Technology Education, College of Education Studies, University of Cape Coast, Cape Coast, GHANA.