DEVELOPING RESILIENCE AND MANAGING CHANGE
IN TECHNOLOGY-ENHANCED LEARNING ENVIRONMENTS

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ABSTRACT

In the competitive higher education environment there is pressure for organisational change at all levels, from major organisational structural change to introducing new curricula or new and innovative educational technology. However, current educational and organisational management strategies in higher education do not adequately address an emerging issue, that of managing for change and uncertainty. The aim of this research was to fill this gap, focusing educational management back on the domain of teaching and learning through a focus on the learning environment.

This thesis explored new heuristics for understanding and managing changing technology-enhanced learning environments. The source of inspiration was concepts and theoretical frameworks from the field of environmental management, including Resilience Thinking and the social-ecological systems approach which grounded the research.

The research took the form of a single case study situated in a regional, mixed mode university in NSW. The time frame corresponded to a period of five years of rapid organisational change which included the institution-wide introduction of a new learning management system (LMS) and other educational technology. The unit of analysis was the technology-enhanced learning environment. The research methods used were primarily qualitative and included the use of ethnography and autoethnography. Data collection included interviews, document analysis, reflective journal and observation and meeting notes.

The work complements and builds on existing frameworks and theories of management. A key finding was that the technology-enhanced learning environment is a complex system that can be represented by five Dimensions. This system was analysed through the application of the five heuristics of the social-ecological systems approach: panarchy, adaptive cycles, adaptability, transformability and resilience. Institutional system variables were identified that can be used to ground institutional planning and management. Panarchy contributed to the understanding of the institutional impact of the implementation of educational technology and
institutional initiatives. The Adaptive Cycle Framework was developed for understanding change and transformation in the technology-enhanced learning environment in the case. Investigation of individual adaptability to change provided new insights into institutional change management approaches. The heuristic of transformability contributed towards understanding the adaptability of the organisation and its capacity to predict, plan for and support ongoing changes in educational technology. Finally, features of a resilient institutional system were identified.

The findings can be applied to wide-ranging issues in the higher education environment. The value in the research lies in its interdisciplinary nature and at a number of levels: systemic, generic and operational. The outcomes of the research offer those in higher education: leaders, managers, academics and professional staff an alternative paradigm from which to prepare for a future of uncertainty and change. Resilience, at the individual and at the institutional level, will be an essential attribute in resolving the wicked problems in higher education.
STATEMENT OF ORIGINAL AUTHORSHIP

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

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Throughout the course of this research there were many people who contributed to its final outcomes.

I thank my colleagues at Charles Sturt University who gave freely of their time to share their insights, and acknowledge those who gave me licence to capture and learn from our changing professional times.

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For my understanding and patient children Elizabeth, Ann, Sarah and Matthew – the accomplished young people you have become are a daily inspiration.

Finally, to my ever-understanding and supportive husband, Alastair. Your determination to make the world a better place has been a driving force and motivation for completing this work.

Dedicated to my mother Bessie Stephenson, the quiet academic achiever.
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<td>LTS Culture, systems, skills: Learning Resource Development Workshop, Orange</td>
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GLOSSARY

This glossary contains terminology and abbreviations relevant to the case study. Some generic terminology is drawn from the literature while other terms are context-specific and reflect modified or new terminology. The origin of those terms is described in the Findings in the case. Bringing all key terms up front provides an easy reference point for the reader.

Unless otherwise indicated, all terms relate to the context of the case study institution, Charles Sturt University.

Adaptability - The capacity of the social components in a system to experience change, including technological change

Adaptive cycle - A key dynamic of the social-ecological systems approach describing the dynamics of an ecosystem and how the system might respond to changes in the environment

Adaptive management – A management approach which uses management as a tool not only to change the system, but as a tool to learn about the system through a structured, iterative process of robust decision making, identifying uncertainties, and then establishing methodologies to test hypotheses concerning those uncertainties

AUQA – Australian Universities Quality Agency

Boundaries - The boundary of a system is determined by the purpose of the system

CELT – Centre for Enhancing Learning and Teaching

CLE – Collaborative Learning Environment, Sakai community source software

Course – A course is the equivalent of a program of study. A course is made up of a number of subjects or units

CSU Interact (or Interact) – The University’s name for its instance of the community source Sakai Collaborative Learning Environment (CLE), a learning management system equivalent, which was the platform for the online learning environment
DE – Distance education

Disturbance – See shock/disturbance

DIT – Division of Information Technology

DLTS – Division of Learning and Teaching Services

DLS – Division of Library Services

DOMS – Digital Object Management System

Ecological system (ecosystem) - A place that consists of living and non-living (physical) components

ED – Educational Designer

EDM – Educational Design and Media section in the Division of Learning and Teaching Services

EMS – Educational Management Studies field

Feedbacks - A cause and effect relationship in the system whereby a change in one component or variable can be shown to have an effect on other parts of the system

Function - The activity or output of a system. “Function” is generally used for a non-human system, the word “purpose” for a human one but the distinction is not absolute, since many systems have both human and nonhuman elements

HOS – Head of School

ICT - Information Communication Technology

Identity (of system) - The purpose of the system where the purpose grounds the function and output of the system

Institution – The term applied to the specific educational context of the case university, reflecting the origins of educational institutions as enduring social structures
Interact – See CSU Interact.

Interview participant IP – Participants who were interviewed as part of the data collection process

IVT - Interactive Video Teaching

LMC – Learning Materials Centre

LML – Learning Media Laboratory (within Centre for Enhancing Learning and Teaching)

LMLC - Learning Media Laboratory Coordinator

LMS - Learning Management System

MDC – Media Development Coordinator

Metaphor – A framework used to help interpret events and to create a world view

MOOC – Massive Open Online Course

MSI – Mandatory Subject Information Policy

OLE - Online learning environment in the case study university, consisting of Interact and other learning technologies

Organisation – The term applied to the generic context of the case and used to distinguish the business origins and focus of the university

Panarchy – One of two dynamics of the five heuristics of the social-ecological systems approach

Participant - An individual or group who was part of the engagement in the study. Active participants were actively engaged in parts of the research process (members of professional groups, interview participants). Passive participants were part of the engagement and observation in the study
**Resilience** - Resilience is the capacity of a system to undergo some change without crossing a threshold, to absorb disturbance and to retain essentially the same *structure, function and feedbacks*. Resilience (capital R) is used for the overarching concept and resilience (small r) refers to the heuristic. The more general application of resilience outside of the environmental management field (in this study) is denoted by resilience (small r)

*Sakai* – An international community which develops community (open) source software and systems

*Shock/disturbance* - A shock is an external impact to the system which impacts the system. A disturbance is an impact which comes from within the system. Within the case study context the terms are used whereby shock refers to a larger impact and disturbance a lesser impact

*SLTI* - Strategic Learning, Teaching and Innovation section in Division of Learning and Teaching Services

*Social-ecological system* - The interaction between two systems namely, social systems and ecological systems

*Social-ecological system heuristics* - The dynamics of a social-ecological system can be described and understood by two heuristics: the *adaptive cycle* and *panarchy*. The properties which determine the dynamics of the social-ecological system are resilience, adaptability and transformability

*Stability landscape* - The extent of the different possible states of system space, defined by a set of control variables in which stability domains are embedded

*Structure of system* – The components, people and physical resources, which make up the system

*Subject* – A subject is a structured unit or module of work which forms part of a broader course or program
System - For consistency within the context of Resilience the term system is analogous with the stability landscape as applied to the property of transformability

TAFE – Tertiary and Further Education Institution

Technology-enhanced learning environment - The environment in which learning that is supported and facilitated by technology takes place

Thresholds - Levels in controlling variables where feedbacks to the rest of the social-ecological system change

Transformability - The capacity to create a fundamentally new system when the existing system is untenable

VLE – Virtual learning environment. The VLE was an in-house developed system made up of a number of tools and did not have Web 2.0 capabilities

Wicked Problem - A problem that is difficult or impossible to solve because of incomplete, contradictory and changing requirements that are often difficult to recognise