Embedding e-Learning in Universities: Analysis and Conceptualisation of Change Processes

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by

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Statement of Original Authorship

The Work contained in this thesis has not been previously submitted for a degree or diploma in 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.

Signed

Dated
Abstract

E-learning has acquired the status of a “radical innovation” in higher education over the past decade. This claim is contestable, but certainly as the latest educational innovation, it can be attributed with introducing significant disruption into many facets of university life, reaching well beyond the traditional activities associated with the classroom pedagogies. In Australian universities, there are many now who simply take e-learning for granted as accepted teaching and learning practice (Oliver, 2004). Conversely, there are others who forecast its demise, claiming that, like previous educational technological innovations, it is another passing fad (Noble, 1998b).

This thesis does not primarily engage this debate. Instead the purpose of this thesis is to gain insight into how universities can realise sustained benefits from the considerable investments to date that have been made in educational technological innovations. The inquiry seeks to understand better change within contemporary universities, in particular the process of embedding the e-learning innovation effectively. The intention is to produce an analysis useful to university executives, managers, teachers and researchers, as well as to make a more general contribution to knowledge about innovations in organisations.

The research literature on change and innovation in organisations is relevant but is reviewed and assessed as of limited value to the enquiry. This is because:

- the literature mainly focuses on the objective characteristics of an innovative product which cannot encompass the socially constructed value of e-learning
- it fails to differentiate between the concept of “embedding” and other change phases and constructs, mostly examining the precursory and innovation-producing processes
- the context of research into innovation has been primarily industrial, not university-based
- its variable analytic paradigm fails to produce holistic analyses which can be appreciated and enacted on by decision makers and practising managers.
For these reasons and because suitable research on innovation in universities is lacking, an introductory investigation based on grounded theory building was undertaken. To this end, four qualitative, descriptive case studies of contrasting Australian universities embedding e-learning were compiled. The four case universities (their identities protected through use of pseudonyms) assessed were:

- Gamma University – a multi-campus institution, geographically spread across urban and regional locations
- Lambda University – an established university, with the majority of students located at a single urban campus
- Epsilon University – a younger, multi-campus amalgamated university with a strong reputation for distance education
- Delta University – a relatively young multi-campus, urban university, although its parent bodies provide a longer history.

The cases were based on interviews and focus group sessions with 74 participants, and electronic resource and document analyses over two phases; the first conducted in 1998-1999 and the second in 2002-2003.

These analyses provided holistic pragmatic accounts that encapsulate a number of issues. One issue was about the importance of creativity in the innovating process. A second set of issues centred on the theme of complexity and the multifarious nature of the e-learning innovation. Other themes included the significance of the innovation context, partnerships and collaborations, and the emerging polarisation of issues such as standardisation versus diversification.

These issues provoked three major propositions about the process of embedding and prompted the development of two systems-based analytical frameworks; one focusing on the nature of system relationships and interactions and the second providing a longitudinal perspective of system change. The propositions are:

- the ability of a university to negotiate system intersections and transitions influences the degree to which e-learning can be embedded in that university
- complexity is an integral part of an innovation, therefore cannot be ignored or eliminated without destroying the kernel of the innovation itself, and its long-term viability
- the efficacy of the innovation is related, in some measure, to the ability to sustain partnerships and collaborations.
The analysis suggested that there are number of key influences which affect the embedding process and the ability of an organisation, such as a university, to manage the processes associated with the e-learning innovation. The key system influences which affect embedding include:

- the nature of the interactions and transactions occurring within the system, at the boundaries and between the phases of transition
- the importance of organisational context (cultural, technological, strategic, geographic)
- the pervasive impact of complexity on all dimensions of the research problem (the e-learning innovation, the change process and the university environment)
- the necessity for collaboration.

The implications of this study for university executives, managers and beyond are far reaching, and in some respects contradict accepted contemporary management practice. They include: seeking ways to maximise organisational tensions to achieve positive outcomes; enhancing decision making by allowing more flexibility and personal judgement into the process; developing greater tolerance for system fuzziness and uncertainty; and encouraging better utilisation of previous knowledge gained about innovation practices and processes.
Acknowledgements

The roots of this research go back many years and my gratitude extends to all the people who, in different contexts and unexpected ways, have encouraged and challenged me to complete this work.

In particular, I have to thank my supervisors Professor Greg Hearn and Associate Professor Yoni Ryan both of whom demonstrated faith in me and assisted me to transform a woolly set of ideas into a feasible, and hopefully, valuable topic for a dissertation. Greg offered me freedom to pursue new and interesting areas of inquiry and the pathways to connect the fledgling ideas which, at the time, appeared isolated in their respective discipline “silos”. Greg, most importantly, also provided the necessary skill to bring me back on track to complete this work. Yoni accompanied me on this journey from the beginning, probing and challenging my ideas and expressions. Her continued support and generous contribution of time, at all hours of the day or night and to the other side of the world, proved invaluable.

I would also like to acknowledge my mother, Elizabeth, who taught me from an early age the value of intellectual thought and argument, and Andrew and Samara, who have both shown their mother endless understanding and support over the years, while she was locked away, working behind closed doors.

Finally, I am indebted to Donald, who believed in me, cajoled and harassed me to keep going when I was ready to walk away. He has shown tremendous patience, made many personal sacrifices, and has supported me in ways too numerous too mention.

I owe a deep gratitude to all these people.
# Terms and Acronyms

<table>
<thead>
<tr>
<th>Term</th>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D</td>
<td></td>
<td>Two Dimensional</td>
</tr>
<tr>
<td>3D</td>
<td></td>
<td>Three Dimensional</td>
</tr>
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<td>3G</td>
<td></td>
<td>Third Generation</td>
</tr>
<tr>
<td>ATN</td>
<td></td>
<td>Australian Technology Network</td>
</tr>
<tr>
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<td></td>
<td>Australian Universities Quality Assurance</td>
</tr>
<tr>
<td>AUTC</td>
<td></td>
<td>Australian Universities Teaching Committee</td>
</tr>
<tr>
<td>AV</td>
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<tr>
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<td></td>
<td>Australian Vice-Chancellor’s Committee</td>
</tr>
<tr>
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<td></td>
<td>Committee for Advancement of University Teaching</td>
</tr>
<tr>
<td>CBE</td>
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<td>Computer-Based Education</td>
</tr>
<tr>
<td>CD-ROM</td>
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<td>Compact Disc Read Only Memory</td>
</tr>
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<td>CFL</td>
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<td>Computer-Facilitated Learning</td>
</tr>
<tr>
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<td>Course Management System</td>
</tr>
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</tr>
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<td>DE</td>
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</tr>
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<td>DETYA</td>
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</tr>
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<td>DVD</td>
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<td>eLIG</td>
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<td>EQUIS</td>
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<td>FTF</td>
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<td>GLC</td>
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<td>Innovation Relationships Framework</td>
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<td>IRU</td>
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<td>ISO</td>
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<td>Acronym</td>
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<td>KPI</td>
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<td>LCMS</td>
<td>Learning Content Management System</td>
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<td>LMS</td>
<td>Learning Management System</td>
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<td>LMU</td>
<td>Lambda Multimedia Unit</td>
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<td>MIT</td>
<td>Massachusetts Institute of Technology</td>
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<tr>
<td>MMVW</td>
<td>Massively Mulitplayer Virtual World</td>
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<td>NBEET</td>
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<td>NCODE</td>
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<td>PDA</td>
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<td>QA</td>
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<td>QoS</td>
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<td>QUT</td>
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<tr>
<td>RHD</td>
<td>Research Higher Degree</td>
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<td>SARS</td>
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<td>SMS</td>
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<td>TCP/IP</td>
<td>Transmission Control Protocol and Internet Protocol</td>
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<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organisation</td>
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<tr>
<td>Universitas 21</td>
<td>International network of research-intensive universities</td>
<td></td>
</tr>
</tbody>
</table>
# Contents

Statement of Original Authorship .................................................................................. ii
Abstract ............................................................................................................................. iii
Acknowledgements .......................................................................................................... vi
Terms and Acronyms ....................................................................................................... vii

Chapter 1: Introduction .................................................................................................. 1
  1.1 The research problem: background issues and context ............................................. 1
  1.2 Research focus – the nature of innovation ................................................................. 2
    1.2.1 The “lure” of innovation .................................................................................... 2
    1.2.2 Innovation and higher education ........................................................................ 3
    1.2.3 The case for further research on innovation ....................................................... 5
  1.3 Research focus – the change process ....................................................................... 7
    1.3.1 Limitations of existing change models ............................................................... 7
    1.3.2 The term “embedding” ...................................................................................... 8
  1.4 Rationale for the study ............................................................................................. 10
  1.5 Research focus – the ability of the organisation to effect change ......................... 11
  1.6 The university – the organisational context of the research problem ..................... 13
    1.6.1 Organisational typographies ............................................................................. 13
    1.6.2 Universities – a context of change .................................................................... 15
    1.6.3 Four university cases ....................................................................................... 17
  1.7 Structure of the Dissertation .................................................................................... 17

Chapter 2: The Innovation – E-learning ................................................................. 21
  Introduction .................................................................................................................. 21
  2.1 Key dimensions of e-learning ................................................................................. 22
    2.1.1 Technology ....................................................................................................... 22
      2.1.1.1 The early developments .............................................................................. 22
      2.1.1.2 Later developments .................................................................................... 24
      2.1.1.3 Current issues and trends ......................................................................... 25
    2.1.2 Access ............................................................................................................. 28
      2.1.2.1 Traditional conceptions of distance and place ............................................. 28
      2.1.2.1.1 Wider notions of accessibility ............................................................... 28
    2.1.3 Quality ........................................................................................................... 30
      2.1.3.1 Conceptions of quality .............................................................................. 30
        2.1.3.1.1 Quality as an indicator of pre-eminence .............................................. 30
        2.1.3.1.2 Quality as an alignment of organisational values .............................. 31
        2.1.3.1.3 Quality as elimination of error ......................................................... 32
      2.1.3.2 Quality factors .......................................................................................... 33
        2.1.3.2.1 Technology ....................................................................................... 33
        2.1.3.2.2 Pedagogy .......................................................................................... 34
        2.1.3.2.3 Content ............................................................................................ 34
        2.1.3.2.4 Student Support ............................................................................... 35
      2.1.3.5 Summary .................................................................................................. 35
  2.2 The role of e-learning as a change agent ............................................................... 37
    2.2.1 Convergence .................................................................................................. 37
    2.2.2 Globalisation and internationalisation of learning .............................................. 38
    2.2.3 Lifelong learning and learner-centredness ......................................................... 39
    2.2.4 Summary ....................................................................................................... 41
  2.3 The status of the e-learning innovation ................................................................. 42
    2.3.1 The e-learning business enterprise .................................................................. 43
    2.3.2 E-learning ecologies ....................................................................................... 45
    2.3.3 E-learning collaborations ................................................................................ 46
    2.3.4 E-learning environments (pedagogy, technologies and learning designs) ... 47
    2.3.5 New e-learning roles – “teacher” and “learner” ............................................... 50
5.2 Case descriptions: Stage One comparative analysis of Gamma University and Lambda University

5.2.1 Organisational elements
5.2.1.1 Strategy
5.2.1.2 Structure
5.2.1.2.1 University Grant Schemes
5.2.1.2.2 New staff roles and communication networks
5.2.1.3 Process
5.2.1.3.1 Policy
5.2.1.3.2 Resourcing
5.2.1.3.3 Staff training and development
5.2.1.4 Culture
5.2.2 Nature of the e-learning innovation
5.2.2.1 Gamma overview
5.2.2.2 Lambda overview
5.2.2.3 Elements of the e-learning innovation
5.2.2.4 Institutional views and expectations of the e-learning innovation – impact on change process
5.2.3 Nature of the change process
5.2.3.1 Critical incidents
5.2.4 Organisational relationships and forces
5.2.4.1 Interventions
5.2.4.2 Alignments and non-alignments
5.2.5 Concluding comments — Gamma and Lambda case analysis
5.2.6 Completion of the framework – the “Innovation Relationships Framework” (IRF)

5.3 Case descriptions: application of the IRF to Delta University and Epsilon University
5.3.1 Epsilon University
5.3.1.1 Organisational elements
5.3.1.2 Nature of the innovation
5.3.1.3 Nature of the change process
5.3.2 Delta University
5.3.2.1 Organisational elements
5.3.2.1.1 Organisational elements
5.3.2.1.2 Nature of the innovation
5.3.2.1.3 Nature of the change process

5.4 Issues and themes arising from the first stage analysis — the four cases
5.5 State of embeddedness of the e-learning innovation — the four cases
5.5.1 Widespread usage of the innovation
5.5.2 Integration of the innovation
5.5.2.1 Shared understanding of the innovation
5.5.2.2 “Routinisation” of policies and procedures
5.5.3 Legitimisation of the innovation
5.5.4 Sustainability of the innovation
5.5.5 Overview of embedding in the four cases and future issues

5.6 Systems theories informing a process approach
5.6.1 General systems theory
5.6.2 Complex systems approaches
5.6.3 Systems dynamics theory
5.6.4 Dissipative theories
5.6.5 Complex adaptive theories
5.7 System theories and organisations
5.8 Conclusion

Chapter 6: Second Phase Analysis — Lambda and Gamma Cases and Development of Second Framework
Chapter 8: Conclusion

8.1 Overview of research findings
8.2 The embedding process
8.3 Key influences that affect the ability of an organisation to effect the changes required to embed
8.3.1 Proposition 1 — managing system intersections and transitions
8.3.1.1 Organisational implications
8.3.2 Proposition 2 — embracing complexity
8.3.2.1 Organisational implications
8.3.3 Proposition 3 — collaborations
8.3.3.1 Implications for operating within the Complex Domain
8.4 Relationship between innovation and the embedding process
8.5 Summary of the findings and implications
8.5.1 Limitations and further research
8.6 Conclusion

Chapter 7: Theorisation of the Frameworks

7.1 System boundary
7.1.1 Boundary behaviours
7.1.2 Boundary location and innovation
7.2 System relationships
7.2.1 Alignments and non-alignments
7.2.2 Interventions
7.3 Progressive or staged change
7.3.1 Levels of analysis
7.4 Complexity
7.5 Summary
7.5.1 Strengths and limitations of the frameworks

Chapter 6: Analysis of the Innovation Longitudinal Framework (ILF)

6.1 Analysis of second stage data
6.1.1 Lambda University
6.1.1.1 Lambda — organisational elements (context)
6.1.1.2 Lambda — nature of the innovation
6.1.1.2.1 Quality
6.1.1.2.2 Accessibility and integration
6.1.1.3 Lambda — nature of the change process
6.1.1.4 Lambda — degree of embedding
6.1.2 Gamma University
6.1.2.1 Gamma — organisational elements (context)
6.1.2.1.1 Gamma University
6.1.2.1.2 Gamma University
6.1.2.1.3 Lambda
6.1.2.2 Gamma — nature of the innovation
6.1.2.3 Gamma — nature of the change process
6.1.2.4 Gamma — degree of embedding
6.2 Mapping of the case studies against the IRF
6.3 Strengths and weaknesses of the Innovation Relationships Framework (IRF)
6.4 Development of a second analytical framework — Innovation Longitudinal Framework (ILF)
6.5 Analysis of propositions
6.5.1 Proposition 1 — managing the intersections and transitions
6.5.2 Proposition 2 — embracing complexity
6.5.3 Proposition 3 — collaborations
6.5.4 Overview of analysis of propositions
6.6 Finalisation of the second framework
6.7 Conclusion

Chapter 5: Implications, Limitations and Further Research
References
Appendix 1
Table 4.1 Interviewee Questions – Phase 1, Stage 1
Table 4.2. Phase One and Two participants
Appendix 2
Table 5.1 Organisational elements – strategy
Table 5.2 Organisational elements – structure
Table 5.3 Organisational elements – process
Table 5.4 Policy environment at Gamma University
Table 5.5 Contrasting IP policy and processes – Gamma and Lambda Universities
Table 5.6 Staff development – Gamma University
Table 5.7 Organisational elements – culture
Table 5.8 Innovation dimension – e-learning profile
Table 5.9 Comparative table of e-learning technology, pedagogy, methodology and curriculum
Table 5.10 Comparative table of scale, location and “radicalness”
Table 5.11 Gamma University – diverse conceptions of the e-learning environment
Table 5.12 Comparison of change elements
Table 5.13 Interventions (high to low organisational significance)
Table 5.14 Organisational non-alignments – Gamma and Lambda
Table 5.15 Barriers and facilitators to change – Gamma and Lambda Universities
Table 5.16 Structural changes – Epsilon University
Table 5.17 e-learning innovation dimensions – Epsilon University
Table 5.18 Barriers and facilitators – Epsilon University
Table 5.19 Dimensions of the e-learning innovation – Delta University
Table 5.20 Barriers and facilitators – Delta University
Appendix 3
Table 6.1 Structural changes – Lambda University
Table 6.2 Lambda, Nature of Innovation – Comparative Technology Overview
Table 6.3 Gamma – Structure
Table 6.4 Structural Changes – Gamma University
Table 6.5 Gamma Nature of Innovation – Technology
Table 6.4 ILF Description
### Table of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>University e-learning enterprise architecture</td>
<td>26</td>
</tr>
<tr>
<td>2.2</td>
<td>Institution-centred model</td>
<td>40</td>
</tr>
<tr>
<td>2.3</td>
<td>Learner-centred model</td>
<td>40</td>
</tr>
<tr>
<td>4.1</td>
<td>Research Design</td>
<td>89</td>
</tr>
<tr>
<td>4.2</td>
<td>Organisational profile framework</td>
<td>90</td>
</tr>
<tr>
<td>5.1</td>
<td>Development of the analytical framework</td>
<td>107</td>
</tr>
<tr>
<td>5.2</td>
<td>Innovation Relationship Framework</td>
<td>124</td>
</tr>
<tr>
<td>6.1</td>
<td>Innovation Relationship Framework – Gamma system elements</td>
<td>176</td>
</tr>
<tr>
<td>6.2</td>
<td>Gamma – System relationships</td>
<td>177</td>
</tr>
<tr>
<td>6.3</td>
<td>Gamma – Relationships – organisational elements</td>
<td>179</td>
</tr>
<tr>
<td>6.4</td>
<td>Gamma – Non-alignments</td>
<td>179</td>
</tr>
<tr>
<td>6.5</td>
<td>Lambda – System relationships</td>
<td>180</td>
</tr>
<tr>
<td>6.6</td>
<td>System levels of analysis. Organisational element – Intellectual property</td>
<td>181</td>
</tr>
<tr>
<td>6.7</td>
<td>Innovation Longitudinal Framework. Innovation Phase</td>
<td>184</td>
</tr>
<tr>
<td>6.8</td>
<td>Innovation Phase. Stage 2</td>
<td>185</td>
</tr>
<tr>
<td>6.9</td>
<td>Embedding Phase, Business Domain, Stage 1 – 2. Innovation growth</td>
<td>187</td>
</tr>
<tr>
<td>6.10</td>
<td>Embedding Phase – Business Domain. Stage 1. Innovation decline</td>
<td>189</td>
</tr>
<tr>
<td>6.11</td>
<td>ILF Innovation and Embedding Phases</td>
<td>190</td>
</tr>
<tr>
<td>6.12</td>
<td>Collaboration context</td>
<td>204</td>
</tr>
<tr>
<td>6.13</td>
<td>Embedding Phase – Complex Domain</td>
<td>205</td>
</tr>
<tr>
<td>6.14</td>
<td>ILF completed</td>
<td>207</td>
</tr>
<tr>
<td>7.1</td>
<td>Framework One – Innovation Relationships Framework</td>
<td>209</td>
</tr>
<tr>
<td>7.2</td>
<td>Framework Two - Innovation Longitudinal Framework</td>
<td>210</td>
</tr>
<tr>
<td>7.3</td>
<td>Example from ILF illustrating alignments and non-alignments</td>
<td>217</td>
</tr>
<tr>
<td>7.4</td>
<td>ILF Innovation and Embedding Phases</td>
<td>222</td>
</tr>
<tr>
<td>7.5</td>
<td>System wide forces and trends</td>
<td>223</td>
</tr>
<tr>
<td>7.6</td>
<td>Innovations Relationship Framework. Multiple levels of analysis</td>
<td>225</td>
</tr>
</tbody>
</table>
Chapter 1: Introduction

The purpose of this chapter is to present an overview of the research problem and the rationale and organisational context for the study. The research problem is investigated from the perspective of three inquiry foci: innovation, change processes and organisational ability to effect change. A brief outline of the research design and the structure of the dissertation is also provided.

1.1 The research problem: background issues and context

The research problem canvassed in this dissertation is the ability of an organisation to embed innovation. The problem gradually became apparent over a period of time when the candidate, employed by three Australian universities, was responsible for the planning and implementing of new technologies to facilitate research, teaching and learning and administrative activities. The universities’ diverse responses to the challenges and opportunities presented by e-learning (defined below), and their varied degrees of success in mainstreaming technological innovation, prompted this study.

The enquiry comprises three fundamental components: innovation as a construct; change as a process; and the attendant processes and elements which comprise the collective ability of a complex social entity, commonly understood as an organisation, to effect change. Each of these elements has attracted considerable research interest in its own right, but when they are brought together into an explicit research enquiry a new educational agenda emerges, providing insight for decision makers about the potential future shape or form of learning in higher education.

The coalition of these key dimensions of the problem is expressed in the broad research question:

*How do organisations, specifically universities, successfully embed the innovation of e-learning?*

The overall research problem can be broken down into secondary questions:

- What is meant by the term “embedding”?
• What are the key influences that affect the ability of an organisation to effect the changes required to embed?
• Does the nature of the innovation affect the embedding process?

The research is applied, initially using existing theory to generate new knowledge concepts, theoretical statements, tools or frameworks within a particular context. In turn, the new frameworks are critiqued and related back to theories of change.

1.2 Research focus – the nature of innovation

1.2.1 The “lure” of innovation

Innovation, as a concept, continues to be topical, “trendy” and desirable – a defining “make or break” attribute of an organisation (Anderson & Tushman, 1997; Farrell, 1997; Hamel & Prahalad, 1994). Governments, industry and educational institutions, for example, have continued to promote innovation actively as the way of the future (Broadband Services Expert Group, 1994; Innovation Summit Implementation Group, 2000; Leavy, 2002; Nystrom, 2000). In the contemporary context, therefore, innovation is generally endorsed as a common “good”, a panacea to outmoded methods and to unproductive entrenched habits, by those who, seemingly, are non-critical about its value and benefits to industry, education and society in general. Indeed, one could argue that innovation per se has become the universal way to prosperity and social wellbeing. The pro-innovative stance is evident across many fields of endeavour: business, technology, science, agriculture, biotechnology and education (Australian Government, 2001, 2004a, 2004b; Department of Education, Science and Training, 2004b; Frambach & Schillewaert, 2002; Marceau, Manley & Sicklen, 1997). It has been argued, therefore, that the ability to innovate is linked to a nation’s economic future, to knowledge generation and wealth creation (Department of Foreign Affairs and Trade, 2004; Innovation Summit Implementation Group, 2000; Marceau et al., 1997). In many ways, innovation appears to have acquired a nation-building remit. Likewise, the business sector argues the imperative of the “creativity advantage” (Kao, 1997), and the need for organisations to innovate (Frambach & Schillewaert, 2002) and “to become inventive in all aspects of their operations and management, if they are to survive and thrive in the new economy” (Leavy, 2002, p. 70).
Hence innovation now has a strategic role, with links being made between innovation, education and the national knowledge economy, as evident, for example, in the address to the Education Foundation Summit by Professor Ruth Dunkin, then Vice-Chancellor Royal Melbourne Institute of Technology: “We now need to see a whole of government approach to innovation with education a key factor” (Dunkin, 2000, online).

This challenge has been readily embraced by governments across Australia. For example, in 2001 the Australian Commonwealth Government “Backing Australia’s Ability” initiative promoted innovation through research, commercial and business schemes. Internationally, governments have adopted a similar stance. For example, in 1999 the United Kingdom’s Economic and Social Research Council’s Teaching and Learning Research Programme launched an initial £11.5 million scheme with significant links to innovation (Hannan & Silver, 2000, p. 147). Within the Australian higher education sector, innovation has been associated with excellence in research as a means of enhancing universities’ international profiles and increasing the social benefit to the community (“Research and Innovation: Australia’s Future”, 2000).

During the 1980s and 1990s, innovative projects involving the use of educational technologies flourished (Alexander & Blight, 1996; McCann, Christmass, Nicholson & Stuparich, 1998; Mitchell & Bluer, 1997; Oliver & Omari, 1999; Stacey & Thompson, 1996), particularly under the auspices of the Committee for Advancement of University Teaching (CAUT) National Teaching Development Grants. In fact, it could be argued that the term “innovation” came to be used almost exclusively to mean technological innovation (Mitchell & Bluer, 1997).

1.2.2 Innovation and higher education

In the decade leading up to the new millennium, grants and funding schemes began to encourage innovation as a means of achieving greater efficiencies, achieving more with less, of attaining a more competitive place in the market, and of improving quality in teaching and learning. Government schemes such as the Higher Education Innovative Programme (HEIP), for example, aimed to “improve the quality of higher education provision through innovative projects” (Department of Education, Science and Training, 2002a, online), while a plethora of institutionally-based innovative educational grants followed suit (e.g. Teaching and Learning Development Grants Scheme (QUT, 1996); TaLMET grant scheme (University of Melbourne)). Such
schemes were premised on assumptions that associated innovation with quality and improvement in teaching and learning, an important consideration underpinning universities’ diverse responses to managing educational technology innovation.

Over time, however, there has been increasing concern, even scepticism, about the value and benefits of educational innovation. Issues to do with quality, effectiveness, cost, efficiency and return-on-investment began to overshadow the enthusiasm and discourse about ingenuity, experimentation and novelty (Anderson, Johnson & Milligan, 1999; Department of Education, Training and Youth Affairs, 1999a; Anderson, Johnson & Milligan, 1999). Administrators and managers within the education and government sectors began to raise probing questions such as “where are the returns-on-investment?”, and “who is benefiting from an innovation: the innovators themselves, the students or the institution?” (Alexander & McKenzie, 1998; Coaldrake & Stedman, 1998; McKenzie, Alexander, Harper & Anderson, 2005; Moran, 1995; Ramsden, 1998; Schofield & Olsen, 2000). In 1996, the Australian Commonwealth Government commissioned CAUT to review the outcomes of the extensive information technology innovations within universities over the previous decade. In particular, there was concern about the disparate take-up of innovations within universities (Alexander & McKenzie, 1998). Alexander and McKenzie’s evaluation revealed that despite a decade or more of innovative grants, a significant number of the projects were still largely experimental in nature, the majority of projects were conceived by an individual or small group, there was a lack of evidence of the influence of strategic plans on decisions relating to projects, the choice of technology used, and there were still uncertainties about whether initial project objectives or outcomes were achieved.

Clearly, much of the technology-related innovation in the higher education sector was at this time uncoordinated, individualistic and fragmented (King, 2001; Schofield & Olsen, 2000) as posited in a more recent review of the Australian education scene which “revealed a great diversity of innovative initiatives as well as parallel and duplicated activity. Views about the future varied across education and training sectors and there were great differences in perception and performance” (Department of Education Science and Training, 2004a, Executive Summary).

Fundamental questions persist therefore with respect to the underlying rationale which drives innovation within educational organisations (McKenzie et al., 2005). Specifically, one could question whether there is consensus about the meaning of the term “innovation” and, if so, “What is its value?”. In other words, “Who benefits?”, “Who
should be involved?” and “Who assesses the value of the innovation?”. Seemingly, ambiguity still clouds fundamental questions about the rationale for much of the innovatory activity in universities. However, the range of rationales includes:

- innovation to bring about efficiency gains – this goal satisfies institutions, governments and, presumably, society at large, all grappling with additional costs brought about by the “massification” of the higher education system in Australia (Coadrake & Stedman, 1998; Marginson, 1997; Martin & Karmel, 2002)
- innovation to improve the quality of the teaching and learning experience (the immediate benefactors being students and teachers)
- innovation to improve the student’s “customer experience”, in other words to increase access, efficiency and flexibility of study options and educational administrative processes
- innovation to increase competitive advantage and ultimately “market share”, benefiting individual institutions.

Lack of clarity surrounding these issues continues to fuel the view that universities, and organisations in general, have failed to reap appropriate benefits or long-lasting returns from the investments made in innovations. Fullan’s observation highlights this concern, and also supports this dissertation’s focus on change processes:

almost everyone would agree (although they have different views on what or whom to blame) that previous reform strategies have failed. I maintain that these failures have occurred because the theories of change underpinning them are simplistic or absent altogether (Fullan, 1999, p. 29).

1.2.3 The case for further research on innovation

Despite the existence of a substantial body of information on the topic of innovation and change, cases for further research have been made (Dunphy & Stace, 1986; Frambach & Schillewaert, 2002; Quinn, 1996; Salaman & Storey, 2002; Wolfe, 1994). Salaman and Storey, for example, claimed that “the managerial processes which contribute to innovativeness and the factors and processes inhibiting its achievement remain underexploited” (Salaman & Storey, 2002, p. 147). Tidd (1997) also made a plea for a more holistic and integrated approach to research, concluding that the literature was “highly fragmented…(and that) much of the research has been
conducted within separate disciplines with relatively little overlap or interaction” (Tidd, quoted in Salaman & Storey, 2002, p. 147).

The generic case for research which recognises a top level or “whole of organisation” systems approach to the questions associated with innovation uptake has been argued by Beer (1980) and Hinings and Greenwood (1988) and has been supported with respect to the education sector by Dooley (1999), Ison (1999), Jette (1994), Kezar (2002), and Laurillard (1997).

This study, therefore, has adopted a general systems approach, focusing on the multiple dimensions of organisational activity and the relationships between the organisational entities or parts, rather than on specific factors such as leadership style, staff development or technological infrastructure. A holistic approach has allowed greater flexibility in exploring the research problem, in particular the complex and variable organisational responses to the challenge of integrating educational innovation across an entire institution.

Educational institutions have experienced many cycles of innovation, particularly technological, but it is the contention in this study that, as yet, they have failed to embed many innovations. The problem has been widely recognised (Ayres & Grisham, 2003; Department for Education and Skills, 2003; Hannan & Silver, 2000; Latham, 1988; Macchiusi & Trinidad, 2000; McKenzie et al., 2005; Salmon, 2004; Zemsky & Massey, 2004), but effective and long-lasting strategies and solutions remain elusive, supporting the case for more robust and extensive research. While a number of these authors cited have made a significant contribution to explicating individual elements of educational innovation, their work differs from this study with respect to scope, perspective or context. Their studies or reports have been conducted either in a different context (the schools sector or a different region) or from a somewhat narrower inquiry perspective, with a different focus from the research question posed in this dissertation. Hannan and Silver (2000), for example, researching within the UK higher education sector, examined a number of organisational factors which impacted on the uptake of innovation, including the crucial nexus of individual versus institutional innovation. Their findings in some respects complement the work of this study, but there remain critical unanswered questions with respect to the holistic nature of what it means to embed innovation. Macchiusi and Trinidad (2000) focused on “uptake” issues, but with the narrower focus of information technology (IT), exploring what is required to encourage or drive individuals to adopt IT in their teaching.
1.3 Research focus – the change process

1.3.1 Limitations of existing change models

The second focus of the research problem is concerned with change processes. The change management and innovations studies which populate this research space have revealed important information about innovation adoption and integration issues, highlighting the complexities which underpin the overall change process. Hinings and Greenwood (1988), for example, raised questions about the sequence and pace of change. Pettigrew, Woodman and Cameron (2001) also questioned whether the order of various change processes influences the outcome, and “whether those processes and mechanisms associated with initiating change are similar to or different from those responsible for sustaining or regenerating organizational change” (p. 705).

Acknowledging the line of inquiry of Pettigrew and colleagues, this study extends contemporary change management theories, probing and challenging some of the accepted views and understandings of change processes, particularly with respect to assertions about successful completion of change processes (Kotter, 1995; Rogers, 1995). Transformation change models, such as those of Kotter (1995) and Peters (1991), entail a sequential templated approach, ending with the “institutionalisation” of the new approach (Armenakis, Harris & Field, 1999; Kotter, 1995, p. 61) or with “anchoring change in the corporation’s culture” (Kotter, 1995, p. 67). This approach carries a connotation of finalisation – a termination, cessation or retiring of a project, which can lead to an institutional attitude that no further action or attention to the innovation is required. The project is finished, the report is on the shelf, the innovation has been implemented; therefore no-one in the organisation has the carriage or interest to continue to oversee the whole initiative.

Diffusion models (Dooley, 1999; Rogers, 1995; Schôn, 1973; Sterman, 2000; Mansfield, 1968) have gained popularity with respect to the adoption of innovation, but in the higher education context they can be argued to have a number of shortcomings (Kezar, 2002). Dooley (1999), for example, argued a case for designing the system to remove barriers and inhibitors, rather like a jigsaw puzzle into which every individual and organisational factor can be placed. In this view, it is the role of leaders and change managers to solve the puzzle in order to complete the implementation process. This is very much a directed, engineering approach, although Dooley (1999) recognised the complexity of the task.
Such models exhibit a pro-innovation or uncritical bias, assuming that all innovation is inherently valuable – it is simply a question of how to facilitate or manage the various stages of uptake within the organisation. If one accepts the existence of such a bias, it may well be a significant influence on the slow adoption of certain innovations by mainstream staff and “later adopters” (Rogers, 1995) within independent organisational cultures such as universities. It is this latter group who are sceptical about change and innovation and who seek more compelling evidence of benefits of change (Jaffe, 1998; Macchiusi & Trinidad, 2000).

Classical diffusion models, such as that of Rogers (1995), have a product-centric view of innovation (Schön, 1973), where the innovation, as a well defined and bounded entity, is seen to be the disruptive force, and the assumption is that the surrounding environment or system is relatively stable. The “product” view of an innovation (Sterman, 2000; Tushman, Anderson & O’Reilly, 1997; Zemsky & Massy, 2004) is too narrow a conception of the “e-learning” innovation as defined by this study because, although e-learning embraces various products or products sets, it is in itself more akin to an ecological system than it is a discrete entity or product. Nor does the uni-directional or “centre-periphery” diffusion model (Schön, 1973, pp. 81-84), with an adherence to transmission practices (Armenakis et al., 1999) align well with the constantly changing, evolutionary and non-stable state which characterises contemporary university environments.

Notwithstanding the extensive work already existing on change processes (Havelock & Zlotolow, 1995; Klien & Sorra, 1996; Kotter, 1996; Lewin 1951; Rogers, 1995; Stockdill & Morehouse, 1992), this research focuses on the change processes aligned with the concept of embedding, as it is defined within the context of the study, and specifically with the ability of organisations, such as universities, to facilitate the embedding process.

### 1.3.2 The term “embedding”

“Embedding” in everyday usage means to position or to “fix firmly in a surrounding mass” (The Concise Oxford Dictionary of Current English, 1976, p. 337), echoing Kotter’s (1995, 1996) analogy of “anchoring” an entity such that it cannot drift or move from a predetermined position. Immediately, however, there is an apparent paradox, a tension between the concept of innovation, as an embryonic, evolving, at times
unstable idea or invention, and that of embedding, which is about corralling, pinning down and positioning firmly. In the context of this study, however, embedding is defined as a part of the overall change process, a later change phase, where the emphasis is placed on *infusion* or integration into a malleable environment, rather than *fixing* or securing the innovation to a given point therein. The important nuance associated with infusion is that it implies the act of mixing or blending, a less rigid process than fixing.

The process of infusion is at times vague, harder to pin down in detail with respect to precise time or place, and there is a two-way flow between the object or concept (the innovation) and the environment, whereby each influences the other, resulting in incremental changes to both the concept and the environment. As such, the notion of the subject (the innovation) and the object (the environment) of change become less apparent. The experience of such a process is unsettling for many, because one cannot always pinpoint or understand exactly what is happening at a given point of time.

For many managers this ambiguity can be disconcerting, as they strive to re-establish organisational stability through careful planning and positioning of the innovation within the institutional environment. Underpinning this managerial compact to maintain a stable organisation is the value attributed to accountability and to the organisational principles of certainty, assurance and minimisation of liabilities, realised through processes such as verification and reporting of accurate outcomes.

It is these ongoing uncertainties about process, as well as the constantly emerging complexities associated with educational innovation itself (King, 2001; Svensson, 2003; Zemsky & Massy, 2004), which underpin the research problem and continue to concern teachers and administrators alike. It would be misleading, therefore, to conceive of this research as a straightforward study about adoption or uptake, which replicates other work about e-learning. Rather, this study is concerned with (a) identifying and unpacking the critical elements or dimensions of embedding (as it is conceived as a phase of a more comprehensive change process); (b) examining how embedding resonates with the key characteristics of an innovation; and finally, (c) determining what the implications are for decision making about management of the change process.
1.4 Rationale for the study

The rationale for the study is that there is a need for practical and creative strategies for a range of key stakeholders, including university executives, middle managers, policy makers within higher education and government, thought leaders, leading practitioners and practitioner researchers in the field. Such strategies, however, should be borne out by empirical evidence and supported by newly emerging theory which is both cognisant of and informed by the issues relevant to contemporary university environments and the nature of innovations such as e-learning.

The timeliness of the study should also be considered. This thesis takes e-learning as an exemplar of an innovation, but the abundance of papers and research on the adoption of technological innovation in higher education gives rise to a perception that its success is a given (Arabasz, & Baker, 2003; Spender, 2001, 2002, 2003; Symonds in Boston, 2001) and that it is bedded down in educational institutions as “an established set of enabling procedures which, through the continuing development of hardware and software, will make possible the description, the analysis and the presentation of almost all educational material” (Hills, 1996, p. 7).

The Sloan Foundation’s annual survey (2003–2004) concluded that usage and positive perceptions of academic leaders and students with respect to online learning (a significant dimension of e-learning) had achieved a critical mass and level of institutional acceptance – that it had in fact been mainstreamed:

The online enrolment projections have been realized, and there is no evidence that enrolments have reached a plateau. Online enrolments continue to grow at rates faster than for the overall student body, and schools expect the rate of growth to further increase (Sloan Foundation, 2004, online).

Notwithstanding the persuasiveness of the above viewpoints which posit widespread acceptance of online learning, implementation of procedures and policies, and increases in the number of web-based courses, there is still a cogent and passionate contrary argument: “E-learning is not embedded in our teaching and learning, at any stage of education” (Department for Education and Skills, 2003, online).

Globally, concerns about over-inflated claims of e-learning adoption rates and educational transformations (Alexander, 2004; Ayres & Grisham, 2003; Noble, 1998a,
1998b; The Observatory on Borderless Higher Education, 2002; Zemsky & Massy 2004) have surfaced: “Just as IT has transformed the context of teaching and scholarship without transforming either teaching or scholarship itself, so has IT transformed higher education without transforming the places that set the standards for education” (Ayres & Grisham, 2003, p. 42).

Zemsky and Massy concluded:

e-learning is unfolding in ways that few had predicted...we believe the story of e-learning is still unfolding – no one really knows what tomorrow will bring, although we suspect that computer-based technologies will continue to serve as a major catalyst of innovation. The underlying information technologies on which e-learning depends are themselves too ubiquitous, and the people attracted to having them serve as learning platforms too smart, for us not to take seriously that prospect that major changes will flow from their efforts (Zemsky & Massy, 2004, p. 60).

These voices add weight to the view that e-learning is still in its infancy, particularly with respect to the strength of a generic claim that it has been embedded in organisational environments. Rather, it seems that higher education institutions are participants in an ongoing and wider evolution of the e-learning innovation, within a dynamic matrix of opportunity, diverse stakeholder expectations, organisational issues and history. A relevant question, therefore, which is part of the overall research question, is “Do higher education institutions have the ability to guide and manage this evolution in a way which aligns with institutional goals and the aspirations of staff and students?”.

1.5 Research focus – the ability of the organisation to effect change

The first two dimensions of the research problem centred on the nature of innovation and on change processes. The question above leads logically to the third focus of the research enquiry, which is investigating the key elements and influences which make up the collective ability of an organisation, in particular a university, to pursue strategic higher order goals involving institution-wide change. The notion of collective ability invokes further consideration of how an organisation might corral the disparate abilities and energies within it, in order to create the maximum organisational capability to realise a specific institutional goal. Questions of this magnitude engage wide-ranging
issues relating to the design and operation of an entire organisational system; the
identification of relevant organisational elements such as structure, strategy and
culture; the examination of relationships between these elements and between the
organisation and the environment; and the exploration of the role an individual plays
within the system – to name but a few. It is not the aim of this study, however, nor is it
feasible, to conduct a comprehensive overview of research in all these areas. For
example, the views of students individually and collectively, although an important
factor with respect to the future evolution of e-learning, will only be considered from a
cursory perspective. Instead, the focus of this study is to tease out the critical shaping
or influencing organisational characteristics or dimensions, for example the ability to
assess the need for change, to build and sustain the critical processes, conceptual
understandings, skills and predispositions that embed, rather than merely implement,
innovation.

From the outset it should be stated that the ability of an organisation to effect
fundamental change requires a number of well known givens, such as resources,
funding, assets, and infrastructure. Again, the size limitations of this study do not
permit in-depth exploration of these components, which are being grappled with by all
universities with varying degrees of success. Arguably, the issue which has received
less attention with respect to the concept of embedding is whether organisations in
general, and universities specifically, have sufficient understanding of the nature of the
e-learning innovation, the resident skills and the conative will, to effect changes and
improvements to individual and group behaviours, norms and processes, in order to
reap the desired benefits of the innovation. For example, in a study of managers in a
large corporation, Salaman and Storey (2002) argued that there was considerable
evidence to suggest that the organisation was less committed to innovation than at first
appeared and, more importantly, that there was doubt about whether the organisation
was even capable of making the necessary management change responses.

Higher education institutions also need to be clear in their response to findings of this
nature. A pressing issue for university executives and managers, therefore, could be
whether organisations can be designed and strategies devised in complex settings,
which enable embedding. Or, to put the same question in slightly different ways,
whether it is possible to predict outcomes, given the degree of environmental and
organisational complexity and paradox in the current university climate; or to formulate
a means of thinking through the complex issues in a way which exploits or leverages
off complexity. For example, does complexity represent a barrier or a limitation to what
the university is seeking to achieve, or does it offer the potential of a profoundly new way of conceptualising organisational life and social systems in general? And finally, is it simply preferable, as Salaman and Storey (2002) have suggested, that rather than seeking to manage or control all aspects of the innovation, managers should simply seek to make better sense of innovation activities and processes, thus improving decision making within their organisations?

Rycroft and Kash (1999) highlighted instability as a key issue that has stymied organisations grappling with large scale innovation: “the factor usually cited as undermining the power of the ‘invisible hand’ to determine core capabilities is the pervasive uncertainty innovative organisations face today” (p. 92). The pervasiveness of uncertainty and the increasing loss of stability have a significant impact on organisational context and the wider environment (Schön, 1973). The environmental context of higher education innovation is also influenced by and contributes to a trend of constant change, new values and systems, which include a growing emphasis on knowledge economies and industries, technological advances and massification of tertiary education (Coaldrake & Stedman, 1998, 1999; King, 2001), as the following section demonstrates.

1.6 The university – the organisational context of the research problem

1.6.1 Organisational typographies

The university, as an example of a complex formal organisation, exhibits the common characteristics that define an organisation:

- a collectivity with a relatively identifiable boundary, a normative order, ranks of authority, communication systems, and membership coordinating systems; this collectivity exists on a relatively continuous basis in an environment and engages in activities that are usually related to a set of goals; the activities have outcomes for organizational members, the organization itself, and for society (Hall, 1996, p. 30).

A number of characteristics shared by all formal organisations can be distilled from organisational theories (Hall, 1996; Katz & Kahn, 1978; Kuhn & Beam, 1982). They include:
• goal direction – can have more than one goal, some complementary and some conflicting
• relatively identifiable boundary
• social interaction – people communicating with each other to do various organisational tasks
• deliberately structured activity system – organisations use knowledge to perform various work activities, devise systems for co-ordinating work flow and divide up work to be done
• culture - “the deeper level of basic assumptions and beliefs that are shared by members of an organization, that operate unconsciously, and define in a basic, ‘taken-for-granted’ fashion an organization’s view of itself and its environment” (Schein, 1985, p. 6)
• subject to internal differentiation (note that they may contain internal oppositional forces) – that is, there are organisations within organisations.

A number of university typologies have emerged, informed by the particular structural, strategic, processual and cultural attributes of universities, and aligning with their traditional profiles. These classifications include categories based on teaching modes (distance education, mixed mode, and distance consortia) (Rumble, 1986) and strategic orientation (in the Australian context, “Group of Eight”, Australian Technological Universities (ATN), Innovative Research Universities (IRU) Alliance, New Generation Universities, and Regional Universities (Australian Vice-Chancellors’ Committee, 2003)).

Mintzberg’s (1991c) classic organisational forms or configurations, namely entrepreneurial, machine, professional, diversified, innovative (adhocracy), missionary and political, can also be usefully applied to universities. The traditional university, Mintzberg has argued, is most closely associated with the professional configuration, where the nature of academic work (professionals with highly specialised skills and considerable autonomy) drives a decentralised horizontal structure. Within existing universities, however, other forms cohabit: the machine form with respect to administrative and support divisions; the innovative organisation in certain research-oriented centres. In more recent times, some universities more closely resemble a centrally co-ordinated, but diversified organisation.

It is important to note, when defining the parameters of this study, that the researcher is not concerned with the study of universities as social institutions (Jaffee, 1998). The
study also excludes the particular discourse which focuses on institutionalisation (Scott, 1995; Scott, Meyer & Associates, 1994. pp. 2-7; Selznick, 1957) and issues such as organisational rituals (DiMaggio & Powell, 1991) or organisational structures as ideologies and myths (Meyer, 1986).

1.6.2 Universities – a context of change

Notwithstanding the typological differences described above, there is a common element in the relationship between the organisation and the external environment. Universities, like most organisations, are experiencing enormous change, induced largely by external forces such as globalisation, increasing competition and advanced technologies and, to some degree, internal pressures from staff or students (Alexander & Blight, 1996; Burn, online, no date; Department of Industry, Science and Tourism, 1997; Green & Hayward, 1997; Hilmer, 1993; Jones, 1997; Tierney & McInnis, 2001). These forces for change have prompted penetrating questions about the role of the university itself, raising issues about the purpose of universities and about their very survival, particularly in their current organisational form, against competing higher educational models (Coaldrae & Stedman, 1998; Cunningham et al., 1998; Cunningham et al., 2000; Gallagher, 2000).

The impact of these changes has brought about a new set of relationships with universities’ constituents: students are now seen as “clients” or “consumers” and prospective students as “markets” (Chipman, 2001; Levin, 2005; Poole, Harman, Snell, Deden, & Murray, 2000) and government is no longer the benefactor or sole master of the system (Department of Education, Science and Training, 2001, 2003; Gallagher, 2001). Furthermore, universities now seek closer relationships with industry, the professions and the business sector (Davies & Hase, 1994; Department of Education, Science and Training, 2002b; Garlick, 1998), while other institutes of higher education are frequently perceived as competitors rather than as part of a unified national system (Cunningham et al, 1998; Department of Employment, Education, Training and Youth Affairs, 1998; Marginson, 1997). Collaborations and partnerships with external groups are promoted by governments, and the Department of Education, Science and Training via its funding model, is driving structural reform (Department of Education, Science and Training, 2002b).

This emerging functional service orientation is challenging the former role of universities which emphasised their educative, training and socialisation role (Hambly,
1997; Katz & Kahn, 1978). Changes of this magnitude have been portrayed as radical and transformational, as they require both staff and students to adopt new and often unfamiliar roles (Moses, 1997; Taylor, Lopez & Quadrelli, 1996). Staff, for example, need to acquire new skills, but also to develop new ways of working together and new conceptions of their roles as teacher, administrator or professional. The impending disaggregation of the conventional role of teaching in higher education, for example, is impacting all aspects of the organisation: structure, processes and culture (Coaldrake & Stedman, 1998, 1999; Department of Education, Training and Youth Affairs, 1998a; Gallagher, 2000; Johnston, 2001).

Therefore, while many commentators continue to support the primary mission of the university as teaching and research, with a particular public responsibility role (Crittenden, 1997; European University Association, 2003; Pennington, 1997; Zubrick, Reid & Rossiter, 2001), the internal processes and structures which enable teaching, learning and research are undergoing massive transformations (Barone, 2003; Bates, 1997; Brown, 1998; Commonwealth of Australia, 2001; Daniel, 1998). Clearly, many former procedures, rules and norms are inadequate in a climate characterised by innovation and change, as are the formal structures established to manage the interactions and communications between various university constituents. The case has been well argued for new research to explore such issues as the need to understand better the processes involved in the adoption of learning innovations and their impact on organisational structures, relationships and culture (Kezar, 2002; King, 2001; Ramsden, 1998; Taylor, 2004).

Conventional conceptions and models of a university are becoming too simplistic and ineffective for the dynamically changing environment, which, it is argued, is now the constant in the higher education environment (Kezar, 2002; Tierney & McInnis, 2001). The distinctive culture of the traditional universities is disappearing, and traditions of independence and autonomy structures such as tenure, are being threatened as the trend towards greater accountability and a perceived social relevance to the “real world” gathers momentum (Coaldrake & Stedman, 1998; Margolis, 1998, Noble, 1998a). Increasing competition between universities is leading to greater specialisations within and differentiation between universities, particularly as the perceived or real threat accelerates from “virtual” and corporate universities (Cunningham et al., 2000; Gallagher, 2000; Ryan & Tapsall, 1999; The Observatory on Borderless Higher Education, 2002; Watts, 1996).
The challenge facing universities, therefore, is to break down the barriers between organisational structures and cultures within and beyond the institution: between bureaucracy (administrators and support staff), teachers and researchers, and the newly emerging professional staff (with expertise in specialisations related to IT, development of resources, and knowledge management).

This is the context in which this research is situated, and while shared characteristics still permeate the sector, including the importance of quality, social equity values, efficiency and scalability, opposing tensions – collaboration versus competition, customers versus learners, tradition versus inventiveness – are becoming the new differentiators which drive the system.

1.6.3 Four university cases

Four institutions from the Australian higher education sector were selected as the cases for this study. They were Australian universities in four different states, each of which was in a relatively early stage of implementing e-learning. The universities chosen were representative of organisations with different histories, strategic profiles, student demographics and geographic locations. The identities of the universities are protected through use of the pseudonyms Gamma University, Lambda University, Epsilon University and Delta University.

1.7 Structure of the Dissertation

The literature review and analysis of empirical data are integrated throughout the thesis, rather than treated as separate and discrete chapters. This approaches aligns with the iterative nature of the research design and facilitates a more natural development and sophisticated discussion of the theoretical concepts and frameworks.

Chapter Two overviews the literature on e-learning as the most recent educational innovation. In particular, the nature of e-learning is examined, with three essential dimensions of e-learning posited as use of technology, access and quality. The latter includes enhancement or improvement of quality of the learning experience and the learning outcomes.
The multi-faceted dimension of the e-learning innovation, as it evolves into a role of a change agent, is also considered. For example, as a change agent, e-learning possesses inherent capabilities that facilitate the breakdown of boundaries between, and thus the convergence of, the traditional educational sectors, (higher education, vocational and schooling); formal learning (structured, accredited, certified – e.g. universities, schools) and informal learning (unstructured, workplace, self-initiated and self-directed, serendipitous). Furthermore, there is evidence that the characteristics of e-learning serve to promote globalisation and internationalisation of learning and to facilitate lifelong and learner-centred learning (Aceto, Dondi & Kugemann, 2004). The implications of the latter are examined.

The chapter concludes with an assessment of the current status of e-learning with respect to an innovation life cycle (e.g. Hayward, 2003). It is argued that it has largely moved beyond the “hype” phase into what has since been loosely termed “next generation” e-learning, with significant implications for universities and learners.

**Chapter Three** reviews the organisational change and innovation literature pertinent to this inquiry. It explores the distinctions between innovation and change as a process or product. The perspective of innovation as a process includes the particular elements or characteristics of change, models or frameworks of change, and typographies or classifications.

The chapter defines more clearly the processual concept of embedding, canvassing a somewhat discursive explanation of the embedding process, and deliberating on the features and limitations of existing change models. A proposition is mooted which identifies four key dimensions relating to embedding innovation: adoption or usage, integration, legitimacy and sustainability.

The key concept of radical innovation is also explored, as is an overview of the innovation context, including four accepted elements which comprise an organisation: strategy, structure, process and culture.

The research design described in **Chapter Four**, drawing on two qualitative research methodologies, grounded theory and case study, embodies an eclectic approach to the collection and analysis of data. Four institutional cases were selected from the Australian higher education sector, each representing a diverse set of characteristics
which enabled ongoing comparisons to be made, relevant to the exploratory nature of the research problem.

A systematic two-phase approach was developed with respect to the collection and analysis of data. Phase One was essentially an inductive phase where large amounts of data were collected and analysed and a wide-ranging literature search was conducted. In Phase Two a more deductive approach was adopted, to hone the nature of the inquiry, develop a number of theoretical propositions and conduct a more focused longitudinal study of two of the cases. The final analysis led to the development of a number of theoretical statements which, it is argued, are integral to the issue of embedding innovation. Implications of the findings of this dissertation and areas for further research are also raised.

**Chapter Five** reports the findings of the initial (Phase One) investigation of the four institutional cases. An analytical framework, Innovation Relationships Framework (IRF), is developed to identify the key dimensions of the research question: nature of the innovation, nature of change process, and organisational elements (strategy, structure, culture, process).

A précis of the findings from the data analysis of the four cases informs the discussion of the issues and themes arising from the first stage analysis. This is a rich exploration of the data, with evidence drawn from the interviewees and the documentation associated with each case. In particular, new nuances or permutations of the original problem, about the nature of embedding, lead to further exploration of the literature, in particular relating to systems theories and complex systems.

This new inquiry process leads naturally to the three theoretical propositions which guided the next phase of research design, described in **Chapter Six.** The focus of Chapter Six is an analysis of Stage Two data of two cases (Gamma and Lambda), to assess the degree to which the e-learning innovation had been embedded, to examine the efficacy of the initial framework (IRF) by mapping this data against the framework, and to explore ideas and strategies to address the limitations of IRF. In particular, the development of a second framework, Innovation Longitudinal Framework (ILF), as a complementary analytical tool is described. This framework draws on Phase One and Phase Two data, representing a longitudinal perspective of change issues related to innovations within universities.
**Chapter Seven** examines the theoretical efficacy of the two frameworks, drawing extensively on complex systems theories and some change theories. An analysis of the strengths and weakness of the frameworks as analytical tools is undertaken with reference to additional analytical and sense-making tools, with a discussion of how the frameworks align with the critical dimensions of the research question, such as the levels of granularity which operate within an organisation at any one time, and the role of the individual.

The final chapter, **Chapter Eight**, returns to report on the research question “how do organisations, specifically universities, successfully embed the innovation of e-learning?” and to demonstrate what has been learned, and especially how this knowledge can be of practical value to the various stakeholders of e-learning in higher education. Theoretical statements, based on the analysis of data, address the key elements of the propositions. These centre on managing organisational transitions and intersections, complexity and collaboration issues.

The particular implications and limitations of the research findings are examined and suggestions for further research proposed.
Chapter 2: The Innovation – E-learning

Introduction

The purpose of this chapter is to explore the concept of electronic or “e-learning” as an exemplar of an educational innovation, with particular reference to the higher education sector. The concept of e-learning as an innovation is central to the overall research question posed in this study, about the ability of organisations to embed innovation successfully and, more specifically, about the nature of the relationship between the innovation and the embedding process. It is critical, therefore, to examine not only the scope and the inherent characteristics of the term e-learning, but also its role and place within universities and the wider constituency. This chapter deals with the following:

• what is e-learning?; since the term has many different meanings and connotations for diverse constituencies
• the (potential) role of e-learning as a change agent
• the current status of e-learning.

Much has been written about e-learning in the literature and the media, contributing to a sense of confusion about the innovation and to the “hype” which, like earlier educational innovations, promised to revolutionise learning (Birchard, 2001; Spender, 2001, 2002, 2003; Watts, 1996).

The term e-learning has been adopted by a number of different learning constituencies: work-based training, higher education, vocational education and schools, and government. Each group brings its particular emphasis, priorities and set of expectations and understandings. In this light, further consideration is required about the nature of the e-learning innovation, its characteristics or attributes, and whether these attributes are unique or distinctive compared to other (earlier) forms of technology-mediated learning.

The position adopted in this study is that, irrespective of the educational arena (e.g. industry, higher education, vocational), e-learning comprises three essential dimensions, technology, access and quality, although these may assume different weightings in different contexts. The definition of e-learning used in this dissertation, therefore, draws these three constituent components into a straightforward but inclusive statement of e-learning as: “the use of new multimedia technologies and the
Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaborations” (European Commission, 2001, online).

2.1 Key dimensions of e-learning

2.1.1 Technology

2.1.1.1 The early developments

As was the case with many previous educational innovations (resource-based learning, distance education, educational television and “open learning”) much of the focus of early e-learning initiatives was on the technologies (Holt & Thompson, 1995; Lundin, 1993; National Board of Employment, Education and Training, 1992; Taylor et al., 1996), that is, the “e” aspect of e-learning, the digital software and hardware technologies that underpin current information, communication and network environments. Typically e-learning has exploited newer electronic and digital technologies (Internet, web, enterprise level learning and content management systems), hardware and software applications, although more conventional or stand-alone media (CDs, DVDs, and conferencing technologies) are not precluded.

In the Australian context an emphasis on the Internet and networked technologies led to the adoption of terms such as “online education”, “online teaching” and “online learning” (Bell, Bush, Nicholson, O’Brien, & Tran 2002; Johnston, 2001; Spender, 2002), terms which in some ways came to be used interchangeably, but in themselves were non-specific or lacked clarity of meaning. Other terms such as “networked learning” (Harasim, Hiltz, Teles, & Turoff, 1995; Haughey & Anderson, 1998; Roberts, 2003), which gained acceptance in the late 1990s, also advocated the power of the web and communication networks, although here the emphasis was more on creating connections, networking and collaboration between learners, tutors and resources than on the more eclectic range of activities promoted by e-learning protagonists.

The vocabulary of e-learning is thus often problematic and re-emerges as an issue with respect to its adoption and integration within organisations (Johnston, 2001). Laurillard provides another example of the importance of language with respect to e-learning, in the use of the term “instructional design”, rather than “learning design” or “educational design”. The latter, she argues, has its genesis in a “more governed
approach to learning” which disregards the true potential of designs enabled by new technologies to facilitate learning (Laurillard interview in Neal, 2003, online).

The current generation of e-learning has been largely based on traditional conceptions of teaching and learning (Ayres & Grisham, 2003; Laurillard, 1993, 2002b). The dominant traditional pedagogy, a content-centred approach, relies on the delivery of information to students (Laurillard, 2002b; Roberts, 2003). Accordingly, “transmission” or “broadcast” modes and technologies were employed (e.g. download technologies such as video- or audio-on-demand) – those which facilitated one-way dissemination or broadcast of information via the Internet or intranets, or, alternatively stand-alone electronic technologies such as videocassette and CD-ROM (Laurillard, 2002b; Lundin, 1993; Rossiter, 1997).

Initially, Internet technologies (commonly employing email and stand-alone web sites) were primarily text-, static image- or graphics-based, permitting minimal interaction or two-way communication between learners. The potential of the web as an interactive communication space, rather than an information delivery mechanism, however, was recognised, even promoted, and attempts were made to differentiate “web-based e-learning” (Sun Microsystems, 2003, p. 3) from other technology-mediated “e”-learning (e.g. via broadcast, satellite, videocassette, CD-ROM). In reality, however, this first phase of Internet-based education largely emulated or transposed the same constructs or elements of the traditional teaching environment into the new digitally connected environment:

The academic community has not redefined what counts as “higher learning” and therefore cannot redraft the specification for how the new technology should do anything other than what learning technology has always done, transmit the academic’s knowledge to the student. The academic world has called each new technological device – word processing, interactive video, hypertext, multimedia, the Web – into the service of the transmission model of learning. The potential of the technology to serve a different kind of learning cannot be exploited by an academic community that clings only to what it knows (Laurillard, 2002b, p. 20).

Another form of content-based pedagogy, resource-based learning (Mason, 1998; National Conference on Open and Distance Education, 1996; Ryan, Scott, Freeman & Patel, 2000), has also been subsumed into the broad domain of e-learning. Computer-based technologies (Cochrane, Ellis & Johnstone, 1993) provided an ideal platform for
the resource-based model, facilitating “an environment in which students interact and wrestle with learning materials directly (or in teams), under the tutorial guidance of a mentor” (Twigg, 2001, p. 9). Innovative and creative learning resources and interactive multimedia, developed over the past two or more decades, enabled learners individually, or occasionally in small groups, to work through carefully structured learning modules. Such resources were usually made available in the computer laboratories of educational institutions, employing technologies such as interactive video discs or CD-ROM. Typically, however, learning was still construed as an individual activity and, despite continued optimism, the development of collaborative learning environments using the Internet or other digital communication technologies was limited by issues such as bandwidth, capacity, reach and cost of broadband networks (Broadband Services Expert Group, 1994; Hiltz, 1994).

2.1.1.2 Later developments

The migration to web-based technologies within institutional environments had two immediate impacts. First, much of the richness of the best of the interactive multimedia resources was scaled back, due to the technical limitations of networks and servers mentioned previously. Secondly, however, the capacity of the web to reach more students at more locations led to a proliferation of single stand-alone websites serving individual courses. Issues emerged about the efficacy of these stand-alone websites from both the institutional and the learner perspective (Crisp, 2002). For example, from the institutional perspective, development and maintenance of individual websites was becoming highly resource intensive and, from the learner’s perspective, numerous course websites demanded that students became familiar with a different user interface and navigation for each of their online subjects (King, 2001).

These issues of scalability and a standard user interface were ameliorated to some degree through the development in the mid- to late 1990s of learning or course management systems, such as TopClass, WebCT and Blackboard. Such enterprise-wide systems, LMS (learning management systems) or CMS (course management systems), addressed issues of standardisation and scalability, but they were still basically premised on traditional university conceptions of coursework and of teacher and student roles. Usually associated with formal or structured courses, they were initially designed around more traditional conceptions of coursework learning, with discrete structured spaces for subject aims and objectives, content, student interactions or forums, questions and so on. The language of the user interface,
access and management privileges were also premised around traditional, generally US-based, conceptions of the roles and activities of students and teachers, with the teacher in a position of control. This raised some sensitivities and barriers with respect to adoption of new technologies among some staff (and students) within the Australian higher education sector, who felt that these tools were more geared to training and corporate needs.

More recent system developments to manage educational content are designed to capture, organise, store and publish digital resources or content, typically as discrete units or chunks of content with associated metadata for search and retrieval. A key rationale for content management systems, digital repositories and resource generators has been to bring about greater efficiency through the re-usability of digital learning resources, a concept built on the pedagogy of the resource-based learning model (McNaught, Phillips, Rossiter & Winn, 2000; Ryan et al., 2000).

2.1.1.3 Current issues and trends
The advent of enterprise systems (such as learning management, content management and student administration systems) introduced new challenges of system compatibility, standards and systems integration. A significant trend in the past few years, therefore, has been integration, driven by the desire for speed and agility (Hayward, 2003) and the need for “seamless” operations. The integration of course or learning management and content management systems to a learning content management system (LCMS), with common or similar sets of functionality and applications, has been accompanied by yet another overlay of ambiguities about the scope or boundary of e-learning technologies. This integrated e-learning environment, for example, is widening to include library and student administration systems (CAVAL Ltd, 2000; Detweiler, 2004) (see Figure 2.1).
Figure 2.1 illustrates both the complexity of today’s e-learning environments and various integrations, linkages or convergences within the system. Technical systems integrations, for example between development and access or delivery systems, rely on external standards and procedures. From a user or learner perspective, however, integration enables access to and engagement with learning resources, interactions and environments, through a university portal and other networks, with the potential to offer a personalised view of all the learning resources, courseware, support and administrative elements associated with a particular student’s learning program. The individual nature of the portal is evident in the branding of the student portal with labels such as “My Uni”, “my.UQ” and “my.monash portal”.

Another significant trend associated with the innovation of e-learning is the relentless advance of technological complexity. Developments include:

- technologies which increase the level of synchronous and two-way interaction and communication at a distance, over internal networks and the Internet
(conferencing, research and real-time communication spaces such as video, voice-over-IP and access grids), one-to-one and one-to-many

- media-rich technologies including video, audio, simulation and 3D immersive environments – environments which enhance telepresence (the human communication dimension associated with a sense of “being there”) or environments which extend the imagination and capacity to experience new creative spaces
- technologies which enhance access, mobility and flexible learning options – that is, wireless, mobile and satellite technologies, connecting with the Internet through TCP/IP (Transmission Control Protocol and Internet Protocol) and Bluetooth (L-change, 2004; B. Alexander, 2004).

Part of the latter trend is the proliferation of handheld devices, mobile phones and other wireless technologies, providing students with immediacy (though not necessarily quality) of access to e-learning resources, information and activities (Peters, 2005). Each of these technologies is expanding in functionality and the number of user applications supported, resulting in a convergence of applications available through the one device. PDAs (personal digital assistants), for example, have moved beyond the basic diary, schedule and personal address book functions to incorporate scanning, data capture, searching, interrogation, sorting and retrieval capabilities, approaching the functionality of personal computers of the mid-1990s.

Similarly, there has been explosive development in the arena of mobile phone technology, including third generation (3G) phones which can transmit data at speeds of up to two megabytes per second. This has heralded the advent of mobile phone applications such as SMS (short message services), email, Internet search, digital video capture and transmission, and two-way transmission of rich media files (such as music and video).

The use of electronic communication and information technologies for teaching is a core element of the e-learning concept, but inappropriate emphasis on technology alone limits the scope of e-learning activities for learners, academic staff and society at large.
2.1.2 Access

2.1.2.1 Traditional conceptions of distance and place

An important dimension of the potential of e-learning is access to education via accredited courses, workplace training and information resources (Department of Education, Training and Youth Affairs, 2001; European Commission, 2001; Helios, 2005). Access has been construed as a primary driver of e-learning, in a similar way as it underpinned the rationale for distance education. A commonly held view about e-learning is that it is an extension of distance or distributed learning, but offering a more contemporary, technological solution to the physical limitations of separation of learner from teacher. The distributed nature of e-learning activities in space and time has been made possible by advances in communication and information technologies, the increasing reach of telecommunications and broadband networks, and improved ICT access by students (Department of Communications, Information Technology and the Arts, 2001; Department of Education, Science and Training, 2002c; McCann et al., 1998; Oliver & Towers, 2000). There remains, of course, a valid argument that the limitations of the technologies, for example in bandwidth and quality of service (QoS) protocols, still place considerable constraints on the reach and the quality of distributed teaching and learning activities. These constraints, however, are gradually being addressed globally (as evidenced in the capacities of Internet 2, Canarie) and in the Australian context (Australian Government, 2001, 2004a, 2004b).

2.1.2.1.1 Wider notions of accessibility

The notion of wider access (e.g. by on-campus students to distance education materials “re-purposed” for online delivery) gained greater acceptance, however, as university administrators reasoned that more benefits, such as solutions to lack of facilities and to large classes, could be achieved by using these same e-learning resources for all students (National Board of Employment, Education and Training, 1992).

Gradually designing accessible learning environments became more concerned with eliminating learning constraints or barriers (Twigg, 2001), such as standard academic course structures, fixed semester timetables, ICT literacy, or belief in a uniform learning style. From a social equity and learner perspective, open access to education and training programs through technology-mediated forms of learning had the capacity to address a range of issues related to distance, time dependence and other learner lifestyle considerations. From the perspective of the education provider and employer,
increased accessibility promised industrial efficiencies with respect to (a) production methods for learning resources (Cunningham et al., 2000); (b) cost effectiveness, with increased numbers of enrolments; a one “star” professor could attract a global cohort of students (Cunningham et al., 1998; Feenberg, 1999); and (c) reduced need for employees to be absent from the workplace to upgrade skills and qualifications.

More recent conceptions of e-learning have not only expanded to include lifestyle preferences, but have also addressed the relatively rigid view of what is meant by time and place accessibility (Curran, 2004). Rather than choosing between on- or off-campus, online or face-to-face (FTF), synchronous or asynchronous communication, there is a trend towards “blended learning” (Collis, 2004; Curran, 2004; L-change, 2004; Mahadevan, Braun & Kadi, 2002; Thorne, 2003) which allows students to combine location-independent, electronically-mediated approaches with place-specific, contiguous teaching and learning approaches. Blended learning has evolved from the concept of “mixed mode” delivery (Taylor, Kemp & Burgess, 1993) to include, in some conceptions, an outcomes-based focus. “Blended learning can be described as a learning program where more than one delivery mode is being used with the objective of optimizing the learning outcome and cost of program delivery” (Singh & Reed, 2001, p. 1). Although still in its infancy as a mode, this conception of delivery provides a glimpse of how two of the key e-learning dimensions posited in this dissertation, technology and accessibility, might combine more effectively to realise the potential of e-learning as a genuine innovation.

One criterion for achieving this potential is that learners have flexible and open access to learning opportunities, not merely for the duration of a course, but over a lifetime. Such a notion of accessibility, referred to as “lifelong and life-wide learning” (Holmes, 2002, online), exploits the mobility and flexibility offered by newly emerging technologies with respect to where, when and how learning takes place. For example, not only can learners participate in learning events over a lifetime (from cradle to grave), but they can engage concurrently in a diverse range of learning experiences (formal/informal; structured/unstructured; planned/serendipitous; accredited/non-accredited). This is discussed further as a feature of e-learning as a change agent in education.

The possibilities that e-learning provides for participation in ongoing lifelong learning activities introduce another dimension of accessibility into the higher education environment. As new cohorts of formerly “non-traditional” tertiary students are
participating in higher education, there is greater pressure to deal with the increased numbers, the diversity of needs and the quality of the educational experience (Coaldrake & Stedman, 1999). These new cohorts include first generation students (those who are the first representative from their extended family to attend a university); mature age students, returning again to formal education or studying part-time while also in the workplace; gifted, young students (completing secondary school as well as undertaking undergraduate subjects); international and transnational students. Each cohort brings a different set of skills, attributes, understandings and support needs, contributing to an ever increasing eclectic student population (Hicks, Reid & George, 1999, online).

Hence accessibility has a number of dimensions, each of which is given a different weighting of importance by different stakeholders of the higher education system – individual learners, lecturers, university administrators, employers, and government policy makers.

2.1.3 Quality

2.1.3.1 Conceptions of quality

The third and critical dimension of e-learning innovation is quality, where again there is ongoing debate about what constitutes quality. Although there is general agreement on the strategic importance of quality in education (Department of Education, Training and Youth Affairs, 1999b, 2000; Dondi et al., 2004), “and on the fact that quality in e-Learning needs considerable attention and constantly high resources” (L-change, 2004, p. 122), consensus on a definition of quality in education is as problematic as consensus on a definition of e-learning. Notions of quality, however, cluster around certain themes or value systems.

2.1.3.1.1 Quality as an indicator of pre-eminence

A familiar theme is to conceive of quality as an assessment of excellence or superiority. Within universities for example, quality teaching and learning are promoted as the pinnacle or the “very best”, often relying less on a set of critical articulated judgements or measurements about the teaching inputs into programs and more on the outputs, the learning outcomes and graduate attributes of the system (Farrell, 1997, online). This position is supported by university administrators and managers (Crisp, 2002; Robson, A., 2002).
The inputs of the education system, especially in a traditional university, focus on the teaching staff, where there is a vested interest in equating quality with the professionalism that accompanies both the academic and the specific discipline cultures ascribed to by university staff. There is, in this conception, a strong subscription to the notion of quality teaching as discipline expertise.

2.1.3.1.2 Quality as an alignment of organisational values
A variation or extension of the excellence theme is a concept of quality as alignment with organisational context and purpose. This view acknowledges that various perceptions of quality are contingent on, or relative to, the goals or values of a particular organisation. The organisational or contextual fit is paramount, and therefore the level of quality can be gauged only through specific institutionally constructed measures that assess the extent to which the organisational mission or purpose has been met. Thus e-learning goals and measures of success vary according to context, for example from developed to developing nations:

For developed nations, online learning was claimed to provide the answer to dealing with the growth of post secondary education, in terms of better pedagogy and the prospect of reduced costs. … For developing nations, online learning was to provide learning to improve basic literacy, numeracy and skills acquisition, lessening the need for expensive bricks and mortar infrastructure (Bell et al., 2002, p. 1).

Proponents of the conception of quality within universities which centres on organisational alignment, for example, often identify elements of the teaching and learning environment that focus on quality and e-learning from a perspective of improving or enhancing the institution’s current educational practice and philosophy. The various stakeholders of e-learning, however, who subscribe to the overall “quality” banner as the raison d’être of e-learning, propose different quality agendas and schemas. Many teachers, for example, emphasise pedagogy and the quality of teaching and professional development as the crux of e-learning standards, whereas administrators and policy makers hone in on processes and efficiencies as a measure of quality, within the contemporary climate of dwindling resources and massification of the higher education system (Taylor et al., 1996).
2.1.3.1.3 Quality as elimination of error

A third conceptual cluster of ideas about quality centres on agreed processes, standards, measurements and controls. This view attempts to address the quality “subjectivity dilemma” head on, and accentuates elimination or minimisation of faults – that is, the fewer the errors the better the quality. This approach has underpinned many of the higher education distance education production methods (Bates, 1995, 1997; National Board of Employment, Education and Training, 1992) and has found similar advocates in e-learning. The standards and tools adopted include ISO (International Standards Organisation), continuous improvement methods, quality controls and guides, and quality assurance frameworks.

Benchmarking activities, for example, as a forerunner of the need for greater effectiveness and quality standards, have been undertaken to influence or recommend to government and institutions the scope and extent of e-learning activity (Oliver & Towers, 2000). In recent years there has been considerable emphasis at national, state and institutional levels on issues related to quality and innovation in higher education. A survey of online education (defined as coursework and coursework related services) within Australian higher education institutions was undertaken in 2001 to identify trends and inform government policy making (Bell et al., 2002). Significantly, this investigation attempted to correct the misconceptions that can derive from generalised, non-critical references to “online courses”, examining the extent and nature of the online activity attributed to a particular course. Three levels of online engagement were determined: “web supplemented”: designating optional online access by students to information that supplements traditional delivery modes; “web dependent”: where online participation is compulsory although a degree of face-to-face interaction is maintained; and “fully online”: indicating no face-to-face components (Bell et al., 2002, pp. 13-14). This well-intentioned, though arguably crude initial classification, was useful in that it made the point that online learning has as much diversity and variability in design and implementation as face-to-face teaching modes.

Governments, national and state, have taken a proactive stance with respect to quality within higher education, driven by an assumed responsibility of protecting consumer rights for domestic students and maintaining reputations and standards for expanding international and transnational markets (Allen, 2000; Hacket, 2000). In 1994, for example, the Australian Government conducted an audit of teaching in universities, as part of a three year process of reviewing quality across teaching, research and community service activities (Quality Assurance Program in Higher Education, 1995).
This was intended to provide incentives to those who were performing well. At the same time, the audit initiated a process of collecting data that could be used to define standards and benchmarks for purposes of assessment, comparison or regulation in the future. A systemic quality assurance process was again instigated by the Commonwealth with the introduction of the AUQA audits in 2000 (http://www.auqa.edu.au/).

Convictions as to the importance of quality frameworks, standards and benchmarks have underpinned much of the debate about the maturing of online learning within a context where the globalisation of education markets requires assurances about quality programs (McKinnon, Walker & Davis, 2000; Skilbeck & Connell, 2000). Although there is a recognition that such tools are useful in a wider repertoire of strategies and approaches to enhance learning, there is also a lingering concern that standards and benchmarks can be promoted as the primary or even the sole determinant of quality.

2.1.3.2 Quality factors

Another approach to understanding what is meant by quality in e-learning is to consider the individual factors or components within the education system that might be identified as indications of quality. Relevant quality factors or indicators span many issues, but the better articulated ones include matters of technology, pedagogy and learning design (including curriculum and content structure), student support and course assessment. A brief outline of some of these factors follows.

2.1.3.2.1 Technology

The inherent capabilities offered by communication and information technologies continues to prompt protagonists, such as the President of MIT, to comment on the potential of technology as an instigator of quality: “We now have a powerful opportunity to use the Internet to enhance (the) process of conceiving, shaping and organizing knowledge for use in teaching. In doing so we can raise the quality of education everything” (Vest, in Johnstone, 2002, p. 20).

Equally, however, there are strong challenges to what is interpreted as technological determinism, or “technological inevitability” (Taylor et al., 1996, p. 11) driving educational change and being adopted as the key measure of educational quality.
2.1.3.2.2 Pedagogy

Pedagogy and learning design is commonly advocated as an alternative to the technology indicator of quality (Hedberg, 2002; McLoughlin & Luca, 2001). Hedberg posits that: “Like past revolutions in education, e-learning will go the way of previous technologies unless there are changes to the design framework as the starting point” (Hedberg, 2002, p. 262). The crux of the issue, therefore, for those who subscribe to this opinion, is not “What is the best e-learning technology?”, but “Why e-learning?” or “What are the pedagogical and learning theories which underpin the e-learning design choices?” Constructivist principles, including active learning, engagement, social construction of knowledge and critical thinking, form the basis of a number of preferred learning approaches, which include situated, authentic, collaborative and problem-based learning for technologically-mediated educational contexts (Herrington, Oliver & Reeves, 2002; Keppell, Kan, Brearily Messer, & Bione, 2002; Laurillard, 1993, 2002a).

In a practical sense, preferred pedagogical approaches and learning designs (or “best practice” models) form the basis of development templates to create consistently structured content and learning experiences (Agostinho, Oliver, Harper, Hedberg & Wills, 2002; Richardson, 2002). The key elements of learning design, tasks, resources and learning supports in many ways become the instruments to gauge the quality of the learning (Oliver, 2004), whereas before the advent of technologically-mediated education, quality was often constructed around the abilities and skills of the teachers in the course program as it was personally designed and delivered.

2.1.3.2.3 Content

Other determinants of quality have focused on e-learning content: its accuracy, design, relevance, currency and creativity. The notion of creative content (Jasinki, 2004; Looms, 2002; Marshall, 2004; Salmon, 2004), “the Wow factor” (Law, 2004, online), as an indicator of quality has been problematic, partly because creativity and enjoyment are difficult to measure as qualitative judgements, but also because some of the creative content elements (e.g. games) have been considered as merely ephemera or entertainment rather than sound education.

An appreciation of cultural and other contextual elements is also considered to be a significant dimension of the “quality” of the content. McLoughlin and Oliver (1999), for example, identify the potential tension in educational design models which attempt to provide access for larger multicultural groups of learners, and the importance of being able to contextualise learning at the “local” level to accommodate culturally relevant
and sensitive dimensions. McCarty (2005) raises issues with respect to cultural influences which underpin students’ assumptions about teaching and preferred learning styles in e-learning environments.

2.1.3.2.4 Student Support
Student support is an aspect of e-learning quality that increasingly is being used to differentiate universities. Support services include administrative services, flexible and convenient online access to information about enrolments, credit transfer, course information, fees and student managed assessment. As Hanna comments: “these direct and immediate personalized contacts with students are becoming more central to organizational and educational quality, as perceived by the student” (Hanna, 2003, p. 27).

Another critical element of student support, particularly in online and technologically-mediated contexts, is learning support. The Pew symposium delegates, as reported by Twigg, argued that quality was premised on greater individualisation of learning experiences for students (Twigg, 2001), but it should be noted that such a trend is premised upon greater independence, learning competencies and confidence on the part of the student. The ability of institutions to provide appropriate adequate information and technological and academic literacy support for students (Oliver & Towers, 2000; Rossiter & Watters, 2000), however, is only one dimension of the broad range of learning skills required by students in the new environments.

2.1.2.3.5 Summary
To summarise, the issue of quality can become quite adversarial: individual factors such as those mentioned above are polarised and championed as the dominant or most important indicators of quality. The intensity and increasingly apparent emergence of seemingly opposing factors or elements highlights a risk of pursuing a factorial approach as an appraisal of quality. A case in point of a dichotomous “quality” discourse concerns content versus learning support for students as the key measure of the e-learning experience (King, 2001). Hanna suggests that “this transition is a major challenge for many higher education institutions, where the focus has historically been on the product or the core program design” (Hanna, 2003, p. 27). A more familiar example is that of pedagogy versus technology as a driver of educational quality. Such dichotomies, however, are simplistic and, it can be argued, work against achieving quality outcomes:
Technology decisions are teaching and learning decisions... The consideration of technology in isolation from other campus variables leads to unrealistic expectations and simplistic answers to extremely complex challenges involving multiple interrelationships among issues, governance conventions, and key players... Concerns about the real or the imagined power of the technology to distort priorities and alter relationships within the academy will be ameliorated only when academicians and technicians are able to communicate their mutual objectives (Barone, 2003, p. 43).

Integrated and complementary approaches drawing on multiple dimensions (rather than a single pre-eminent factor) are preferable in order to realise institutional objectives with respect to quality e-learning. Best practice quality exemplars, for example, demonstrate an interplay at work between technology and pedagogy dimensions; each exploiting the strengths and creativities of the other. The process is analogous to a dance – technology, for instance, might make the first bold step in the innovative process, to be quickly recognised and taken up by the pedagogy partner. A harmonious encounter ensues, where each element is “in sync” with the other, only to be followed by another bold move, this time potentially initiated by the pedagogical camp, which challenges the technologists to respond positively to the new opportunity. The dance is a strong, positive analogy which highlights the importance of developing synergies and complementarities between university system elements, such as technology, teaching and learning. As Laurillard notes:

Teaching does not invent its tools; it uses those invented by others. The academy had language but it didn’t invent writing – traders did that. It had writing but it didn’t invent books – administrators did that. It didn’t invent computers – engineers did that... All those technologies have been adopted by the teaching profession... All technologies create communities that invent a range of formats within which practitioners can craft a variety of contents: different types of books, television programs, PC applications. We need the same formats for learning technologies. But these devices grow organically... They begin life in the excitement of creativity and the intention of doing something different. That is how new teaching designs should begin (Laurillard, 2002b, p. 24).

Conceptions of educational quality have proven to be inherently subjective and potentially problematic within a climate where the vast majority of higher education institutions claim that infusing quality into educational practice is a vital part of the
institutional mission. Notwithstanding this ongoing discourse, the need to address quality issues in a practical way, with the common intent of advancing tertiary education, is essential if innovations such as e-learning are to move beyond the faddish and transitory.

A defining position as to quality and e-learning, in the context of this dissertation, therefore comes down to two points. The first is that quality is essential to the development of e-learning as a new educational paradigm; and secondly, quality is such a broad and subjective concept (from whose perspective will it be assessed or judged?) that educational strategists, architects and visionaries must be cognisant of and responsive to the diversity of needs and expectations of the various stakeholders while they develop and implement the new strategies, processes, content, infrastructure and services that will define the next generation of e-learning. Equally, researchers must demonstrate that learning outcomes are at least not inferior to those under existing learning and teaching approaches.

2.2 The role of e-learning as a change agent

The above exposition of e-learning leads to consideration of a pivotal role of the innovation, that of a change agent (Ellsworth, 2000), which e-learning is beginning to carve out within education systems. Key characteristics or capabilities inherent in e-learning (e.g. scalability, connectivity, flexibility, creativity and reusability), when applied either alone or in various combinations, can prompt, enable or hasten fundamental change or trends in teaching and learning. These changes, occurring not just within traditional education sectors but across new borders and industry boundaries, include convergence, internationalisation or globalisation, learner-centredness and lifelong learning. The trends associated with educational innovation are not necessarily new to the university sector, but there is a wider understanding of how new patterns are evolving in the 21st century, informed by some of the principles and concepts that underpin e-learning.

2.2.1 Convergence

Convergence, particularly technological convergence, was a popular theme in the 1990s, (Cunningham et al., 1998; Hicks, Reid, & George, 1999). The breakdown of barriers between traditional student cohorts, such as on-campus and off-campus,
international or transnational, has to a large degree been made possible through the capacities of technologies, new learning designs and enhanced student support services, many of which have co-evolved with e-learning approaches (King, 2001; I. Reid, 1997; J. Reid, 1999a). The blurring of formerly distinct learning boundaries is beginning to occur between workplace learning and higher education, between formal and informal learning (Gallagher, 2000; Young, 2002), and between media networks, publishers and education providers.

Convergence of the educational and training sectors, for example, has implications for the nature of the learning activities undertaken by individuals at any one time, and influences learners’ expectations about the processes and systems that educational providers should develop to ensure seamless engagement across provider boundaries (as depicted in Figure 2.3). Convergence of educational and training opportunities facilitated by e-learning technologies and methods has led to notions of borderless education (Cunningham et al., 1998, 2000).

### 2.2.2 Globalisation and internationalisation of learning

While e-learning technologies, IT networks, broadband and telecommunications have facilitated the development of global learning, the more significant influences are, in fact, the accompanying socio-economic and cultural dimensions of higher education. Much has been written, for example, about the potential of globalisation of education to improve the economic viability of programs by tapping into new markets, for example in Asia or the Middle East (Perkinson, 2004; Tierney & McInnis, 2001; Watts, 1996). Equivalent attention has been given to the potential threats of globalisation to the Australian higher education sector as foreign providers enter the local market, assisted by new technology and government policy (Allport, 2002; Cunningham et al., 2000; Gallagher, 2000).

However, e-learning methods have the potential to add to the richness of the learning experience, as students from around the world are brought together in a virtual environment which facilitates exchange and discourse based on diverse cultural, political and social perspectives. Perhaps this “internationalisation” dimension offers the greatest potential with respect to the quality of the learning experience, but relatively little study has been done of the capacity of e-learning to address issues related to cultural context and the particular needs of diverse international students cohorts (Marginson 1997; McLoughlin & Oliver, 1999).
2.2.3 Lifelong learning and learner-centredness

One of the clearest directions to emerge from e-learning innovation is a shifting focus to the student and away from the teacher or educational provider. This is best encapsulated in two complementary learning approaches – lifelong learning and learner-centred learning – which share a common focus on the learner.

Lifelong learning (Candy, Crebert & O’Leary, 1994; Department of Employment, Education, Training and Youth Affairs, 1998; Knapper & Cropley, 2000) has undergone cycles of recognition of varying intensity, building on the rationale originally articulated by UNESCO of a vision of continuous education throughout an individual’s lifespan, where the whole of society is seen as the learning resource (Cropley, 1979; UNESCO, 1972). The advent of information and communication technologies (acting as enabling mechanisms) renewed interest in lifelong learning (Aceto, Dondi & Kugemann, 2004; Hanna, 2003; Norris, Mason, Robson, Lefrere, & Collier, 2003b; Tinkler, Lepani & Mitchell, 1996). This heightened interest generated new research agendas and again has spawned new terminology such as “perpetual learning”, a contiguous and integrated set of learning engagements that fuse work-based, formal and recreational learning, and are distinguished from the sequential nature of episodic lifelong learning (Norris, 1996, p. 18). Norris’s conceptions of lifelong learning (1996) intersect with the e-learning concept in two fundamental respects: each subscribes to principles of learner access to the full gamut of societal knowledge as an integrated learning environment, and each places the learner as the focus of the learning system.

The terms “learner-centred” or “student-centred” learning are used by higher education institutions to encapsulate the importance of the role of the learner, “the intention to increase learner access to learning opportunities and control over the learning process” (University of South Australia website, online). Griffith University articulates two dimensions of student-centred education as “a concern for the personal and intellectual well being of the student”; and “the optimisation of student learning” (Griffith University website, online). The notion of “optimal learning” is interpreted at Griffith as an inclusive process involving all members of the University community; it has a focus on learning outcomes, and incorporates key themes from educational theory and practice including “achievement of quality ‘deep learning’”; recognition of discipline or profession-specific principles; and active support for students (Griffith University website, online). As such, Griffith’s view of student-centred learning maintains a
consistency with the tenets of e-learning which emphasise quality and diversity (at Griffith through acceptance of various discipline-specific approaches) and student support.

The concept of student- or learner-centredness represented in Figures 2.2 and 2.3 (adapted from Oblinger & Maruyama, 1996, p. 6. and Rossiter, 1997) illustrates the transition from a system which organises from the perspective of the institution as the focus to a system where the learner becomes the centre of the learning process.

Figure 2.2. Institution-centred model

![Institution-centred model](image1)

Figure 2.3. Learner-centred model

![Learner-centred model](image2)

There is a relevant semantic difference in these representations in the change of terminology from “student”, with its connotation of dependency or reliance on an institution (or discipline, profession or teacher), to “learner”, which implies additional commitment on the part of an individual to the acquisition of knowledge, skills and
understandings. Contemporary educational design and learning systems (Laurillard, 2002a) are becoming more learner-focused, by offering learners greater choice and flexibility. Overall, however, it can be argued that the systems within our universities still largely skew towards institutional needs (fixed semester enrolments, timetabling and assessment processes) rather than accommodating the increasingly broad spectrum of learners' needs, including those of more mature learners (Grover, 2005).

One final point of clarification is made with respect to learner-centred versus institution-centred approaches. The enhanced role of the learner in these models should not imply a limited role for the teacher:

Effective education must be both learner-centred and teacher-centred – and so must educational uses of information technology be both learner- and teacher-centred. To advocate trying to meet the individual needs and capabilities of students while treating faculty as interchangeable makes no sense (Gilbert, 1996, p. 252).

Research is yet required into educational paradigms (Reeves, 2002; Reigeluth, 1996) which will reflect the duality of these two roles and new pedagogical and learning attributes (empowerment, metacognitive skills, critical thinking, collaboration). The issue of an emerging academic role is explored in the next section on the status of e-learning.

2.2.4 Summary

To summarise the role of e-learning as a change agent, it is clear that it may be seen as an enabler or change agent with respect to a number of new educational trends (learner-centredness, borderless and lifelong learning). The capacity for learners to access and benefit from a variety of learning experiences and opportunities (both formal and informal), from different sources, institutions and across a variable time span, can be realised through new technologies which allow improved searching, retrieval, storage and sharing of information and knowledge (Johnstone, 2002; Norris, Mason & Lefrere, 2003a). This is a future which challenges the traditional conceptions of education as formal or structured, construing it as a broader concept that includes the exchange of information and resources. This education places greater onus on students and teachers, but potentially offers greater rewards throughout a lifetime.
One can imagine a future in which digital technology will allow students to learn all the time, taking several majors at once, interacting with others, with knowledge resources and instruments around the world in a seamless and time- and distance-independent way (Duderstadt, Atkins & Houweling, 2003, p. 52).

Contemporary interests in e-learning are maturing around several fields of theoretical and practical endeavour, and reflecting an array of perspectives which emphasise pedagogy, learning effectiveness, innovation, efficiency and technology. The effective interweaving of technology, pedagogy, learning theory and design, for example, has demonstrated the potential of learning tools (e-portfolios, mobile technologies, gaming and interactive technologies) to facilitate personal, customised, and engaging activity and problem-based learning encounters, in ways which give meaningful expression to learner-centredness and provide the motivation to participate in lifelong learning.

While there are generous smatterings of good practice e-learning (Sunoikisis, http://www.sunoiisis.org) that illustrate one or more of these trends, the reality of embedded models of e-learning, engaging the majority and enhancing both the quality and depth of learning experience, is yet to be realised in subsequent generations of e-learning. It is important, therefore, to consider the current and future status of the e-learning innovation.

2.3 The status of the e-learning innovation

The adoption of e-learning is now both wide, across educational sectors, and deep, with numerous examples of sophisticated and entrenched programs (The Real Initiative, Glasgow Scotland, www.intoreal.com (Young, 2002); University of Southern Queensland programs, USQOnline, http://www.usqonline.com.au/). Underpinning much of the e-learning discourse and literature is an assumption about the extent of uptake of the innovation (Commission of the European Communities, 2002), suggesting that e-learning has been embedded within educational institutions, corporate learning and training programs (Barone 2003; Holmes, 2002; Symonds in Boston, 2001; Ubell, 2000). Barone, for example, claims that “technology has permeated the academy to such an extent that institutional behaviour occurs within a sociotechnological context, fundamentally altering the dynamics of a campus” (Barone, 2003, pp. 45-46).
E-learning has indeed accommodated new and different perspectives, but it is yet to achieve the level of integration, acceptance or cohesive application required to fulfil its potential. Furthermore, although key technologies and applications (Internet, web and email) have been widely adopted, there remain others with enormous potential which have not. Hence the overall benefits and impacts of e-learning to date could be described as patchy. McGhan, for example, in plotting e-technologies on the Gartner “hype” product life cycle, places content repositories and content aggregation at the “peak of inflated expectations”, with a maturity time span of 2 to 5 years, and streaming technologies in the “trough of disillusionment” with a 5 to 10 year maturity prediction (McGhan, 2004, online).

New industries are nevertheless emerging which are in many ways leveraging off the e-learning concept: such as e-publishing (“Featured product: Kluwer Online:ePublishing comes of age”, 2002; Johnson, 2002; Roberts, 1999), digital rights management (Ianella, 2002) and e-knowledge (Norris et al., 2003a).

A critical facet of the e-learning innovation that is central to this study is the number of dimensions it incorporates: business and organisational models, systems and infrastructures, pedagogical-technological frameworks, conceptions of learning, roles for academic, professional support and creative staff and, most importantly, for learners. One of the influential developments of more recent times is the trend towards e-learning as a business enterprise.

2.3.1 The e-learning business enterprise

The trend towards conceiving of the education institution and e-learning in particular as a business enterprise (Baron, 2002; Twigg, 2003) is driven to some extent by ever increasing accountability and customer focus, accelerating the current debate about the values and conceptions of higher education. Under this model, the student has become the client or customer, education has become a commodity, and the new business models focus on providing value to customer in a way that ultimately returns value to the organisation and its constituents – governments, industry and educational partners (Hilsberg, 2004). The economic model of e-learning, however, will need to be more sophisticated than existing approaches (e.g. activity-based costing (National Board of Employment, Education and Training, 1997)), incorporating a long-term view that extends beyond a focus on inputs and cost reduction to an emphasis on ways of adding value and building relationships: “IT, e-learning and knowledge management
can provide a strategic differentiation only if they drive genuine innovation and business practice changes that yield greater value for learners” (Norris et al, 2003b, p. 16).

Many Australian universities have already introduced elements of the business model of e-learning, with the re-engineering of organisational and teaching and learning support structures, such as at University of Newcastle (O’Brien, Little & Linklater, 1996), and the implementation of processes and concepts, such as the products and services model introduced as a major service division realignment at Griffith University in 2002.

Business models for e-learning in higher education will need to take a long term strategic perspective, one that also aligns better with the emerging role of universities, rather than their earlier position in which e-learning was envisioned as a means of extending market share:

To offer a sequence of courses in Pakistan or to try to get students from Sri Lanka to study in Australia, for no other reason than because a market exists that will generate income, is to reduce academic life to a business; in the long-term such a strategy will call into question the raison d’etre of the university. If students are simply consumers and the curricula is [sic] simply another product, then one might ask whether a business might offer such services and products more efficiently (Tierney & McInnis, 2001, online).

Issues related to the “massification” and composition of higher education (Coaldrake & Stedman, 1998; Gallagher, 2000; Marginson 1995, 1997) and organisational efficiency drove the current scalable systems solutions, which have dominated first generation e-learning. However, although technical scalability issues will continue to present challenges, the considerations that will most likely occupy this space in the future will be related to scalable solutions for high-end sophisticated media applications and the ability to create humanistic and personalised “e” experiences for the majority rather than the few.

E-learning makes new educational provision models possible, allowing new cohorts of students, “earner-learners” and “learner-earners” (Cunningham et al., 2000, p. 94) both focused on convenience and value-for-money, to participate in learning options from multiple institutions and sources. This trend, referred to as “swirling” (Johnstone, 2002,
pp. 19-20), includes options to take courses from more than one institution, either simultaneously or consecutively, as well as “reverse transfer” from 4-year to 2-year institutions. Excelsior College New York (formerly Regents College), for example, allows students to take courses from several institutions, as does Open Universities Australia (formerly Open Learning Australia). Clifford Adelman (cited Johnstone, 2002) provided evidence of the growing momentum of swirling in the US in the mid-1990s, reporting that 54% of students who graduated with a degree had earned it from two or more institutions. The trend is indicative of growing expectations on the part of students, who are behaving more like consumers, shopping for the best deals, best delivery options or best service for their needs at the time. Indeed, the trend has caught many institutions flat-footed in failing to anticipate it (Johnstone, 2002, p. 20).

An alternative concept to that of the e-learning innovation as a business enterprise is the notion of an e-learning ecology.

2.3.2 E-learning ecologies

The interconnecting linkages and relationships of a multi-faceted learner-centred model evoke an analogy of an e-learning ecology or knowledge ecology (S. Alexander, 2004; Norris et al., 2003b), characterised by pervasive and unlimited information exchange and knowledge construction. Brown (2000, p. 12) describes a learning ecology as “a collection of overlapping communities of interest, cross pollinating with each other, constantly evolving and largely self-organizing”. The activities within the ecology, whether individual or shared, are fused into daily life, rather than artificially constrained by the traditional structures and processes imposed by educational institutions which adhere to an historical ivory tower mentality.

The strength of an e-learning ecology, therefore is its adaptability to new contexts and its capacity to embrace dynamic new contents. But the challenge for educators is to revolutionise existing conceptions and processes surrounding a conventional resource-based learning model, to enable radically different approaches to learning- or knowledge-object discovery, creation, re-purposing and re-use.

In the networked world, perpetual processes of learning are supported by vast accessible, continuously changing resources of explicit and tacit knowledge. E-learning and knowledge management become fused in practice. Both are essential to everyone in an educational institution… (Norris et al., 2003b, p. 17).
This new knowledge-based gestalt will depend on technical and educational design standards to achieve interoperability across systems and sectors; system capacity for learners to interact with and to track changes in content, in varying degrees of detail, as both individuals or learning communities; enhanced technological and information literacy on the part of learners, teachers, educational professionals and administrators; and new business process, intellectual property (IP) and collaboration frameworks.

The capacity for teachers and students to engage with the e-learning ecology implies a broader understanding of the collaborative processes and constructs and the attendant roles of the participants:

Collaboration beyond “lecturing” means designing collaborative learning experiences for all the participants … In which case students would not simply play their role as passive observer or “consumer” of information but an active constructor … taking responsibility for their own learning (Mahadevan et al., 2002, online).

Arguably one of the greatest institutional challenges to be addressed in the forthcoming years of e-learning innovation, therefore, relates to human concerns – that is, how to envisage and sustain the collaborations (individual and institutional) which underpin this ecological, evolutionary model of innovation.

### 2.3.3 E-learning collaborations

A future model of collaboration will need to transcend existing tentative forms, many of which, as a response to the economic realities of increasing in-house production costs, have entailed joint development of resources, or course sharing. The burgeoning of consortia in recent years to share resources in e-learning has resulted in a myriad of different forms, a number of which are yet to be proven (Barone, 2003; Johnstone, 2002). Diverse examples include: The University of Texas system, an affiliation of eight institutions, traditionally operating independently and competing in the open marketplace, joined together to create a single degree program; education.au limited, a not-for-profit company owned by Australian state, territory and federal ministers, with the goal of developing and managing online resources services for education and training sector nationally (White, 2002); Open Universities Australia (formerly Open Learning Australia); Universitas 21; and eLIG, the European e-Learning Industry Group comprising 15 companies involved in e-learning services ([www.elig.org](http://www.elig.org)).
Many of these contemporary models of collaboration, however, have proved wanting by any number of performance measures (Grigg, 2001). Witness the underperformance of Western Governors University (http://www.wgu.edu), Universitas 21 Global, or the demise of the eUUK and Scottish Knowledge (Maslen, 2004; Samuels, 2005). The problem these initiatives faced related in part to a lack of understanding of the evolving nature of e-learning and in part to flawed economic models and business acumen. Underpinning many of the concerns of such alliances is the thorny issue of collaboration versus competition (Mitchell, 1998), which is still to be successfully managed by most higher education institutions:

Whereas demand for learning is growing and access to higher education is improving, competition is also increasing. This competition will cause campuses and corporations alike to focus on their unique programmatic and delivery advantages. Co-operate to compete as identified by William Graves as a strategy of “collabotition” will increasingly be a critical strategy for colleges and universities in the future (Hanna, 2003, p. 28).

The focus of much collaborative effort in universities to date has been on co-operative projects or processes associated with resources production or staff development, focusing on the operational level of organisational activity. Alternatively, there have been high level strategic alliances between like institutions, with perceived or real shared needs or orientations with respect to profiling, marketing and lobbying various constituencies (e.g. ATN, IRU). In the Australian context, however, there are few examples that have successfully achieved both strategic and operational collaborative success. Institutional boundaries issues, it can be argued, have in many respects outweighed the key e-learning considerations operating at the sectoral, regional and international scale, and must be reconfigured if e-learning is to be embedded socially and globally.

2.3.4 E-learning environments (pedagogy, technologies and learning designs)

Proponents of contemporary e-learning models continue to grapple with the pedagogical, technological and theoretical underpinnings of educational design. Although in many respects this is still an inchoate and emerging field, these core components of e-learning are beginning to converge to provide an integrated and cohesive environment for learning. The potential of next generation e-learning,
however, is to deliver a far more radical teaching and learning framework, offering on one hand, an array of individually determined, learner-driven and personalised events and experiences, and on the other, meaningful group-based interactions to encourage development of communities of learners. The aim of these virtual experiences should be to provide rich collaborative, constructivist environments for active learning, which shift the focus from surface to deep learning, employ multiple representation modes and encourage both independent and interdependent learning opportunities (Dalgarno, Hedberg & Harper, 2002; Keppell et. al., 2002; Mahadevan et al., 2002; Spender, 2002; Thornburg, 2001).

For example, the nature of immersive 3D environments will be qualitatively different from the virtual or collaborative spaces created by current technologies. Glimpses of what is envisaged are provided by “Croquet”, an open source software and network architecture to create 2D and 3D objects in shared distributed 3D virtual environments, and by Second Life, a “massively multiplayer virtual world” (MMVW) simultaneously played by hundreds of people around the world, but created and interacted with by individual users (Antonacci & Modares, 2005). These environments of the future draw on the full range of human sensory capabilities (including touch and smell) as well as creating a realistic and intuitive spatial representation which engenders a fidelity and “telepresence” associated with the real-world human communication experience.

The nature of next generation e-learning will differ from the current norm where individuals learn in isolation. Everyday opportunities will exist to work with large communities of learners, in small groups or partnerships or individually. E-learning need no longer be characterised by relatively impoverished text, broken sound or poor video links between a few participants. The technologies and the creative people are already available, to design synchronous and asynchronous rich communications and interactions between multiple sites and groups, with images and sound equivalent to broadcast or DVD quality.

It is perhaps the relative paucity of creative learning designs and experiences associated with the current form of e-learning that have contributed to its somewhat limited application to date in higher education. Future generations should have opportunities to develop and engage with creative and inspiring content, referred to as “the democratisation of creativity” (Spender, 2002, p. 24). Such content includes games, simulations, role plays, exposés, presentations, demonstrations, tours and experiments, to motivate, challenge, test and explain in imaginative ways impossible
without the application of advanced information and communication technologies (Brown, 2004; Looms, 2002).

Content is now available in multiple formats and sizes, providing modularised “chunks” that can be personalised and customised. This is a useful and efficient mode, but it presents both a future dilemma and an opportunity: “while we can atomise knowledge into elements such as ‘learning objects’, we must recognise that they are there to be shared, contextualised, and negotiated in the social context of the online community of practice” (Laurillard, 2003, p. iii).

The technologies previously cited – 3D immersive technologies, broadband and networking technologies, multiple point communication and conferencing technologies; access grids; interactive, on-demand, high definition television; e-publications and integrative technologies that provide a single “enter once, use and trust anywhere” point (Norris et al., 2003b, p. 20) to learning resources and events – are an essential ingredient of the e-learning future. For many students, learning and engagement with these technologies and in these environments will not be a virtual experience – it will be their everyday reality, their sense of the normal rather than the unusual:

Members of today’s digital generation of students have spent their early lives immersed in robust, visual, electronic media…They approach learning as a plug and play experience, they are unaccustomed and unwilling to learn sequentially – to read the manual – and, instead are inclined to plunge in and learn through participation and experimentation (Duderstadt & Womak, 2003, p. 63).

Ideally, face-to-face interaction and learning will, as much as possible and where appropriate, be incorporated into the blended course design, as a learning activity of educational choice because of its unique and valuable attributes, rather than the conventional form of delivery. “Blended” learning (Thorne, 2003) has already gained currency in contemporary contexts almost as a staging or transitioning phase between face-to-face and fully online learning. The potential for the future is that a blended design created through real choice will embed flexibility into learning in ways that justify the term student-centred learning.

E-learning events and experiences are framed and influenced at the same time by new pedagogies, learning designs and technologies, but the key to success, the factor that
will make a qualitative as well as quantitative difference, will be ensuring that these work together in synchronicity rather than compete with each other.

### 2.3.5 New e-learning roles – “teacher” and “learner”

The e-learning innovation enunciated above prompts a further rethinking about the traditional roles of the academic teacher (Coaldrake & Stedman, 1999; Department of Employment, Education, Training and Youth Affairs, 1998; Young, 1997), leading to what has been termed the “disaggregation” or “unbundling” of the teaching and learning process:

> Previously integrated activities of course design, materials preparation, lecturing and tutoring, assignment marking and assessment are being “unbundled”. New specialisations of labour are being established. New opportunities are emerging for courseware sharing and the buying-in of student support services (Department of Education Science and Training, 2002b, p. 12).

Next generation e-learning, however, is likely to accelerate this trend, exacerbating a crisis with respect to demand not only for professional staff development, but also for the type of learner support to equip students with the skills and understandings to become effective learners in an e-world (Department of Education, Science and Training, 2001; Reid, 1999a; Spender, 2002; Yetton et al., 1997).

### 2.4 Conclusion

The innovation of e-learning entails levels of sophistication and complexity of huge proportions, which are increasing exponentially. The ability of universities to embed e-learning fully within their practice therefore provides an additional rationale for this research. As with new fields of research and practice, the proponents are quite evangelical in their approach (Duderstadt & Womak, 2003; Norris, 1996; Spender, 2002). Notwithstanding the sometimes exaggerated claims for e-learning, it is argued in this dissertation that there is a discernable trend to the transformation of education. But the journey of real transformation has only just begun, and the claim that e-learning is a radical innovation lies with the next generation.

Next generation e-learning is far more than another new wave of technological invention. Rather it is a holistic maturing of the innovation concept in ways that entail
identification, development and integration of its multiple constituent facets: pedagogy, theory, technology, assessment, administration, commerce, legislation, creativity and research. Essentially, the next generation of e-learning will need to involve qualitative as well as quantitative change of all these facets and at all levels of organisational granularity, but particularly with respect to pedagogy and learning approaches:

The promised revolutions in education will only be realised when qualitatively different learning experiences are afforded through the application of information and communication technologies, rather than the provision of “re-packaged” learning experiences which have only the appearance of being “up-to-date” (Alexander & Blight, 1996, p. 1).

The pertinent observation about this quotation is not so much what was stated, but when it was made. The message remains valid today. The continuing challenge to educators and administrators alike is to exploit technological capability to develop learning resources, experiences and “approaches that go beyond producing no significant difference” when making comparisons between traditional and technology-mediated learning (Twigg, 2001, p. 4). The expectations of the next generation e-learners will be far higher in that they will be looking for imaginative and astute use of technology, pedagogy and learning design to make a difference (Shulman, 2002), to make the learning experience and the outcomes qualitatively and quantitatively better.

E-learning, it could be argued, stands at a point of confluence. Although the majority of educational institutions in Australia have moved beyond the model where the application of technology is restricted to enhancing an existing cottage-based product, a genuinely new and effective educational paradigm shift has yet to take its place. Existing models (business, commercial, traditional, collaborative) or emerging concepts of e-ecologies are potentially all competing, converging to a point where some argue that a dominant design is likely to emerge (Zemsky & Massy, 2004). Whether this is the most efficacious outcome remains to be proven.

E-learning is well entrenched in terms of the extent of technological systems and the advance of organisational processes, but it is still in its infancy with respect to pedagogy, learning potential and fulfilment of its capacity to elicit the 21st century education model envisioned by Laurillard (2004) as the “web of confidence”.

51
The goal, therefore, is to retain and build on the best of what we have learned about e-learning, and also to discover the new meanings associated with embedding the e-learning innovation into institutional ideology and practice. The goal, ideally, is to do this in a way that establishes models of good practice and exemplars that can be used by other sectors and industries, and that will inform governments, policy makers and decision makers. It is critical to establish a robust research agenda in place of that which to date, with respect to e-learning and educational research in general, has been criticised as flimsy (Reeves, 2004). In so doing, this research should answer the negative connotations associated with e-learning as a faddish educational trend.

This chapter has considered diverse meanings of the term e-learning, adopting a definition which incorporates three core elements: (a) technology – the application and integration of a wide range of technologies; (b) access to educational and learning opportunities, both formal and informal; and (c) quality – an essential but subjective and potentially divisive attribute. The chapter has also examined the potential role of the e-learning innovation to act as a change agent and it has provided an overview of the predicted future status of e-learning. The issues raised in this exploration of the nature of the e-learning innovation are highly germane to the research question, how universities might successfully embed e-learning. The next chapter examines some of the theoretical change and organisational perspectives underpinning the notion of embedding innovation.
Chapter 3: Organisational Change and Innovation

Introduction

This chapter provides an overview of existing theories underpinning change and innovation. It is noted that much of the research with respect to IT and technological innovation has been conducted in an industrial rather than a higher education context (Betz, 1998; Gardner & Ash, 2003; Nieto, 2004; Scheel, 2002; Suchman & Bishop, 2000; Tushman et al., 1997; Twiss, 1992; Yonghong, Zigang & Kaijin, 2005). Furthermore, the emphasis in the innovation and change literature has been on innovation take-up, adoption and implementation (Ensminger, Surry, Porter & Wright, 2004; Frambach & Schillewaert, 2001; Glynn, 1996; Svensson, 2003; Macchiusi & Trinidad, 2000) rather than on a broader understanding of change as envisaged in the concept of embedding as advanced in this study.

The change phenomenon, like innovation itself, has been widely covered in educational and organisational literature. It is not the intention in this dissertation, nor is it feasible, to provide an exhaustive review of the literature. Instead the chapter presents a critical review focusing on areas of particular relevance to the research problem. In addition, critical dimensions associated with innovations, in particular “radicalness” (Hall & Martin, 2005; Leifer, 2000) and the importance of the innovation context (Pettigrew et al., 2001), including the organisational elements of strategy, structure, process and culture, are examined.

Investigation and analysis of change and innovation issues are inextricably woven together throughout the literature — at times the two are used almost synonymously. However, it is critical, with respect to this study, to distinguish between process, that is, the act of changing or innovating, and product, that is, the entity, object or set of outcomes associated with the process. The literature clearly describes innovation as both a process and a product or entity in its own right (Anderson & Tushman, 1997; Hannan & Silver, 2000; Marceau et al., 1997; Rogers, 1995; Tornatzky & Fleisher, 1990).
3.1 Change and innovation – the process perspective

Extensive research has been conducted on organisational change (e.g. Dunphy & Stace, 1990; Greiner, 1972; Quinn, J., 1980; Quinn, R., 1996; Rogers, 1995), describing the variance between the status quo or pre-change condition and the state where change has been fully implemented and integrated. The complexity of the change process (Wheatley, 1992) has invited research into its various aspects and dimensions (e.g. change forces, pace, stakeholders), and has spawned innumerable change models (social, economic, biological, process, strategic, (Dunphy & Stace, 1990; Gardner & Ash, 2003; Kezar, 2002; Leonie, 2005; Weick, 1979) at various levels of system complexity (e.g. micro, macro).

Change can be analysed:
- from the perspective of its elements or characteristics, e.g. the level or scale of change
- as a model or framework, e.g. from a processual perspective, examining sequential processes and factors which evolve over time
- as a typography or classification of various types of change based on a key factor, element or cluster of elements, e.g. evolutionary or strategic change.

3.1.1 Elements

The scale and organisational level of granularity at which change occurs have been recognised as significant factors in understanding the overall change process (Fossum, 1989; Quinn, 1996; Rogers, 1995; Rycroft & Kash, 1999). Clearly, small scale and isolated change efforts impact in vastly different ways from ubiquitous and large scale change programs (Dunphy & Stace, 1990; Ledford, Mohrman, Mohrman & Lawler, 1991).

Pettigrew et al. (2001, p. 698) emphasise the change context (traditionally “dichotomized into the outer and inner contexts of organizations”) and levels of analysis, as fundamental and underdeveloped areas of the literature, arguing that:

> there are different levels of context to consider, but also most likely multiple related processes underway at those different levels, all impacting on the primary change process under investigation… . A source of change in this form of analysis is the asymmetries between levels of context, where the intertwined processes often have their own momentum, pace, and trajectory (pp. 698-699).
Rogers (1995) offers two fundamental perspectives of the change or innovation process: an organisational perspective and an individual development process. The latter has particular relevance to this study. Other researchers posit greater detail of granularity. Fossum (1989) suggests four operational levels of change: personal, group, organisational and environmental. Dunphy and Stace (1994) highlight the individual, group, business unit (major), and whole of organisational system (macro). Rycroft and Kash (1999, pp. 93-94) refer to five levels or types of sociotechnical systems associated with complex innovation: work groups, core actors (such as a university or government agency), networks (integrated formal organisations, work groups and informal relationships), complexes (integrated networks) and natural innovation systems. Each of these levels or types maintains a “locus of self organisation” where inter-agency or associations between system agents, in the uncertain and embryonic innovation phase, is located largely at the level of autonomous individual entities (p. 94).

Issues of organisational granularity, therefore, are especially important in making sense of relationships between the elements or system agents, in understanding the contextual attributes of the phenomena being examined, and in any substantive theory one might wish to derive from research findings. Scholars argue the importance of specifying the theoretical level at which research is undertaken (Klein, Dansereau & Hall, 1994; Klein & Sorra, 1996). This study, with its focus on the whole of the organisation, rather than specific organisational elements, views the organisation as an entity in its own right, but acknowledges and refers to issues related to all structural layers or levels of granularity that exist throughout a system, such as the influences of the environment on the organisational context and the innovation process (and vice versa), and the motivations of individuals to participate in innovation.

The ultimate success of an organisational change initiative, therefore, depends on understanding of and insight into the different social or structural levels within an organisation, and especially the relationship between individual change and collective change. Glynn (1996, pp. 1081-1111) explores a multi-level approach to organisational innovation in a framework which implicates both individual and organisational “intelligences” in the initiation and implementation of innovation. Quinn (1996) also emphasises the distinguishing features of the personal and organisational perspective, within a broad conceptual framework of deep, transformative change operating at both levels.
Glynn (1996) refers to individual and organisational intelligence as a cognitive process, drawing out some of the issues related to the multi-level (micro to macro) linkages and modes of analysis. Glynn questions, for example, whether macro-level processes and analyses are merely the simple aggregation of micro-level entities and elements or whether this mechanistic interpretation is too simplistic in large, complex organisations. The significant influence of the individual within an organisation, and the relational links between individuals and other system elements, are widely acknowledged (Argyris, 1964; Beer, 1980; Burke, 1987; Quinn, 1996; Vecchio, Hearn & Southey, 1996). Hall (1996) argues that individuals must be treated as other organisational variables or elements (such as structure and culture), especially as they bring unique sets of abilities, behaviours, habits and skills into the organisation. The role of the individual is an important consideration in the context of this study, particularly with respect to the ability of organisations to manage complex change processes.

Another key element of the change or innovation process relates to temporal considerations. There has been extensive research into the rate or pace of change processes (Anderson & Tushman, 1997; Kirton, 1992; Rogers, 1995). Rogers defined the adoption rate as the “relative speed by which an innovation is adopted by members of a social system” (p. 22). Kirton found a considerable time lag (2–3 years) between the first articulation of an innovative idea and acceptance by managers to proceed. Anderson and Tushman refer to the lag between the introduction of a technology innovation and the emergence of a “dominant design” as the “era of ferment”, proposing that this rate varied according to whether the innovation destroyed or enhanced existing organisational knowledge (p. 49).

Less consideration has been directed to the longitudinal dimension of innovation processes which extend investigation beyond the more conservative boundaries of adoption or implementation of a specific innovation (Avital, 2000; George & Jones, 2000). Pettigrew et al. (2001) argue the need for research other than the snapshot or episodic technique, claiming that “a bigger casualty from an atemporal organizational analysis may be the still small number of process studies of organizational change that offer a holistic and dynamic analysis of changing” (p. 699). There is a paucity of such studies in the higher education arena.

Another significant constituent of change and innovation is the population of human stakeholders involved in the process. Kirton (1992, p. 47) refers to “adaptors” and
“innovators”. The former adapt within existing frameworks and established norms, and the latter produce a proliferation of ideas, favour doing things differently and come up with the unexpected. Rogers (1995) identifies five “adopter” categories: innovators, early adopters, early majority, late majority and laggards. These types, when superimposed on the normal bell curve, demonstrate common attributes: innovators, representing the smallest percentage (2.5%), are highly motivated, “venturesome” innovation-passionate individuals; while early adopters (13.5%), early majority (34%) and late majority (34%) individuals respectively display respect, deliberation and scepticism towards innovation. The final category, laggards (16%), are traditional, more risk averse to innovation (Rogers, 1995, pp. 261-266).

3.1.2 Models and frameworks: processual models

A second perspective for understanding change and innovation is through change models and frameworks. As a key focus of this study is on the processual nature of change, this overview is confined to a relatively brief critique of models which emphasise various phases or stages of the change or innovation process (Greiner, 1972; Kotter, 1996; Lewin, 1951). Lewin’s model describes three principal stages: “unfreezing”, or breaking down existing organisational structures and attitudes; “changing”, or implementing the new system; and “refreezing”, or stabilising the new system within the operations of the organisation. Greiner’s model is more complex, depicting change as a pattern of organisational growth and decline. Each growth phase focuses around a set of issues or factors — creativity, autonomy, delegation, coordination and so forth. Kotter describes eight stages, beginning with an environmental scan and progressing through a series of tactical management strategies which, if successfully negotiated, “anchor” the new approaches in organisational culture (Kotter, 1996, p. 21).

Each of these models or frameworks emphasises the sequential nature of the change process — from the birth of an initiative through to its stabilisation or demise. It can be argued, however, that the innovation process too frequently has been viewed only as a reasoned, chronological series of steps, especially in adoption and implementation models.

Yin (1979), for example, developed a staged adoption model, whereby the innovation progresses steadily towards integration, its associated tools and procedures becoming routine and indistinguishable from those of the larger system. In this conception the
process of innovation essentially destroys the innovation as a discrete entity or product in its own right, at the same time irretrievably altering the parent system or organisation in the process. Rogers (1995) developed two diffusion models, an individual and an organisational, to describe the innovation adoption process. Each contains five clearly structured phases which characterise the actions and decisions from an initial awareness of the innovation (the need to innovate), through the confirmation of the decision to adopt, and finally to the routinisation of organisational elements supporting the innovation.

Such highly sequential and linear approaches have been criticised as overly simplistic (Rothwell, 1992), ignoring, for example, the importance of feedback loops (Olson & Eoyang, 2001). As stated in the introductory chapter, in this study change processes are viewed as more iterative or even cyclic, particularly in the later embedding phase. Thus an over-dependence on a highly structured approach would be considered a limiting factor.

Marceau et al. (1997) conceived more complex patterns as integral to the innovation process:

The innovation process can thus be thought of as a complex network of communication paths. Some of these work by linking together the various in-house functions within a given firm in a “rugby tackle” approach to developing new products and processes while others involve firms in developing complex “intelligence gathering” systems through collaboration in networks (Marceau et al., 1997, p. 2.8).

Furthermore, the more extreme or radical the level or nature of change, the greater the complexity of movement, interactions and exchanges. Nevertheless, models which propose more complicated pathways still retain a certain pattern or structure, though it is not as rigid as in the strict linear models. However, all these approaches to the innovation process contrast with models that depict a somewhat more ad hoc or free approach, one that arguably equates more closely with an experimental view. Leifer et al. (2000) endorse the free-wheeling and fuzzy front end of the innovation process, introducing the analogy of “grabbing at lightning” (p. 25), even as they argue for ways to manage the overall innovation process.

Hannan and Silver (2000, p. 7) refer to the process of managing this open-endedness as “guided innovation”, where the functions of innovation are increasingly
institutionalised at higher levels of system granularity. Describing the UK higher education context, Hannan and Silver posit that guided innovation gradually merges into a more prescribed structure of “directed innovation”, where the incentives to innovate assume an institutionalised form, thus ensuring that other kinds of innovation lower down, while not entirely ceasing, are discouraged, become sporadic and difficult to sustain.

3.1.3 Classification approaches

It was posited that change can be analysed from three perspectives: first as its constituent elements, and secondly as a model or framework. The proliferation of change models calls for an organising device to facilitate the analysis of change processes in the context of this study. The third analytical mode mooted is to conceive of change from the perspective of a typography or classification system. Classification approaches to change are based on critical aspects or elements of the change process and frequently group together several models or theories of change. Kezar (2002) presents a typology of organisational change models with six categories: evolutionary, teleological, life cycle, dialectical, social-cognition and cultural. It is important to note that these classification approaches have grown from particular contexts (e.g. business, industry or social settings) which underpin the key elements, assumptions and principles of the approach, and as such each brings interpretative strengths and weaknesses to a specific research problem.

The notion of organisational fit, for example, underpins evolutionary classification schemes influenced by environmental factors (Beer, Voelpel, Leibold & Tekie, 2005; Miles & Snow, 1978, 1984; Siggelkow, 2001). This primarily adaptive change approach contrasts with the teleological typologies which emphasise planned change, scientific and rational management models, and re-engineering theories (e.g. Golembiewski, 1979; Levy & Merry, 1986). Together these two approaches account for the majority of change literature, including the change literature in higher education. Although these approaches contrast in their basic conception of change, e.g. social/technical, subjective/objective, non-intentional/deterministic, they have a common focus, along with life cycle models, on phases of change (Kezar, 2002).

Life cycle models share with evolutionary models a developmental and systematic focus on change, but emphasise specific milestone phases of growth, maturity and decline (e.g. Greiner, 1972). Technological innovation models, particularly those developed in an industrial and manufacturing context, have been premised on life
cycles (Tornatzky & Fleisher, 1990; Twiss, 1992). Tornatzky and Fleisher saw technological innovation as analogous to a life cycle pattern, involving an extended time span from the initial idea through to widespread use. However, while cautioning against the rigidity of strict linear models which “delude people into thinking that one stage inexorably leads to the next”, they argued that the process is far from random, as most innovations proceed through a relatively common set of gateways or “marker events” (p. 32). Using the metaphor of different rooms connected by a finite number of doors, they emphasised the interconnectivity between the stages or spaces where various groupings or clusters of similar activities or core behaviours occur.

Life cycle models which focus on change over time are theoretically promising, but as yet have less empirical soundness and furthermore have not been extensively applied to higher education sector organisations (Kezar, 2002). In some respects, however, life cycle models offer great insight to universities as they emphasise the importance of individual identity and change through factors such as motivation and professional training (Bolman & Deal, 1991). There is, therefore, a compelling case to pursue this avenue of research beyond the conceptual arena with respect to change in universities.

Dialectical, social-cognition and cultural models ameliorate some of the limitations associated with the adaptive/environmental versus planned/purposeful change theories, in particular moving away from the notion that all change is rationale. Dialectical models include political and social interaction theories of change (e.g. Morgan, 1997) and are popular from the perspective of advocating strong leadership and visionary emphasis for change.

Social cognition encompasses a variety of models such as sensemaking (Weick, 1995) and institutionalism (Scott, 1995). Some social cognition models give cognisance to the complex and interrelated nature of change, the existence of multiple paradigms and realities within organisations (Cohen & March, 1991). The influential role played by an individual with respect to the success of change is recognised through social cognition models (Kezar, 2002), whereas cultural models are more concerned with group norms and values. Cultural models, however, share with social-cognition models an assumption that change is a fluid and complex process, non-linear dynamic and unpredictable (Smircich, 1983).
Kezar (2002) makes a distinction between change and diffusion, institutionalisation and innovation processes, positing a more comprehensive conception of change models than articulated in the more discrete or focused activities associated with the latter three models. For example, Kezar (2002, p. 13) argues: “Diffusion is an important change strategy, but it is not a change model or an overall approach to change” and “Institutionalization is distinct from change models as well. It examines only part of the process”.

Diffusion theories are based on communication channels, patterns of movement, and dissemination, and have particular relevance to this study as they are frequently associated with the transfer of an innovation – beginning from a specific point and spreading out to permeate the whole within a specific time frame. Rogers’ (1995) model, for example, is premised on the notion that social change is diffusion – the communication and adoption of an idea, concept or practice over time throughout a social system.

The nature or rate of change is another thematic approach used to classify various theories or models. A gradual progression towards a new desirable state underpins the incrementalist approach to organisational change, which promotes evolutionary rather than revolutionary change (Golembiewski, 1979; Quinn, 1980; Shaskin, 1984). The rate of change is measured, allowing the various elements or sub-systems within the organisation to adjust in small, manageable steps in order to avoid discontinuous disruptions to organisational life. Technological innovation is frequently associated with incremental change processes, generating a continuous flow of improvements and new knowledge (Nieto, 2004; Shilling, 1998). Incrementalist approaches are premised strongly on additional elements, for example, values of order, employee inclusiveness, participation, building on existing knowledge, risk aversion, consensus and collaboration.

Critics of the incrementalist approaches (e.g. Beer & Walton, 1987; Peters, 1991) point to their inward-looking focus and preoccupation with internal processes, and their neglect of the role of external environmental factors which increasingly contribute to a dynamic and radically shifting external climate. It is precisely the imperatives posed by this unpredictable climate that demand an alternative approach to the incrementalist organisational change model, according to theorists such as Kimberley and Quinn (1984), Peters (1991) and Quinn (1996).
A number of contemporary models advocate radical and rapid change (reflecting the turbulent climate in the outside world), major organisational restructuring and cultural shift (Kotter, 1996; Leifer et al., 2000; Peters, 1991). This category of innovation, also referred to as transformative, is described as chaotic, extreme, involving “fundamental changes… distinguished by the development of product and process designs that differ from anything that existed before” (Rycroft & Kash, 1999, p. 190). Transformative or radical approaches are characterised by language which refers to re-engineering change, blockages to progress, resistance to innovation, and so forth (Champy, 1995; Kotter, 1996; Nord & Tucker, 1987; Quinn, 1996).

3.1.4 Summary

These three analytical approaches to change (elements, models and classification systems) can be helpful in understanding and developing insights about the change process, but should not been seen as mutually exclusive. Arguably, there is a danger of ignoring the multiple perspectives of the change phenomenon if one focuses exclusively on a specific element or dimension such as the scale or the pace of change, or if one positions investigative research too firmly in a particular classification or genre of change theory, with its inherent assumptions about why and how change occurs and what are its outcomes. Each model has elements or principles which offer a useful perspective on the complex nature of organisational change within Australian higher education contexts.

Furthermore, although providing useful constructs and perspectives onto the various dimensions of change and innovation processes, existing models have some limitations with respect to addressing the question of the ability of organisation to embed an innovation such as e-learning. Some of these concerns were articulated in the introductory chapter, in discussion of diffusion models such as those of Rogers (1995) and Lewin (1951), with their emphasis on sequential or one-way movement rather than integration or infusion. Similarly, problems arise with an emphasis on adoption (Kotter, 1996; Yin, 1979) rather than integration, internalisation and acceptance processes. The latter differentiation was made by Sussman and Vecchio (1991, quoted in Klein & Sorra, 1996). A number of models appear to be premised on the need to eliminate the uncertainties, complexities and nuances associated with innovation, utilising the mechanisms inherent to the change processes. While some theorists acknowledge newness and contradiction at the outset, they posit that these factors are resolved through stages such as “routinisation” (Rogers, 1995) and
“institutionalization” (Kotter, 1996). Marginalising the complex dimensions of an innovation such as e-learning, particularly as it is unfolding in a higher education context, is problematic in the overall context of this study. Thus existing innovation and change models and classifications fail to grasp or accommodate the nuances associated with the concept of embedding (as it is defined within this dissertation), and a new distinctive approach to change which draws on multiple theories is required.

3.2 The embedding process

It is worth returning briefly to the paradoxical issue raised in the introductory chapter concerning change, innovation and the concept of embedding. The issue is – if the essence of change is about movement, flow, or a shift from one state to another, how does the concept of embedding form an integral part of the change concept?

*Embedding* in common usage refers to fixing or stabilising, which aligns it with the process models of change and innovation that articulate a clear beginning and an end – a finality of events which brings to a conclusion a particular sequence of activities and actions. Lewin’s (1951) change model, for example, concludes with the stage of freezing, and Rogers’ (1995) organisational innovation process model concludes at the routinisation stage where an innovation ceases as an entity in its own right: either it is discontinued or it has lost its separate identity. In this dissertation, however, the concept of embedding challenges existing change models which emphasise a definite ending to the innovation process, proposing instead a concluding phase characterised by ongoing cyclic and adaptive processes that respond to the constant state of flux in contemporary organisations.

A limitation of Rogers’ (1995) model, therefore, is his conception of an organisation as:

- a stable system of individuals who work together to achieve common goals through a hierarchy of ranks and a division of labour. Individual behaviour in an organization is relatively stable and predictable because organizational structure is characterized by predetermined goals, prescribed roles, an authority structure, rules, regulations and informal patterns. Although behaviour in organizations is relatively stable, innovation is going on all the time (Rogers, 1995, p. 403).

The contrasting view of organisations, particularly of universities in contemporary society, is of systems in a constant state of change or upheaval (Aitkin, 1997;
Armenakis, Harris & Field, 1999; Axelrod & Cohen, 1999; Becher & Trowler, 2001; Weick, 1969; Wheatley, 1992). Furthermore, from a theoretical perspective, it has been posited, that the ability to attain a final fixed or stable state is an illusion (Schön, 1973) which can never be achieved; as within any entity or social system, there is always an ongoing stream of activity (De Geus, 1997; Pettigrew et al, 2001; Pfeffer, 1997).

We can gain further insight into the embedding conundrum if a distinction is made between the *process* of embedding, how a particular state or condition is brought about, and the final condition or state itself, in this case a *state* of embedment. The focus of this dissertation is on the process of embedding, which forms part of a pattern or stream of activity and draws on the principles of adaptability and progression associated with the broader understanding of the change concept. In this way, the embedding process can be further explored in terms of a number of dimensions which all involve actionable activities.

The key dimensions of the embedding process with respect to innovation, as construed in this study, are:

- widespread adoption or use (that is, the attainment of a critical mass of users of the innovation)
- successful integration or fusion of the innovation into the organisation (includes inculcation in practice, ideologies, values — from a business perspective it becomes “core business”)
- the attainment of legitimacy of the innovation (as measured at different levels of granularity throughout the organisation: whole of organisation, work group, individual)
- sustainability (including long term viability)

### 3.2.1 Adoption or usage

The adoption or usage level of an innovation within an organisation is a key indicator of the embedding concept. Widespread usage (across an entire organisation) and deep or penetrating use (high saturation levels of use within a specific area) are significant structural dimensions of the adoption criterion. Gilbert (1996, p. 256) refers to “narrow/deep” and “wide/shallow” change strategies, where the narrow-wide continuum is the proportion of individuals who have adopted the innovation and the shallow-deep dimension refers to the degree of impact.
Gilbert’s (1996) subsequent reflection on embedding a technological innovation refers to the issue of how deeply ingrained and how widespread the innovation is, aligning with the critical distinction made in this study between usage and acceptance of an innovation (Jaffe, 1998, online). Usage patterns suggest a statistical measure, which should not necessarily be accorded any positive or negative value of worth. Usage rates and rates of adoption can be useful indicators of impact with respect to a particular intervention, perhaps the result of a management directive or short term phenomenon. It would be risky, however, to make an interpretation of usage as acceptance, implying that a particular innovation has been mainstreamed or gained widespread acceptance merely because high usage or critical mass figures can be demonstrated. The notion of acceptance implies that the change or new practice has been internalised by individuals and thus has intrinsic value for them. This is akin to the concept of legitimisation in the context of this study, and is discussed in a following section.

Critical mass describes “the point at which enough individuals have adopted an innovation so that the innovation’s further rate of adoption becomes self-sustaining” (Rogers, 1995, p. 313). Critical mass is a key concept with respect to adoption and mainstreaming of innovation, but it is not a definitive statistic. It is open to value judgements and thus a specified figure cannot be set for all organisational contexts. Even in terms of technological change, Rogers suggests that the point of critical mass required for a particular technological uptake varies between approximately 20% and 60%. The key message with respect to use of critical mass in this study is that it is contextualised according to the nature of the change, the innovation being introduced and the environment into which is being introduced. It is also important to appreciate that the concept of critical mass operates at the systems level of organisational analysis, whereas the concept of an individual adoption threshold operates at the individual level of analysis.

3.2.2 Integration

Integration is another key dimension with respect to the ability to manage an innovation on a practical everyday level within an organisation (Burns & Stalker, 1961; Lawrence & Lorsch, 1967). The definition, “the quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the demands
of the environment” (Lawrence & Lorsch, 1967, p. 47), highlights the distributed nature of organisational activity which relies on successful integration.

Ideally, innovation integration must occur at all levels and in all activity arenas of an organisation: administrative, teaching and learning, support services and research. In short, a system-wide approach is fundamental to the principle of integration. Iansiti (1998, p. 21), for example, argues: “Technology integration underlies an ability of an organisation to view the entire product and production system as a coherent whole, balancing the potential of individual technologies with the requirements of the context of the application”. Iansiti’s argument, though centred on a product, captures both the need to align the nature of the innovation with the organisational context and the importance of its being a “system-focused organisation” which emphasises integration as “a pervasive philosophy used to manage the novelty and complexity of introducing new products at all organisational levels” (p. 120). Another relevant aspect of Iansiti’s integration concept in relation to the embedding process is the notion of fusion between existing and new information.

In summary, it can be argued that the notion of innovation integration aligns better with the prevailing cultural and contextual climate in higher education than do the concepts of innovation adoption or diffusion, with their attendant deterministic connotations.

3.2.3 Legitimacy

To achieve a state of embeddedness, legitimacy should occur at all levels of the organisation. Legitimacy refers to attaining a level of respectability and acceptance, of being seen as belonging and moving beyond the radical or extreme edges of organisational practice and values. Klein and Sorra’s (1996) distinction between compliance and internalisation captures the essential meaning of legitimacy from the perspective of the individual. Compliance is described as “the acceptance of influence in order to gain specific rewards and to avoid punishments” and internalisation as “the acceptance of influence because it is congruent with the worker’s values” (Sussman & Vecchio, 1991, quoted in Klein & Sorra, 1996, p. 1061). The concept of legitimisation for the individuals in this study is consistent with Sussman and Vecchio’s (1991) concept of internalisation.

At the institutional or workgroup level however, the notion of legitimisation aligns most closely with the concept of organisational integration, in particular with the
development and implementation of organisational processes, practices and ideologies which have been explicitly enacted to support the innovation. Examples include policy to support integration and use of the innovation; procedures to facilitate adoption, such as funding and resourcing; and mission statements which articulate the core values and organisation beliefs in the innovation. In short, the aim is to enable the innovation to become core business within the organisation, still evolving and incorporating newer permutations with respect to the “how” issues associated with ongoing development, but no longer asking the “why should we adopt the innovation?” question.

3.2.4 Sustainability

Sustainability essentially refers to the capacity for the innovation to grow over time within the organisation, rather than merely to exist or survive, without undue reliance on external interventions. Sustainability therefore draws on the other criteria of usage, integration and legitimacy, but also incorporates a more sophisticated degree of evaluation on the part of the organisation about the effectiveness of the innovation and the need for a return on organisational investment.

The need for a mature innovation to deliver effective outcomes is frequently emphasised and therefore considered to be part of the sustainability of an innovation. Effective outcomes accruing from innovation are thus prerequisite to the long-term organisational health and survival of a particular innovation. Effectiveness alone is not sufficient to sustain an innovation, however, nor is it a clearly defined concept (Hall, 1996). Effectiveness, it is argued, has less value for this study if conceived as a scientific concept (Kahn, 1977) rather than as a general perception of satisfaction, success or wellbeing by a community.

The construct of overall efficacy, rather than effectiveness metrics such as productivity, efficiency or return-on-investment, may offer more promise (Tornatzky & Fleisher, 1990), but it too is not problem-free. Efficacy (and effectiveness) assessments rely on an organisation being especially clear about its vision and higher-order goals (Etzioni, 1964) with respect to an innovation, and applying these when making value assessments about the innovation. If the organisation’s expectation is that an immediate and positive benefit or outcome will accrue from every innovative activity as a direct causal effect, then the overall benefits and potential long-term advantages of the innovation may be obscured.
3.3 Innovation as a “product”

It is essential to explore the other key conception of innovation, that is, the notion of innovation as an entity or product. In this study, e-learning is the innovation exemplar.

A common theme or meaning which underpins all views of innovation is that of newness or novelty, as evident in the definition of innovation as “an idea, practice or object that is perceived as new by an individual or other unit of adoption” (Rogers, 1995, p. 11). However, newness is not an objective measure, and need not always imply the creation of an original work, but rather the discovery of something new. Indeed, innovations frequently build on existing knowledge. Significantly, the message of linking innovation to a process of conversion of, and building on, knowledge and ideas for benefit, has been promoted by governments (e.g. Queensland Government’s Innovation Council, 2002).

The conception of innovation as a product or set of outcomes has led researchers to probe its various features or attributes. Attributes such as technical and administrative (Damanpour & Evan, 1984), technological, physical or social (Nieto, 2004) have been used to identify or classify innovations (Tornatzky & Fleisher, 1990). However, a narrowly conceived classification of an innovation, for example, technological versus social, is too restrictive for research focusing on multi-dimensional and complex innovations which incorporate technological, administrative, pedagogical and social aspects.

Rogers (1995, p. 15-16) identified the following characteristics or attributes of an innovation, as perceived by individuals within an organisation or system:

- “relative advantage”: the degree to which an innovation improves upon its predecessor
- compatibility: the degree to which an innovation displays consistency with existing values and needs
- complexity: the degree of difficulty in understanding or using the innovation
- trialability: the degree to which an innovation can be piloted or tested on a small scale
- observability: the visibility of the innovation to others.

The scope or scale of a particular innovation is a critical feature (Sahal, 1981). Harianto and Pennings (1994), for example, describe innovation in terms of broad or...
narrow scope. However, even a cursory investigation of the magnitude of innovations reveals that they are not equivalent units of analysis as they can differ in size and significance. Some, for example, are conglomerates of innovations, a “super” innovation (Rogers, 1995, p. 155), whereas others are seen to comprise more discrete secondary or micro-innovations.

A related but subtly different perspective is that of concurrent “innovation streams”, where the innovation product is “made up of a set of subsystems, each of which has its own innovative stream” (Tushman et al., 1997, p. 5). Tushman and colleagues assert that the organisational challenge is to manage these coexisting and frequently quite diverse streams.

In distinguishing between product and process innovation, Anderson and Tushman (1997) argue that product innovations are normally more evident to clients and observers, while process innovations can appear hidden. This aligns with Rogers’ observability characteristic which, he argues, impacts on the take-up of the innovation by individuals within an organisation, in that people are more likely to adopt an innovation with high visibility (Rogers, 1995).

Anderson and Tushman (1997) also suggest that product innovations are often more disruptive because they interrupt the linkages in the whole development, delivery cycle or chain. For example, new products frequently demand new materials as resources are introduced into the development chain. Such “discontinuous” innovations, which significantly disrupt or disturb, are perceived as far more imposing than an evolutionary or “continuous” form of innovation. Anderson and Tushman conclude that “discontinuities are breakthrough innovations that advance by an order of magnitude the technological state-of-the-art which characterizes an industry” (p. 46).

Discontinuous innovation shares many similarities with radical innovations. Both, for example, are frequently “competence-destroying”, in that they render existing skills and knowledge obsolete, but in some cases they can be “competence-enhancing”, fast tracking or significantly advancing existing knowledge and technical know-how (Anderson & Tushman, 1997, p. 48; Powell & Brantley, 1992, p. 368). On the other hand, an incremental innovation, which has drawn heavily on existing knowledge, is far more likely to require only minor adaptations to existing practice and therefore is characterised by a more evolutionary development cycle (Anderson & Tushman, 1997; Ettlie, Bridges & O’Keefe, 1984).
3.4 Radical innovation

The connection between innovation and radical change has long been established (Schumpeter, 1934), but in more recent times the radicalness of an innovation has gained currency as a more generic and useful descriptor in the development of theoretical frameworks or models. Nord and Tucker (1987) defined a radical change as a process requiring the development of completely new routines, norms and values within an organisation. The definition of a radical innovation as “a product, process or service with either unprecedented performance features or familiar features that offer potential for significant improvements in performance or cost” (Leifer et al., 2000, p. 5) highlights the newness or novelty and scale of performance improvements or economic efficiencies. Leifer et al. argue that radical innovation creates dramatic change, transforms existing markets or industries, or creates new ones.

Radical innovation is usually concerned with the development of new product lines or new business. It is based on new ideas that transform the economics of the business and therefore depends on competencies in exploration. Incremental innovation, on the other hand, emphasises cost or feature improvements in existing products and relies on competencies in exploitation (Leifer et al., 2000). The pull between radical and incremental innovation within an organisation can be detrimental to the future of an organisation, evident in the following concerns about evolutionary approaches to innovation: “The danger …is that we expend all our resources on extrapolating and sustaining our current portfolio and not nearly enough on new initiatives. The result is that tomorrow is neglected to sustain today” (Salaman & Storey, 2002, p. 155).

Radical innovation can also be understood in relation to alignment with an organisation’s established business, in that it can occur within the technology/market domain of existing business units, in the “white space” between existing business, or outside an organisation’s current strategic context (Leifer et al., 2000, p. 6-7). White space is the area between existing businesses and either a new business unit or one that is expanding its scope. The position of the innovation within an existing organisation, for example the white space available for radical innovation, raises considerations with respect to managing the interface with the mainstream organisation. A number of researchers argue that most innovation originates at the periphery of an organisation, far from the organisational centre (Bull, Dallinga-Hunter, Epelboin, Frackmann & Jennings, 1994; Farrell, 1994; Hanna, 2003; Peters, 1983). This isolated aspect of innovative initiatives has disadvantages. For example, the
project team often has significant deficiencies in knowledge, resources and skills. Remoteness also eliminates opportunity for the wider organisation to assimilate learning from the project, to establish the innovation’s legitimacy and to prepare a foundation for the later implementation phase (Leifer et al., 2000).

The life cycle of a radical innovation is typically characterised by uncertainties (e.g. about resources, technical feasibility, market acceptability), conflicts, high risk, discontinuities, knowledge gaps, critical transitions and leverage points. The time-line for radical innovation is frequently long-term, the development process non-linear, sporadic and stochastic, and the outcome unpredictable and highly context dependent (Leifer et al., 2000). Evolutionary, continuous or incremental innovation, on the other hand, tends to follow a more predictable and orthodox project management process with respect to funding, organisational sponsorship, development and commercialisation (Sahal, 1981). The more radical the innovation, therefore, the more complex and the more difficult it is to manage:

Management of radical innovation projects … remains more of an art than a science. Because radical innovation projects are faced with high uncertainty on multiple dimensions, the sophisticated management tools that work so well in the incremental innovation environment are not adequate (Leifer et al., 2000, p. 55).

Nord and Tucker make a distinction between radical and routine innovation:

Radical innovation is the process of introducing something that is new to the organization that requires the development of completely new routines, usually with modifications in the normative beliefs and value systems of organizational members. Although it would be best to consider routine-radical as a continuum, this book treats the variable as if it were a dichotomy (Nord & Tucker, 1987, p. 42).

A number of researchers offer a counterpoint, articulating both the difficulty and importance of balancing radical and incremental innovation (Salaman & Storey, 2002; Tushman et al., 1997). From this perspective, it is the capacity to manage the slow evolutionary processes, along with the rapid, urgent or extreme; the continuous with the discontinuous; and to extrapolate the organisational knowledge enhancement and the competency-destroying elements associated with both evolutionary and discontinuous forms of innovation, which underpins organisational flexibility and capacity.
Tushman et al. (1997) describe organisations with this ability as “ambidextrous”, and as possessing “multiple organizational architectures to concurrently nurture these diverse innovation requirements” (p. 6). A key difference between radical and incremental innovation is that the latter enjoys a higher degree of legitimacy within the organisation (Dougherty & Heller, 1994). Pennings (1988, p. 75) also argues that “the degree of radicalness depends on the way people in organisations perceive it”.

These arguments again lead one to conclude that the innovation context influences the nature of the innovation. The characteristics used to define a radical or incremental innovation are highly contextual, such as the degree of change from an existing state, the extent of uncertainty, the knowledge gaps or discontinuities. This study views radicalness as a critical factor in understanding the nature of an innovation, but acknowledges that in turn it must be considered from within the higher education context.

### 3.5 Innovation context

The nature of the innovation, interpreted as a product or set of outcomes influences, is influenced by the innovation process, but that in turn is impacted by the environmental context in which it is conceived, developed and implemented. In other words, innovation as a concept does not exist in isolation but is determined by system influences. These systemic influences can either constrain or facilitate the innovation process (Marceau et al., 1997).

The significance of the innovation context has been widely emphasised (Hannan & Silver, 2000; Pettigrew et al., 2001; Rogers, 1995; Schoonhoven & Jelinek, 1997; Tornatzky & Fleisher, 1990). The innovation context is a multi-faceted environment, comprising physical, social and technological aspects as well as different system levels or layers, such as the organisational and the external environment (Tornatzky & Fleisher, 1990). The external context, for example, might incorporate outside organisations, sectoral interests, the economic and political climate, and issues of national and global significance (Pettigrew et al., 2001). The characteristics of the internal organisational context comprise the key elements of strategy, structure, process and culture, which form part of the orthodoxy of organisational literature.
3.5.1 Strategy

Axelrod and Cohen (1999, p. 4) refer to strategy as “the way an agent responds to its surroundings and pursues its goals”. Strategy is traditionally perceived as a top level management plan to better the position and performance of the organisation (Vecchio et al., 1996), evidenced in organisational documents such as mission statements. Quinn (1991) distinguishes strategy from lower order organisational decision making and tactics as:

the pattern or plan that integrates an organisation’s major goals, policies and action sequences into a cohesive whole. A well formulated strategy helps to marshal and allocate an organisation’s resources into a unique and viable posture based on its relative internal competencies and shortcomings, anticipated changes in the environment, and contingent moves by intelligent opponents (p. 5).

The key characteristics of this definition are the advance planning and the purposefulness of the intent of the plan in relation to the external environment. Implicit in this concept of strategy is the notion of deliberate choice, but choice is complemented by a less well articulated pattern of response where individuals pursue organisational goals with little or no discernable forethought.

Mintzberg (1991b), Dill (1994) and Wilson (1997) see limitations in perceiving strategy solely as a plan or blueprint used by organisations to navigate unknown territory, arguing instead for an eclectic approach. Wilson’s (1997, online) criticism summarises the mechanical nature and lack of vision which characterise such strategic planning exercises: “views of the future are all too often a projection of the present with modified statistics”.

An alternative to the single-mindedness of the plan definition, with its focus on intent, is what Mintzberg (1991b, p.14) refers to as “emergent” rather than deliberate strategy. He argues that a stream or sequence of actions, resulting in a “pattern” of consistent behaviour, is another legitimate form of strategy, an evolutionary or emerging scheme which provides an ongoing account of the organisation’s response to environmental conditions. Mintzberg introduces other nuances and dimensions of the concept strategy, including “ploy”, a manoeuvre intended to confuse or deceive; “perspective”, a collective abstraction which gives each organisation a unique and characteristic way of acting; and “position”, the means of locating a specific place within the external environment (pp. 14-17). The concept of strategic positioning or orientation is another
way of understanding the priorities or driving forces which underpin organisational decision-making processes.

Given the complexity of the notion of strategy, “strategic thinking” (Loehle, 1996; Wilson, 1997), rather than strategic planning, offers an alternative approach to an organisation’s need to position itself favourably in the wider environment. Strategic thinking can be understood as “acting in the present with a clear sense of the future” (Wilson, 1997, online). Strategy in its broadest sense provides some way of dealing with the unknown and managing the unpredictable, but underpinning this through all levels of the organisation there must always be focus and cohesion (Quinn, 1991), typically articulated through artefacts such as mission, goals and objectives.

3.5.2 Structure

Structural elements (technical, human and economic) which have had an influential role on organisational theory and development include the formal hierarchy of authority within the organisation, governance, the informal social and communication networks (DiMaggio, 1992; Nohria, 1992; Stoner, Yetton, Craig & Johnston, 1994), the technological, physical and financial infrastructure (Beer, 1980; Child & Mansfield, 1972; Mintzberg, 1991c). Hall (1996) argues that organisational structures are primarily intended to achieve organisational goals and produce organisational outputs. Beer (1980), however, points out that organisational structures often exist because of long standing values or conventions, rather than for the furthering of desirable organisational goals. DiMaggio and Powell (1991) consider structure important as it has been found to give meaning to organisational life and predisposes particular organisational behaviours.

The formal structural aspects of an organisation, such as organisational reporting structures, job design, management information systems, budgetary systems, location and physical layout, are primarily designed to facilitate the work of the organisation, and have been found to have a dominant though not always desirable influence on organisational behaviour and outcomes (Beer, 1980).

Size is another significant and well-recognised structural element, which itself comprises a number of variables including physical capacity of the organisation (e.g. plant, buildings, land); number of staff; quantity of inputs or outputs (in a university this could equate to number of students); and discretionary resources (Kimberley, 1976).
These examples of structural components provide the arena in which organisational activities and power are exercised (Hall, 1996).

Structural elements, according to Beer (1980), can be understood in terms of various positions on a dimensional continuum: hierarchical versus flat structure; decentralised versus centralised operations; unitary versus more complex dispersed authority and communication channels.

Mintzberg (1991c) identified important dimensions which influence organisational structure, such as unit size and job specialisation, but also highlighted the significance of interdependencies across organisational structures, resulting in new forms such as matrix or liaison overlay structures. An example of the matrix form is where a group or individual operates within a dual authority structure, while the liaison overlay is exemplified by standing committees or task forces, both of which are familiar entities within universities.

Structural configurations can also be influential in the positioning or relationship an organisation is perceived to hold with the external environment. Thus Mintzberg’s (1991c) emphasis on structure to devise organisational configurations is important because certain assumptions and understandings have been attributed to types of organisations with respect to their responses to environmental conditions. Bolman and Deal (1991), for example, argue that Mintzberg’s conception of a professional organisation (Mintzberg, 1991c) is exemplified by traditional universities and that this organisational configuration has had a tendency to respond more slowly to the external environment.

Alternatively, the multi-campus or the amalgamated university that arose from the Dawkins reforms may be more representative of Mintzberg’s (1991c) diversified (formerly referred to as divisional) configuration. In this case, departments or campuses conduct their work in a semi autonomous fashion, albeit under the umbrella of a centralised “head office” executive. There is evidence of a more managerial than collegial approach to governance in universities with a diversified configuration, although this can lead to structural tensions (Bolman & Deal, 1991) which some Australian universities have dealt with by adopting a looser administrative federated model, as did the University of Western Sydney.
All university types (e.g. traditional, multi-campus or amalgamated) have tended to favour machine-like bureaucratic structures (Mintzberg, 1991c) to perform the traditional administrative and support tasks which have been assiduously separated from the academic work of teaching and research. It is interesting to note that the increasing “bureaucratization of universities” and the concomitant perceived decline of academic leadership have been noted as key areas of change (Kezar, 2002, p. 127). A problem with this conventional organisation within contemporary universities is that it is increasingly difficult to clearly delineate teaching from the other professional roles required to support student learning within the university (Coadrake & Stedman, 1998). Consequently, it becomes more complex and problematic to maintain structural distinctions between a machine and professional dichotomy for these increasingly converging roles. Hall (1996, p. 64) argues:

Complexity is a basic structural characteristic…. There appears to be strong evidence that particular degrees of vertical, horizontal or spatial complexity are related to organizational survival and continuity in particular situations. If an organisation chooses an inappropriate form or is unable for what ever reason – economic, personnel, tradition, leadership – to adapt its structure to changed situations, it will likely soon be in trouble.

3.5.3 Processes

Processes are the interactions between the various elements of an organisation which ensure that the business of the organisation gets done. Organisational processes can include procedures which provide an operational framework through which the organisation conducts its daily affairs, such as budgeting systems, recruitment and training, decision making, indoctrination, policy formulation and communication processes (Perrow, 1986; Stoner et al., 1994). Decision making, for example, as a process, impacts significantly on all aspects of organisational life. Effective decision making is a vital counter to blind acceptance of normative processes and rules, but is particularly relevant in an environment of institutional change (Tierney, 1999; Weick & Sutcliffe, 2001). It occurs at all levels within an organisation, from the individual who makes the decision to adopt a new approach or volunteer a new idea, through to the executive who is involved in top-level policy making.

Policy making is another key process, which in effect is a form of decision making:
An organizational policy is an abstraction or generalization about organizational behaviour, at a level that has structural implications for the organization... policy making, (is) the making of general statements of what organizational behavior shall be. The making of policy in this sense is at once a category of decision making, an aspect of organizational change, and perhaps the most significant expression of leadership (Katz & Kahn, 1978, p. 522).

Organisational processes are typically characterised by repetitiveness (Kreps, 1990), actions that can be replicated in order to achieve greater organisational efficiency and mechanisms that simplify or minimise uncertainties within an organisation. In many organisations, particularly large and complex ones such as universities, processes such as rules, procedures and communication protocols can appear formal, slow and unwieldy, and thus work against innovation and creativity.

Formalisation of organisational work through procedures and rules is construed by some researchers (Hall, 1996) to be part of the structure of an organisation. For the purposes of this study, an important distinction between process and structure is that the former focuses on the action or the doing (e.g. policy making). It has a sense of sequence or flow. The latter, structure, is concerned with the object, entity or pattern, such as an organisational policy, reporting structure or a job design. Kreps (1990) makes a grammatical distinction in relation to the process of organisation as both an activity that people engage in and the successful outcome of the activity. Organizing (as a verb) refers to the process of developing coordinated activities... the active process of organizing can lead to a relatively stable (at least temporarily) state of organization (p. 13).

Weick's (1979) understanding of the phenomenon of organisation is oriented strongly towards a process model which is premised on the notion of ongoing streams of human interactions and activities rather than the existence of a fixed structural entity.

Notwithstanding these distinctions, it is important to appreciate the impact of processes on the specific human or organic aspects of organisational activity, such as communication, knowledge management and innovation (Buckley & Carter, 2002). Highly regulatory and stringent rules will curtail innovation and spontaneous thought, whereas minimal formalisation offers employees maximum discretion and intuition to respond to unique situations (Perrow, 1967). It has been posited, however, that formalisation processes in one area do not necessarily translate into a generic
approach across the entire organisation. In fact they can well lead to pressure to decrease formal processes in another (Hall, 1996). Nevertheless, a high degree of formalisation frequently correlates with a high degree of routinisation in organisations (Dornbusch & Scott, 1975; Nord & Tucker, 1987; Pugh et al., 1969).

Management and supervisory activities are arguably the most influential set of organisational processes. The classical management processes are recognised as planning, organising, controlling and leading (Stoner et al., 1994).

### 3.5.4 Culture

Organisational culture, sometimes referred to as climate (Klein & Sorra, 1996), is often hard to grasp as a phenomenon, probably because as Beer (1980) suggests, “it is determined by all the components of the organization (structures, people, process, and environment)… yet it is more than their sum” (p. 33). It is the indefinable aspect of culture, simply put; the “ideological glue that binds an organisation together” (Mintzberg & Quinn, 1991, p. 307), that makes it a unique organisational characteristic.

Studies of organisational culture have their roots in anthropology. Thus organisational culture is construed as underpinned by shared beliefs, values and norms which provide an effective organising theme for behaviour which permeates all work habits and practices (DiMaggio, 1992; Harrison, 1972). The culture of an organisation is a powerful force in the context of organisational change in a number of ways. Trice and Beyer (1993), for example, argue that organisations have “repertoires of cultural forms”, referred to as “artefacts” by Schein (1992, pp. 17-18), observable actions and constructs that help people cope with uncertainties through meaning and tangible associations. Organisational culture is a collective phenomenon, comprising the “substance”, the shared beliefs and value systems, and the “forms”, entities and actions which members use to express and affirm their culture (Trice & Beyer, 1993, p. 3).

As with many other aspects of organisational life, there is a paradox with respect to culture. Internal cultures are seen to be stable entities in their own right, defined as “a possession – a fairly stable set of taken for granted assumptions, shared meanings, and values that form a kind of backdrop for action” (Smircich, 1983, p. 58). Thus it may therefore be somewhat unrealistic of managers to try to direct or use culture as a management tool.
Another anomaly exists with respect to this stable and pervasive characteristic of organisational culture in large and complex organisations. In this context, the lack of homogeneity in relation to behaviour patterns and value systems has been attributed to multiple cultures residing within the same organisation (Beer, 1980). Different cultures can be identified in different functional work groupings, or, in certain professional organisations, can also be associated with membership of specific professions. This is particularly evident, for example, with respect to the strong work norms which some university academics attribute to their own disciplines and professions (Becher & Trowler, 2001), norms which, in many cases, are stronger than the cultural and work practice ties to their employing university. Thus, one finds that the articulated and public norms and values of an organisation such as a university or university department coexist with another, at times subverting, nebulous or informal sets of values.

The latter cultural forms are difficult to identify as they are often unspoken and unarticulated. These “underlying assumptions” or unconscious systems of beliefs, perceptions and values of Schein's (1992) typology typify the intangible norms that pervade organisational life. It is precisely for this reason that a non-supportive culture can introduce significant, often insurmountable, barriers and constraints to programs and initiatives, regardless of how well those programs may be planned or executed by managers. Cultural resistance, for example, can undermine restructuring efforts in formally planned change. Universities typically display evidence of strong multiple cultural influences, both formal and informal.

Organisational culture does not exist as an entity in its own right. On the contrary, culture has a strong relationship with other organisational elements. Hannan and Silver (2000), in their study of UK universities, suggest that organisational structure offers a strong clue to culture. Furthermore, Mintzberg posits a strong relationship between organisational culture and its role in shaping strategy, as evidenced in the concept of strategy as a “perspective” (Mintzberg, 1991b). The relationship is complex and interdependent but one of its essential functions, depicted by Smith and Vecchio (1993, in Vecchio et al., 1996), is a filtering role between the environment and the strategy formulating process undertaken by management. Hence, culture can prove to be a barrier or a facilitator to organisational change, from an organisational as well as an individual worker perspective.
The orthodox organisational elements, strategy, structure, process and culture, interrelate to form a unique and complex institutional profile and provide the innovation context for this study. Thus, organisational context can be understood as a complex set of interrelationships among the elements — human, organisational and environmental factors – envisaged broadly as a set of “related goals, roles, rules, assumptions, and expectations about behaviour and outcomes” (Tornatzky & Fleisher, 1990, p. 45). Tornatzky and Fleisher extend the argument, suggesting that “to a significant degree, “all is context” in understanding the processes of technological innovation” (p. 46).

Leifer et al. (2000) also highlight the context dependencies associated with different forms — radical or incremental — of innovation. Radical innovations, for example, develop or evolve more easily within a particular corporate culture, where history, expertise, personalities, informal relationships and priorities create a unique set of conditions or factors that define the nature of the innovation.

Factors such as alignment, congruence or “organisational fit” (Miles & Snow, 1984; Nadler & Tushman, 1997; Siggelkow, 2001) are also seen to influence the innovative process and the outcome. Rogers (1995) posits that the nature of an innovation can predict its future success or demise, highlighting its degree of compatibility with existing organisational values and cultures, its complexity, and the extent to which it can be tested or piloted in an observable and open way. Rogers also argues that it is the perception of newness to an individual or a broader organisational context which is of more significance than its originality in the wider external environment. The “newness” of an innovation can be expressed in terms of knowledge or awareness of it, or persuasion towards it (Rogers, 1995). Hannan and Silver develop Rogers’ point in their study of innovation in the UK higher education sector. “An innovation in one situation may be something already established elsewhere… but [it is] important that the initiative takers and participants see it as new in their circumstances” (Hannan & Silver, 2000, p. 10).

The innovation context (the higher education sector with respect to this study) is of great importance. The university environment has demonstrated its ability to influence significantly the course and direction of a particular educational innovation such as e-learning. Hannan and Silver (2000), for example, claim that innovation has assumed great importance in reviving interest in teaching and learning.
They also suggest that the higher education context can actually influence the course or nature of innovation:

Innovation in higher education has generally been taken to mean a planned or deliberate process of introducing change, directed towards, not necessarily achieving improvements or solving or alleviating some perceived problem. Such changes may be new to a person, a course, a department, institution or higher education as a whole. … Difficulty at the heart of discussion on innovation is the association of different kinds of motivations with different kinds of innovations (Hannan & Silver, 2000, p. 10).

The underpinning consideration here is managing innovation and change. Leiffer et al. (2000) argue that strategic intent (Hamel & Prahalad, 1994) is management’s primary motivational tool for generating new ideas. Indeed, Hamel and Prahalad (1994) suggest that the more radical innovative concepts arise from a non-alignment of an organisation’s current resources and its corporate ambition.

3.6 Conclusion

The literature relating to organisational change and innovation process, the nature of the innovation itself and the innovation context influenced the design of this research enquiry. In particular, the need for a systematic and holistic approach to educational innovation was highlighted, acknowledging the different levels of system granularity and the interrelationships purported by Ellsworth (2000) between the various system elements. Four university cases were chosen, exemplifying the Australian higher education context, with the intention of drawing out insights with respect to the research question: the ability of an organisation such as a university to embed innovation. The detail of the inquiry agenda follows in Chapter Four.
Chapter 4: Methodology

4.1. Research Design

The research question, which examines organisational ability to embed innovation in universities is primarily of an exploratory nature. In particular, it seeks to identify and examine the characteristics of the embedding process, to investigate more fully the nature of the e-learning innovation, and to search for nascent patterns in the relationship between organisational elements, change processes and innovation characteristics. Thus there are a number of unknowns about how educational innovations are incorporated in a university’s culture and practice. Neuman (1994, p. 18) points out that when little is known about a topic, and therefore everything is potentially important, exploratory research is “more open to using a range of evidence and discovering new issues”. It is therefore less suited to a positivist or scientific approach which favours objectivity and uses quantification techniques and measurement for data analysis (Jakupec & Nicoll, 1994).

Thus this study fits most appropriately within a qualitative research paradigm (Denzin & Lincoln, 2000), deriving its rationale from the need to investigate and understand the whole phenomenon, the range of experiences, events and data which shed light on relationships between dimensions of organisational experience.

The key characteristics of qualitative research methodology are:

- the research is conducted within a theoretical framework (Burgess, 1994)
- the focus of research is on the observed present, but findings are contextualised within a broader social, historical and cultural framework (Burgess, 1994); thus events and experiences must be seen in context if they are to be understood and accurately interpreted (Ely, Anzul, Friedman, Garner & Steinmetz, 1991)
- the whole experience or phenomenon is taken into account, not fragmented into individual components or variables (Ely et al., 1991)
- the field setting (context of inquiry) must be natural, not contrived (Ely et al., 1991) and the researcher, as much as possible, makes minimal impact on the social setting (Burgess, 1994).

The research, an ex post facto design, adopted essentially a case study methodology but drew on a number of the underlying principles and methods associated with
grounded theory building. A syncretic approach was taken as it provides a flexible
discovery strategy which aligns with the emerging and developing nature of the
research problem over time. It was important, however, to ensure cohesiveness in the
research design, reconciling the strengths of grounded theory methods, such as a
systematic and coordinated data analysis process, with the essential qualities of case
study methodology, which facilitates the collection of intensive and rich data in
complex settings. As such, the inquiry represents a pluralist methodological design,
but care has been taken to avoid diluting the essential principles of each to a point
where the research methods employed amount to little more than a superficial
association with the original methodology.

4.2 Grounded theory building

Grounded theory methodology involves the systematic discovery or building of theory
or theoretical statements from data, ensuring that the theory is rooted in observation of
the social world rather than the abstract (Robson, C., 2002). Ideally, theory emerges
from the researcher’s immersion in, and analysis of, the data rather than from
established theory.

In this inquiry, grounded theory provides a useful approach to incorporate the rich data
extracted from the cases into the theoretical frameworks and tools which may later
have wider relevance beyond the original setting (Charmaz, 2000; Silverman, 2001).
Seale (1999, p. 88) argues the benefits of grounded theory for researchers: “treading
the middle road between grand theory and abstracted empiricism is an evocative
depiction of the task that faces researchers who wish to do high-quality work”.

The methodology entails the grounding of theoretical statements by multiple examples
of germane general concepts and carefully selected illustrative examples which are
indicative of a distinct class of objects, “rather than overlapping with other things that
might be seen as superficially similar” (Seale, 1999, pp. 88-89).

This research design encapsulated key elements of grounded theory methodology
through constant comparison of data, the thoughtful and deliberate pattern of theory
building, entailing an iteration between the examination of data and the construction of
theoretical propositions and statements. This method included the generation of
“theoretical categories” through analysis of data (Seale, 1999, p. 91).
Constant comparisons (Glaser & Strauss, 1967) are an indispensable systematic tool for developing and refining theoretical categories. This method adds considerable weight to the process of theory building and involves “open coding” of data and identification of categories and properties (Strauss & Corbin, 1990, pp. 61-74); “axial coding”, generating new ideas about the sub-categories or “properties”, including making connections between categories and sub-categories and reassembling data (Strauss & Corbin, 1990, pp. 96-115); “selective coding” or integration of categories and properties, noting in particular interactions between the properties (Seale, 1999; Strauss & Corbin, 1990, pp. 116-142); and “theoretical saturation”, which occurs when no additional categories or properties emerge that add new information or insight (Glaser & Strauss, 1967, p. 61).

The purist inductive view of grounded theory (Glaser & Strauss, 1967) has been challenged by those who are open to a less rigid approach: “accounts of grounded theorizing depend on separation between data and theory which is to an extent artificial if we accept the philosophical point that all observational data depend on some theoretical system” (Seale, 1999, p. 88).

Ezzy argues the benefits of a more sophisticated approach to thematic analysis and theory building which draws on both inductive and deductive methods, explaining the distinctions made by advocates of the maturer model:

Many grounded theorists emphasise the role of preexisting theory in sensitising the researcher to orienting questions that need to be examined during the research. The task of the grounded theorist is to allow deductions from preexisting theory to suggest specific research problems and foci, but the researcher must not allow this preexisting theory to constrain what is noticed. The grounded theorist uses deductively derived theory, but also examines questions and issues beyond what is suggested by deductively derived theory (Ezzy, 2002, p. 12).

It is important to separate statements that report data from statements that explain data. Seale argues that the grounding of theory in data is an important element in achieving the more general aim of supporting claims with credible evidence (Seale, 1999).
4.2.1 Concepts

Within a grounded theory methodology, the notion of the concept as a distinct (rather than overlapping) class of ideas or objects (Seale, 1999), is particularly relevant to this inquiry. In this way, for example, *embedding* is developed as a nascent theoretical concept as the research progresses. It is important, nevertheless, to differentiate between concepts used by participants in negotiating their own reality, and theoretical concepts created by the researcher (Rose, 1982).

4.2.2 Theory and theoretical statements

A theory is a statement about a set of ideas or concepts, arranged to explain or define a phenomenon, series of occurrences or relationships (Robson, C., 2002). Ezzy (2002, p. 3) argues that theory development that focuses on “the role of meanings and interpretation” is particularly well suited to the domain of qualitative research.

Theories that focus on meaning are particularly relevant to this study, where individuals have attached multiple and diverse meanings to the same incident or phenomenon. This diversity poses particular challenges for the researcher, who must grapple with the issue of subjectivity associated with meanings, remaining alert to how meaning can be open to dispute or manipulation. Nevertheless, theory in itself can be helpful in social contexts in providing possible explanations for how people shape their observations and behaviours (Ezzy, 2002).

New theories in the first instance are “substantive” in that they refer only to the immediate phenomenon described (Seale, 1999), and yet, as argued by Glaser and Strauss (1967), the grounding of theory in data means that it has been tested to some extent, enabling a hypothesis to be made about generalising to broader situations. The capacity to generalise is further supported by Seale (1999), who posits that the advantage of concepts grounded in data is that it is possible to make applications to more broadly based experiences. Thus, an important distinction in theory generation is the difference between theories that are replicable and theories that are transferable (Henwood & Pidgeon, 1993), producing principles which explain patterns that may not be replicable because of context and culture. This study is concerned with the latter.
4.3 Case Studies

The research design entailed a multi-site case study of four Australian universities. Case study methodology facilitated the identification and exploration of the organisational elements, their relationships, and the issues which influenced the changes associated with an innovation such as e-learning in different university contexts.

Case study methodology derives from a strong tradition in both organisational and educational research (Burns, 1994). Burns suggests that case studies are well suited to exploratory research “because they are so intensive and generate rich subjective data they may bring to light variables, phenomena, processes and relationships that deserve more intensive investigation” (p. 313).

Furthermore, Morgan (1991, p. 1) argues that the case study, employing a wide range of methods, can be useful “to get to the bottom of and to understand what is really going on in a complex organisational setting and to attempt to make sense of the multiple realities of the complex phenomena”.

The confusion among some researchers over what constitutes a case study warrants clarification from the outset. Crotty (1998) views the case study as a research method along with interviews, observations and questionnaires, whereas Yin (1994) posits a broader view of the case study as a research strategy, a methodological choice which encompasses the attributes and characteristics of methodologies such as qualitative or quantitative, exploratory and descriptive. This study adopts Yin’s position.

4.3.1 Defining the “Case”

There is another important distinction to be made, between the case as the unit of analysis and the case study, as the overall research methodology employed. Identifying the boundary of a case is important (Burns, 1994; Yin, 1994), and it should be clearly defined from the outset, for “without this the investigator will have no bounded system and will be tempted to collect everything that randomly may have a bearing on the issue” (Burns, p. 318).

Burns (1994) and Yin (1994) both acknowledge the existence of naturalistic case studies, and this form presents alternative ways of distinguishing the case as the
primary unit of research. Becker (1992) argues that a case can never be defined at the outset of the research because it is only as the research progresses, as evidence emerges, that the ultimate shape and form of the case materialises. The answer to the question “What is this a case of?” is thus revealed through the analytic exchange of ideas and evidence by the researcher.

In this dissertation four universities were identified as the primary sites for the cases, conceptualising the case as an empirical, generalised unit of analysis. At two sites the whole university was chosen, and at two the case was a faculty within the university. In all four the case was seen as empirically real and bounded, and its existence as an entity in its own right was not challenged.

As Ragin (1992) argued when devising his typography, case categories are not absolute and a researcher can adopt an eclectic approach drawing on more than one conception of the case within the one study. He further argued:

In fact, most research involves multiple uses of cases, as specific or general theoretical categories and as specific or general theoretical units. These multiple uses occur because research combines theoretical and empirical analysis... The point (of the typography) is not to establish boundaries between different kinds of research, but to establish a conceptual map for linking different approaches to the question of cases (Ragin, 1992, p. 11).

In this sense, although the primary case unit is the university or the faculty, which is taken to be a more conventional empirical unit of analysis, within each case unit, additional sub-units of analysis are identified during the research process. Some researchers (Ragin, 1992; Yin, 1994) identify different levels or sub-units of analysis within a case, “no matter which case or unit investigators use in their empirical analyses, they typically invoke additional units in the presentation of their research” (Ragin, 1992, p. 2). This approach aligns with the analytical methods of grounded theory methodology.

Yin (1992, p. 41) refers to the identification, selection and integration of sub-units into the research design as an “embedded” case study. Examples of sub-units within a case study include organisational programs, individual projects and “process units” such as meetings, locations and work groups (Yin, 1992, pp. 41-43). In this research, the likely sub-unit candidates embedded within the wider university case are the key programs, initiatives, organisational units, stakeholders and work groups involved in
the change process, such as senior executives, individuals, or groups from Rogers’ (1995) innovation adopter categories. A holistic rather than embedded design is appropriate when no logical sub-units can be identified or when the relevant theory underlying the case is of a holistic or unified nature. Nevertheless, if most cases embrace more than one analytical level or dimension, it is useful to explore the question of how the researcher handles this complexity.

4.3.2 Case selection methods

The university cases chosen reflect a broad range of organisational backgrounds, missions and interests. Individual cases, according to Yin (1994, p. 31), should be selected “as a laboratory investigator selects the topic of a new experiment. Multiple cases, in this sense, should be considered like multiple experiments”.

Grounded theory requires that the choice of cases to study involves careful choice of interviewees and settings to observe, with a view to challenging existing notions or theories, or limitations of existing theories, and forcing the researcher to be open to the incorporation of new phenomena (Seale, 1999). For example, in the context of this inquiry, existing theories of organisational change (Rogers, 1995) might be challenged or expanded to incorporate new conceptions of embedding innovation. A key requirement of grounded theory centres on the selection of multiple comparison groups, carefully considered according to theoretical criteria (Charmaz, 2000; Glaser & Strauss, 1967).

4.4 Research agenda

The overall research design can be appreciated from two overarching perspectives: an exploratory and discovery inductive phase, and a transition later to a more focused deductive phase. Each of these broad phases involved data gathering and analysis activities but with a different intent, to amplify the inquiry process and then to hone it, as illustrated in Figure 4.1.
Figure 4.1. Research design
4.4.1 Literature review

The initial exploratory stages of defining the research problem were motivated by the researcher’s extensive experience working with educational innovation in the higher education sector, but were also significantly informed by a relatively open and wide ranging investigation of the literature in the fields of organisational change and innovation, and open systems theories.

The literature search was also influential in guiding the researcher with respect to the research methodology and, in the initial stages, in determining the key elements of an organisational profile which would guide the ultimate selection of the case sites. For example, many of the criteria identified in the literature (Mark, 1990; Yetton et al., 1997), such as strategic orientation, management and structural variables, were used to build organisational profiles of the selected university cases. Ultimately, the elements of the organisational profiles also contributed to development of tools or “frameworks for analysing, quantifying and comparing institutions” (Mark, 1990, p. 13), as represented graphically in Figure 4.2.

Figure 4.2 Organisational profile framework

The early role of the literature was therefore to refine the research question, influencing the criteria for site selection and the interview questions, and informing the researcher’s early thoughts in the conceptual development of frameworks. The
literature, in fact, underpinned the empirical work at various key stages of the research. For example, when the issues arising from the first analysis of case data were explored, a review of systems theory and, in particular, complex systems was conducted, which subsequently informed the later focus of the research design.

4.4.2 Four institutional profiles

The selection of the case sites for this research was based on each organisation’s strategic orientation (e.g. distance education, research, technology, international or transnational focus), affiliations (e.g. with other higher education institutions), age, size, geographic location/s, organisational history (e.g. structural status: amalgamated or unitary), numbers of campuses (single or multi-campus).

This approach permitted a greater scope for investigation of possible congruencies or divergences, thus opening up creative avenues for research. The cases chosen were:

- Gamma University: a geographically distributed distance education university
- Lambda University: an established research strong university
- Epsilon University: a regional multi-campus distance education university
- Delta University: an urban university of technology.

The four Australian university cases occupied specific geographic and strategic positions within the higher education sector. The organisational elements of the profile, in particular strategic orientation, affiliations, age, size, location and history, facilitated the development of a top level institutional profile useful for purposes of comparison and analysis.

4.4.2.1 Strategic orientation

Strategic orientation is a strong indicator of an organisation’s position within the external environment. An institution’s strategic orientation provides a framework of “organisational intent” or perspective with respect to the external environment (Mintzberg, 1991b, p. 16), which in turn guides its internal direction and sense of cohesion. Strategic orientation influences other organisational elements such as the
geographic location, number and size of a university’s campuses, its affiliations and collaborations, and its marketing strategy (Porter, 1991, 1996; Wills & Yetton, 1997).

It was evident that Gamma University, for example, shared a similar orientation to Epsilon University with respect to their strong commitment to off-campus education, with Gamma University placing particular importance on an international perspective within its distance education profile. In contrast, both Lambda University and Delta University had a tradition of on-campus, face-to-face teaching. All universities recognised the growing significance of the use of technology in educational programs, but their individual traditions and preferences for distance or on-campus teaching had important implications with respect to the application of online and technology-mediated approaches to learning.

4.4.2.2 Affiliations
Delta University had a strong applied technology focus and had recently joined the ATN (Australian Technology Network). Gamma University was also a member of the ATN group. Lambda University placed great emphasis on research, and had aligned itself with the established universities “Group of Eight” network. It also belonged to the international consortium Universitas 21. Epsilon University, at the time of the first round of field work, had no formal institutional sectoral alignments within the Australian university sector. At the outset of the study, external alliances were seen by the researcher to be indicators of potential influences rather than a strong influence on internal decisions on institutional core business such as teaching and learning.

4.4.2.3 Geographic location
Lambda University was primarily a single campus institution with a central urban location. Likewise Delta University also occupied a city location, but had additional suburban campuses and considered itself a multi-campus institution. Gamma and Epsilon were also multi-campus institutions; Gamma was located in an urban setting, while Epsilon was a regional university. Each university had a close affiliation with its geographic location, empathising with its area constituents defined by state or regional locale. Locality, therefore, was an important factor with respect to the nature of engagement of each university with its external environment, in that each institution was keen to demonstrate a significant local presence. There appeared to be more diverse views about the importance of physical location in determining or guiding the
universities’ interests with respect to transnational markets and other strategic considerations.

### 4.4.2.4 Size, age and organisational history

Size, age and organisational history are additional characteristics that contribute to the overall profile of a university. All four universities were relatively large by Australian standards in 1998-1999, with student populations of approximately 25,000 to 30,000. The demographic makeup of the student cohorts and the staffing profiles were quite different.

Gamma University had approximately 2,000 staff (55% academic), and of its 25,000 students over 2,500 were international. Over half of the international students were, in fact, transnational enrolments, with concentrations in Singapore, Malaysia, and Hong Kong, studying business and management courses. The relatively high number of off-campus enrolments (15% in 1997) illustrated the ongoing distance education focus of the university. Additional figures complete the snapshot of Gamma University’s student population: in 1997 just over 50% of the students were full time; there was a predominance of undergraduates (approximately 80%); and a small proportion (3%) were research higher degree (RHD) students. Business and management had the highest enrolments (approximately 25%).

Lambda University, although larger than Gamma, with approximately 30,000 students, had fewer than 2,000 full-fee-paying international students. The faculty comprising the case for this study had 795 full-time equivalent academic staff, 411 general staff and 4471.4 full-time equivalent students. International students made up 9.2% of the faculty’s student population (significantly lower than average for Australian universities).

The four universities diverged with respect to history and age. Three of the institutions (Gamma, Epsilon and Delta) were relatively newly designated universities, less than 15 years old. Gamma University was less than 10 years old. Their relatively new university status was atypical of a newborn organisation, as the three were formed largely through amalgamations with established tertiary educational institutions. (The amalgamations were fostered by the Commonwealth Government in the late 1980s and early 1990s.) This amalgamated multi-campus structure introduced significant complexities into the management and culture of the institutions. In contrast, Lambda
University was an established institution, with a tradition of over 100 years, and although in more recent times it had acquired new institutions and campuses, fundamentally it was considered a single principal campus location.

The broad organisational profile of each of the cases can be summarised as follows. Gamma University is a multi-campus institution, geographically spread across urban and regional locations. An amalgamated university from the late 1980s, with a recognisable distance education profile, it is affiliated with the Australian Technology Network (ATN). The university had promoted the strategic use of information technologies, particularly online technologies, to further its academic programs locally, nationally and internationally.

Lambda University is an established university, with the majority of students located at a single urban campus. Affiliated with the “Group of Eight”, it has a strong orientation towards research but also strongly advocates excellence in teaching. Extensive use of interactive multimedia programs is encouraged, particularly in the case faculty examined in this study, and at the time of first round data collection the University was beginning to explore online applications.

Epsilon University is a younger university in the Australian context. A multi-campus amalgamated university with a reputation for distance education, it was developing a strong regional presence. Epsilon demonstrated broad institutional use of online technologies.

Delta University is also a relatively young multi-campus university, although, as with a number of amalgamated institutions, its parent bodies provide a longer history. The university is in an urban location, is a member of the Australian Technology Network (ATN) and has developed strong local and state professional and industry links. The University, and the case faculty studied, had adopted diverse approaches to the use of educational technologies, including online.

4.5 Research methods
Following the selection and profiling of the four cases, an appropriate research design was constructed, incorporating data collection and analytical methods from both grounded theory and case study methodologies.
4.5.1 Data collection

The major data gathering methods used in this research were archival research through analysis of key documentation, semi-structured interviews with key personnel, and focus groups with other significant groups, including students and support staff.

Documentary data were collected from a wide range of each institution’s published information, including mission statements, strategic and resource allocation plans, review and annual reports, policy and procedure documents. Glaser and Strauss (1967, p. 45) advocate a method of theoretical sampling, defined as:

the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyzes his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges. The process of data collection is controlled by the emerging theory.

Collection of qualitative data using personal interviews and focus groups also employed a number of additional research techniques, including the “critical incident techniques” (Kain, 2004; Tripp, 1993), whereby interviewees are asked to relate the critical events or incidents from their experience which they believe influenced or engendered a change in personal or organisational behaviour. These incidents or events could then be analysed according to pre-determined criteria and in relation to other evidence presented in the institutional case documentation. The appointment of a new member of the university executive, or implementation of a new institutional policy, are examples of critical incidents related by participants. Critical incident techniques were especially helpful in the initial stages of the research in gaining a deep understanding of emerging phenomena such as the e-learning innovation. Furthermore, critical incident techniques align well with a grounded theory methodology, as a systematic approach to data gathering which minimises the subjective input of the researcher through a focus on the real world stories of the participants (Kain, 2004).

Reliability and validity are paramount with respect to the data collected in case study research. Morgan (1991) argues that it is possible to conduct case studies in a manner which maintains high reliability, but it is important to chart the multiple realities of any given setting, ensuring that interpretation is negotiated through participant verification.
A reliability check on the study relates to whether the description of the data or report represents a recognisable reality to the reader or to those acquainted with the situation (Morgan, 1991). Participant verification of all transcripts was undertaken in both phases of this study.

Validity was also assured through reference to multiple sources from records and documents, interviews or focus group discussions. As Burns (1994, p. 321) explains, “multiple sources allow for triangulation through converging lines of inquiry, improving the reliability and validity of the data and findings”.

### 4.5.2 Analytical strategy

A systematic approach was adopted with respect to the analysis of all the case data, drawing on a number of methods of grounded theory. A sophisticated position on coding and analysis was taken which mixed both inductive and deductive methods and recognised the potential advantages of “the process of theory building (which) involves an ongoing dialogue between data and theory” (Ezzy, 2002, p. 93). Grounded theory analytical methods were employed, such as open, axial and selective coding (Ezzy, 2002; Strauss & Corbin, 1990), and “theoretical saturation” (Glaser & Strauss, 1967, pp. 61-62). Theoretical saturation, similar to “thick description” (Geertz, 1973, p. 10), is reached when new instances from the data repeat or are similar to previous occurrences, and thus the researcher is able to feel “empirically confident that a category is saturated” (Glaser & Strauss, 1967, p. 61). Theoretical saturation aids the researcher in determining when to stop filling categories (Glaser & Strauss, 1967), which Seale considers analogous to creating “provisional truths” (Seale, 1999, p. 93). This is a precursor to building theoretical statements. In particular, theoretical saturation was useful in informing the development of propositions, which Neuman (1999, p. 517) defines as “a basic statement in social theory that two ideas or variables are related to one another”. Propositions can point to conditional rather than causal relationships.

In summary, a thematic analysis of data was applied effectively for the purposes of comparing and contrasting cases, exploring categorical schemata and negotiating the emerging convergences and divergences in thinking and theory building between the data and existing theory. In particular, the identification of themes was invaluable in making sense out of enormous quantities of open ended data. Themes can be understood as “meaning statements” that pervade most of the data collected, or that
occur in only a small amount of the data but are highly relevant or carry great weight (Holroyd, 2001, online).

Document analysis and analysis of transcriptions of interviews and focus groups also made use of other techniques, such as “sensemaking” (Weick, 1995, 2001) and the use of “thinking units” or “thinking topics” (Lofland & Lofland, 1984, 1995). When applied in the early stages of data sorting, the latter are particularly valuable if the original data reveals patchy or non-specific information.

Sensemaking, “literally, it means the making of sense” (Weick, 1995, p. 4), is particularly valuable in assisting the researcher to understand or find new meanings where discontinuities or previously inexplicable disruptions of events have occurred. This was evident in this study, with respect to questions related to innovation uptake. In other words, “if an initiative had worked well, why was it not generally well accepted and adopted by colleagues?” Sensemaking is an action-based process rather than merely an interpretative one, which Weick argues is a more descriptive undertaking. Sensemaking therefore implies a high degree of engagement on the part of the researcher for the purpose of constructing or creating a tangible outcome from a previously dissonant or uncertain context. Individuals or collectives such as organisations can engage in sensemaking as a means of making sense out of ambiguity, and as a strategy (though by no means the only strategy) for formulating action and gaining commitment.

Notwithstanding the logical analytical strategy associated with grounded theory methodology, it is important to note that the more sophisticated model also supports the role of the researcher’s intuition and hunches, reflecting the fact that processes are not always straightforward and linear, but are “often confusing, frustrating and somewhat chaotic” (Ezzy, 2002, p. 90).

### 4.5.3 Phase approach

The collection (and subsequent analysis) of the empirical data was designed in two principal phases, aligning with the inductive-deductive approach (see Figure 4.1). Phase One involved the collection of data, and identification and analysis of themes and issues from the four cases (1998-2001). Phase One was conducted in two stages: the first centred on the Gamma and Lambda cases, the second on Epsilon and Delta.
Phase Two (2002-2004) employed a more deductive approach involving the collection of new data based primarily on three propositions, and subsequent analysis, from only two cases (Gamma and Lambda).

4.5.3.1 Phase One, Stage One – data collection

Data collection during Phase One employed exploratory and flexible/responsive design methods such as semi-structured and open-ended questions (see Appendix 1, Table 4.1 for questions). Data gathering, which occurred from late 1998 to 1999, entailed interviews or focus group sessions with 74 participants over 59 sessions across the four institutions (see Appendix 1, Table 4.2). The interviewees were selected as representative of university staff and affiliates engaged in or influencing the adoption of e-learning within the particular university environments. They ranged from senior executive staff (at the level of Pro-Vice-Chancellor or Dean) to administrative staff and in between staff with a range of job roles (e.g. lecturer, librarian, computer programmer, multimedia developer, administrator, project, program and line manager). Selection of interviewees was also based on the degree of involvement with or acceptance of the e-learning innovation, from the enthusiasts and early adopters through to the late adopters or non-users. Focus groups were employed when it was felt that individuals might reveal different perspectives or greater insight on certain topics, such as motivation to adopt e-learning, if they were encouraged to share their views in a non-threatening and permissive environment. Special attention was taken through the moderating process to minimise the problematic issues which can arise with in-house focus groups (Krueger, 1988). All interviews and focus groups were recorded, transcribed and verified.

Much of the Phase One data (interviews and focus groups) was originally collected by the researcher as part of a Department of Employment, Training and Youth Affairs (DETYA) Evaluations and Investigations study published in 2000. Access to this data was subsequently authorised for use for this study by the Director of the Higher Education Division of DETYA, and by the participants. The emphasis of the original DETYA study was on evaluation of general issues related to the adoption of educational technology methods in teaching, and the requirements for establishing a national inventory, but it did not theorise the innovation process or pursue the analysis of this thesis.
4.5.3.2 Phase One — data analysis

Analysis of the four cases data was completed in two stages: the first focused on Gamma and Lambda, and the second on Epsilon and Delta.

In the first instance, an open coding process was adopted that centred on devising broad classifications for the Gamma data (transcriptions and institutional case documents). This first-level coding process was based largely on identification of broad themes and patterns of issues or concepts, derived primarily from the nature of the data itself, in the tradition of grounded theory (Strauss & Corbin, 1990). For example, the broad classifications included all data related to “the nature of the change process” or the “characteristics of the e-learning innovation”. Following this, a second and more detailed process of classification was devised. For example, with respect to the change process, a new classification unit was created which included the pace of change; the current organisational position the change occupied; the direction in which the change was moving; and the type of change (e.g. radical, evolutionary). Evidence with respect to who had provided the information and quotations was also attributed to the classification table at this stage.

This systematic approach was applied to the Lambda data in the same way. It became apparent in the coding process of the second case, however, that additional information required some refinement of the original second level codes or sub-categories adopted for the Gamma analysis, such as addition of a sub-category relating to the motivations of the change stakeholders, and expansion of a sub-category dealing with intellectual property under primary category “Organisational Elements”.

A subsequent stage of data analysis of Gamma and Lambda continued until “theoretical saturation” (Glaser & Strauss, 1967, p. 61) had been reached and the data was considered to be rich and thick (Geertz, 1993). The creation of two comprehensive tables facilitated the analytical process, in particular the capacity to make comparisons between the two cases, and the ongoing development of the first framework, the Innovation Relationships Framework (IRF) in a way which graphically represented the key dimensions and relationships of the research problem within a specific organisational context.
4.5.3.3 Phase One, Stage Two — analysis of Epsilon and Delta cases

Final data analysis of Phase One was then conducted on the Epsilon and Delta cases. Again, a detailed examination of the interview transcripts and documentation of the cases was conducted for each, but in these cases not all data were coded. Instead, information relating to the initial primary categories was recorded, in order to enrich the comparative analysis of all cases. In addition, data which added a new perspective to a particular category, particularly in relation to the non-saturated categories, was included.

This approach ultimately facilitated the comparison of all four cases, using a common and sophisticated system of categories and sub-categories, and gave rise to a number of key issues, new questions and propositions and ultimately to the refinement and critiquing of the IRF. In particular, issues related to complexity and innovation, a more mature conception of change processes with respect to embedding, gave rise to the formulation of some embryonic propositions. This marked the transition to Phase Two of the research design, and a more deductive approach.

4.5.3.4 Phase Two

The purpose of this phase was to

- assess the extent or degree to which the e-learning innovation had evolved and been embedded in the case organisations
- test and explore further early propositions about the nature of the embedding process and organisational ability to embed the e-learning innovation
- examine further the efficacy of the first framework as an analytical and sense-making tool.

Another review of the literature at this point also raised significant issues with respect to complexity theories and the role of innovation.

Phase Two data collection, undertaken in 2003, involved interviews with participants from Stage One at the two principal case sites, Gamma and Lambda. Interview questions were designed to test the new ideas and propositions arising from Stage One analysis. The selection of the interviewees was based on the key role they had played in Phase One and their availability and willingness to be interviewed again in Phase Two (see Table 4.2). Face-to-face interviews were held with three interviewees.
and a telephone interview was held with the fourth. All interviews were recorded and transcribed, and then current documentation was accessed or used from these sites as appropriate.

Analysis of the data drew on the primary categories developed in Phase One. The data were summarised, but also mapped against the IRF. This latter process was useful to assess the efficacy of the IRF as an analytical tool. However, considerable emphasis was also placed on the analysis of data and ensuing findings with respect to the propositions and to an assessment of the degree to which e-learning had been embedded in the intervening years. For example, the limitations of the IRF gave rise to the development of a second, complementary framework, the Innovation Longitudinal Framework (ILF) which, drawing on the Phase Two data, offered a longitudinal perspective of the embedding process.

The literature was again reviewed and applied to both frameworks in order to validate their theoretical as well as empirical efficacy. Limitations and strengths of these analytical frameworks were identified, along with possible complementary strategies.

4.5.3.5 Final Phase

The final phase synthesised the findings from Phase One and Two of data analysis. In particular, the theoretical concept of embedding was refined and the research question “the ability of an organisation to embed innovation” was directly addressed through theoretical statements created as a response to the three second phase propositions.

An overview of the research design is represented in the Figure 4.1.


4.6 Research issues and limitations

There is a need for research within the higher education context which systematically and holistically examines and interprets the nature of the relationship between the elements or dimensions of an organisational entity and its capacity to embed innovation. As indicated previously, much of the research to date has been fragmented, focusing on a specific factor or variables, such as leadership style or technological infrastructure, which affect the capacity of an organisation to integrate or infuse innovations throughout the entire organisation. The way organisations confront and respond to change is both complex and multi-dimensional, and a narrowly focused empirical research design is unlikely to capture the complexity and interrelationships inherent in the research problem.

The qualitative research methodology employed promises to widen the perspective and increase understanding of how technological innovation such as e-learning can be mainstreamed, by identifying and probing the rich and complex set of issues and influences at work in organisational settings. However, as a methodology, qualitative case studies can be limited in their generalisability, and have been criticised by researchers such as Atkinson and Delamont (1993), who argue that case studies, by their one-off nature, have been unable to generate a cumulative research tradition or a body of theory or methods.

Others (Morgan, 1992; Yin 1994) disagree, arguing that case studies may be generalised to theoretical propositions, rather than to a population or universe: “case study research can provide more general insights which contribute towards theory” (Morgan, 1992, p. 82). Alternatively, research results can be juxtaposed and compared with existing theory. The strength of case study research is to expand and generalise theories through analytical processes, rather than to enumerate through statistical generalisations.

Furthermore, the integration of grounded theory building (Glaser & Strauss, 1967; Seale, 1999) strengthens the ability to broaden the application of theoretical findings.
4.6.1 Ethical issues

The nature of exploratory research makes it difficult to conduct because there are few guidelines or precedents to follow (Neuman, 1994). The principal issues in the social science field which potentially limit or pose problems for qualitative researchers include concerns with protection of privacy and integrity of individuals, covertness in obtaining or using data, openness in conducting research, and power relationships between the researcher and the researched (Evans & Jakupec, 1996).

In this inquiry careful attention was paid to ensuring that the research was conducted in an honest, ethical, inclusive and balanced manner. In particular, care was taken to obtain the informed consent of participants, maintain confidentiality and protect the anonymity of participants.

4.6.1.1 Informed consent and covertness

Researchers can be tempted to gain access covertly to data they believe is vital to their study. There are seductive means of gaining informed consent, but Evans and Jakupec (1996) argue that a number of points must be covered if participants are said to have given their informed and willing consent, including the provision of information about the nature and purpose of research, time requirements placed on individual, the voluntary nature of participation, the processes, methods and techniques to be used. Care was taken to ensure that participants were fully informed with respect to the aims and nature of this research.

4.6.1.2 Confidentiality and anonymity

In some instances, confidentiality was an important issue. Some interviewees felt they had sensitive information which, while relevant and valuable to the study, could be seen as potentially damaging to individuals or to their organisation. Such issues relate to commercial confidentiality or the perceived competitive advantage of certain information.

The integrity of the findings, however, depended on the openness and frankness of participants to reveal information about the goals and operations of their organisations. Participants had more empathy for the research aims and demonstrated a willingness to cooperate when assured that the integrity of the information and the identity of the organisation and individuals would be protected.
Obtaining the informed consent of participants was the first step in establishing an open and trusting working relationship throughout the duration of the study. Ongoing negotiation and communication were required to maintain the relationship.

Although every attempt to maintain confidentiality was observed, it should be acknowledged that there is always a small risk that the creation of organisational profiles and the inclusion of other information could hint at the identity of a particular organisation. Nevertheless, particular care was taken to ensure that institutional anonymity and participant privacy were observed in the dissertation and in the security of original documentation and data.

4.6.1.3 Citing of secondary or electronic data

Organisations have a large amount of data that has been collected for a specific purpose. For example in higher education, reviews, strategic plans and course evaluations were seen to have relevance to this study. In many cases, published documents (reports, reviews, statistics) are public and may be used, but in other instances permission was sought to use unpublished data.

The digital age has introduced a new set of complexities into the research context. Online research facilitates access to information on a grand scale and opens up increased possibilities of unauthorised use. Jones (1994) argues that the same professional principles and ethics that pertain to the non-electronic environment should be applied to electronic sources and data gathering methods. Yet researchers should be cautious with respect to working in certain electronic environments including:

- citing material archived in list servs or made available in electronic discussion forums
- observing the rights of individuals with respect to electronic communication via email.

This study observed these principles.

4.7 Conclusion

The research design (see Figure 4.1) adopted a systematic and methodical approach which was reflected in the reporting and analysis of the case data explored in the following chapters. The research design drew on case study (Yin, 1994) and grounded theory (Glaser & Strauss, 1967) methodologies in the data gathering and analysis of
four Australian universities, chosen to explore the broad nature of the research problem. The early inductive approach enabled a wide ranging exploration of the research problem, drawing on the extensive data from the four cases and the literature. The deductive approach which followed in Phase Two honed the analytical processes to enable the findings and conclusions to be presented in a manner of most benefit to university executives, managers and other stakeholders of educational innovation. Analysis of the data collected from the four cases over the two phases of the study follows in Chapters Five and Six.
Chapter 5: Comparison of the Four Cases — New Issues Arising

Introduction

This chapter analyses the first investigative phase of the four case sites (see Figure 4.1). The selection of the cases, based on their profile, provided a wide scope for the investigation of possible congruencies or divergences, opening up creative avenues for research into the conditions which affect the ability of universities to embed innovation within the institution. The analysis was conducted with particular reference to the secondary questions which comprise the overall research problem:

- What is meant by the term “embedding”?
- What are the key influences that affect the ability of an organisation to effect the changes required to embed?
- Does the nature of the innovation affect the embedding process?

The key issues and themes arising from this analysis are discussed and an overview of the state of embeddedness for each of the case institutions is provided. New questions arising from the analysis revealed a gap in the theoretical underpinnings of the study, in particular with respect to the complex and inter-related nature of key elements of organisational systems. A brief overview of systems theories is therefore included, providing an additional theoretical perspective for subsequent phases of the study.

5.1 Analytical framework

The framework used in the initial description of the four cases (see Figure 4.2) was adapted to represent three key dimensions of the research question: the organisational elements, the innovation, and the associated change processes (see Figure 5.1). The initial elements (size, age, affiliations etc.) used to select and create the unique profile of the case universities have been combined into four key organisational elements: strategy, structure, process and culture. These elements are part of the lexicon of organisational theory which not only define an organisation but also shed light on how it conducts its business, both internally and externally.
The nature of the innovation, in this instance the characteristics of e-learning, is central to this research and consequently has been positioned within the organisational boundary. Some innovations are entirely “home-grown”, developed from within using an organisation’s internal resources, skills and capabilities. In this study, however, most of the elements comprising the e-learning innovation were developed externally and had migrated inside the institutional boundary, where the innovation had been adapted to suit the institution’s particular contextual requirements.

The third significant organisational dimension is the change process, and specifically how that process influences the integration or embedding of the innovation within the organisation. These three sets of elements, or super-factors, were considered crucial to advance an understanding of what affects an organisation’s ability to adopt and sustain the innovation of e-learning. It is important to note again that the focus of the study is on organisational elements or dimensions which affect the ability to bring about change. While the role of other influential dimensions of change such as student perceptions and attitudes is acknowledged, they are beyond the scope of this research.
5.2 Case descriptions: Stage One comparative analysis of Gamma University and Lambda University

The case at Gamma University was at the institutional level, examining academic programs within two divisions, areas within the central executive, and the professional support service centres. The case at Lambda University focused primarily on the single largest faculty within the University, but again data were collected from centralised professional support areas.

The key dimensions of the research question, organisation elements, the nature of the innovation and the nature of the change process, were systematically identified and analysed using the methodology outlined in Chapter Four. Only the key findings are reported here, with additional background and contextual information contained in Appendix 2.

5.2.1 Organisational elements

The organisational elements, as an inter-related and comprehensive set of agents, incidents, factors and occurrences, provide the context for the e-learning innovation. Organisational context is a key influence on its ability to successfully embed an innovation.

5.2.1.1 Strategy

In the 1990s, the majority of Australian universities, at the highest institutional level, articulated similar mission statements with respect to teaching quality, commitment to learning, research and community service (Anderson, Johnson & Milligan, 1999). They had, nevertheless, begun to differentiate their institutional goals, to focus on their particular strengths or opportunities and to devise strategies which suited their strategic intent. Lambda and Gamma had quite distinctive strategic approaches that reflected their unique organisational profiles (history, background, student population). Appendix 2, Table 5.1 sets out these characteristics and provides an overview of the strategic focus of each case.

Lambda University’s overall strategy was premised on growing its existing reputation for excellence and quality in relation to teaching and research. The strategy was designed to attract and retain the highest calibre of student, and all decisions
pertaining to the teaching and learning programs within the case Faculty aligned with this overall direction. Lambda’s teaching and learning approach was premised on quality campus-based education, and this permeated all aspects of the organisational context.

In contrast, Gamma, as a young university, sought to carve out a distinctive position in a rapidly changing environment. Its mission stressed innovation, application of knowledge in professional settings and social responsibility, and its goals promoted access to equitable higher education. Teaching and learning were especially important to Gamma and, as such, the University paid particular attention to the development of a carefully considered, strategic institutional approach to teaching programs; one which embraced online learning. In 1998-99, development of online learning was focused on giving the university a competitive advantage:

It (online) is entirely a strategic initiative. It has, as a concomitant of that, a number of significant benefits in terms of adding quality to what we are already doing. But the University quite seriously took the view that it could not simply sit back and watch other institutions develop online services, market their programs internationally, have a face which could be seen around the world, without us trying to match that.

Executive Director, Gamma, Interviewee A3.

The top level strategic direction adopted by Gamma and Lambda was, in most instances, followed through in their organisational structural and process elements. These elements made up a significant operational component of the innovation context.

5.2.1.2 Structure

Structure, as applied to all the cases in this study, incorporates human, technical and administrative organisational structures (see Appendix 2, Table 5.2, for a more comprehensive summary of the structural elements of Gamma and Lambda cases). Overall, structure played a significant role in both cases but each institution focused on different aspects of structural change with respect to the implementation of e-learning. Structural changes were introduced as deliberate interventions to further the organisational goals of the universities.

Organisational re-engineering at Gamma University was widespread, affecting both academic and non-academic areas, but generally the structural change aligned with
the new strategic direction of the University. Structure impacted on all operational areas of the University (see Appendix 2, Table 5.2), but of particular relevance to this study was the establishment of an integrated central professional support unit “to bring together disparate parts of the University” (Executive Director, Gamma, Interviewee A3). This major commitment was designed to steer the direction of online course development and delivery firmly within the institutional strategy and policy framework.

Yet, in 1998-99, many of the really pioneering online programs, for example in the Marketing and Management Schools, operated outside both existing and newly established institutional structures. These innovative, and initially successful, e-learning programs were “owned” by enthusiastic individuals operating at the margins of the University’s existing administrative and professional support structures. Significantly, within these programs, strong alternative collegial networking structures had emerged, “so there’s a team spirit that’s developed amongst the staff … they have started to share and help each other out” (Academic Program Manager, Gamma, Interviewee 8).

The scale of structural change at Gamma, however, had created a sense of uncertainty and produced organisational tensions, which manifested in cultural misalignments and which were also evident in the University’s organisational process responses to e-learning.

Lambda’s organisational structure was more stable than Gamma’s and its structural changes more targeted to further specific e-learning goals. Lambda’s structural interventions included the establishment of key senior positions, e.g. Assistant Dean, to guide the appropriate use of information technology (IT) and technology in teaching and learning. Lambda University had an extensive nested system of institutional and faculty-based units providing comprehensive professional advice and service to staff (see Appendix 2, Table 5.2), but of particular interest to this study was the Lambda Multimedia Unit (the LMU).

The autonomous academic structure at Lambda, along with the relatively high level of resources (e.g. IT, funding, staffing), acted as an isolating force, enabling those within the Faculty to retain a high degree of independence in work practice. It allowed individuals to work in a focused, but to some degree insular way from the generic issues impacting the institutional context. There was a strong discipline and professional focus in the Faculty’s teaching and learning goals, and the philosophy and
pedagogical practice of the staff. Generally, although particular individuals had been charged with the role of brokering e-learning activity between the Faculty and the University or the external environment, the need or the capacity to collaborate was neither widely recognised nor exploited.

Analysis identified a number of structural elements of particular significance to the broad issue of adoption and implementation of the e-learning innovation. These included the introduction and management of institutional grants for teaching and learning innovation and the emergence of new professional staff roles and informal communication networks.

5.2.1.2.1 University Grant Schemes
The teaching and learning grant scheme at Lambda was a key plank in the University’s strategy for adoption of e-learning approaches. The scheme was designed as a positive incentive to support varying levels of innovation from start-up pilot projects through to large scale, collaborative initiatives. The scheme was judged a success as a structural intervention, pivotal to the realisation of the Lambda’s strategic plans and to the capability of the Faculty:

I think the provision of seed funding from the University has been very important, a major stimulus to let people develop… that’s led to increasing quality of the products we’ve been developing. They’ve been funded in a competitive situation. Faculty Dean, Lambda, Interviewee A1.

5.2.1.2.2 New staff roles and communication networks
The numerous projects in e-learning at both institutions had spawned new roles and informal communication structures within project teams, across disciplines and university functional groups (see Appendix 2, Table 5.2). These changes affected both academic, administrative and professional support staff. Administrative staff at Gamma University, for example, had forged new communication lines with other administrative areas of the University in response to the need for more flexible processes within the new transnational programs. New informal relationships and communication networks relied less on rigid rules and procedures, as the staff reported that they “[were] jumping on the phone to the people down at the Registry… and slowly but surely they’re looking at our issues and trying to work around them for us… and just recently it’s starting to come together” (Administrative Support Officer, Gamma, Interviewee 12).
Structural changes to work groups also prompted change with respect to the role of the academic teacher at both universities (see Appendix 2, Table 5.2). The disaggregation of the traditional teaching role had begun in the Lambda Faculty case, for example, where much of the preparation of class teaching materials (especially computer-based multimedia development) was done by professional support staff. At Gamma, academic staff were not only devolving some development of learning materials to others in their project teams, but were also sharing responsibility for program delivery and student assessment among the team members.

Significantly, the analysis of structural elements revealed that the changes of greatest impact were those involving people, staff roles and communication networks, prompted by the escalating demands of teaching and learning with new technologies. Furthermore, these developments were also leading change in established organisational processes and practice.

5.2.1.3 Process
Both universities had instigated operational and management change with respect to policies, procedures, planning, communication processes and training and support programs. An overview of the key organisational processes at Gamma and Lambda is provided in Appendix 2, Table 5.3. Policy and procedural areas can act as a litmus test of organisational health with respect to change and strategy, highlighting organisational gaps and tensions, as became apparent in some areas at Gamma University.

5.2.1.3.1 Policy
Policy was a key influence at Gamma with respect to the University’s ability to embed e-learning. The existing policy framework was strong, building on a tradition of distance education, but gaps and contradictions were highlighted with respect to online development and delivery. While there was general consensus about the need for policy to drive the e-learning innovation (with notable exceptions of early innovators), key staff recognised the complex issues associated with such an embryonic educational paradigm:

Policies are written around a certain environment, and the environment is partly the delivery technique of education, and it’s also the cultural environment… choosing to
operate online means that you are teaching in a whole range of cultures… in the best of all possible worlds, when you develop a policy you’ll involve all stakeholders… With online, I guess there’s always a difficulty when you’re moving into new areas. It’s not the fact that its online that creates the problem, it’s the fact that it is a new area and no-one has experience in it. Senior Administrative Manager, Gamma, Interviewee A2.

There were diverse views about the efficacy of Gamma’s policy framework to drive e-learning and the reality of what seemed to be unfettered individual project development (examples of policy gaps and tensions are provided in Appendix 2, Table 5.4). The Pro-Vice-Chancellor (Interviewee A1), for example, foresaw that new University policies for a universal e-learning online environment would be resisted by a number of early adopters, who actually saw themselves as leading institutional change.

**Lambda’s** approach to process in general, and policy specifically, was more low key, allowing much greater freedom to its academic staff than Gamma. In some ways Lambda’s policy regime, with respect to multimedia development and educational use, could be described as fairly loose, even laissez-faire. The Dean suggested that computer-based learning, despite its 10-year history within the Faculty “hadn’t had any particular effect on the policy framework” (Faculty Dean, Lambda, Interviewee A1). Intellectual property (IP) policy and process, however, were the exception, in that they were often perceived as barriers or impediments to the advancement of e-learning (Appendix 2, Table 5.5 compares the position of the two case universities towards IP).

5.2.1.3.2 Resourcing
Implications of different levels of resourcing and funding at Lambda and Gamma flowed through to a number of processes that influenced teaching and learning. **Lambda** had the capacity to direct new funding and additional staff to promote and progress the educational use of IT. **Gamma**, however, was operating within a tighter fiscal and resource environment, and consequently relied on processes to ensure efficiency and a clear return on the investment across the whole University.

5.2.1.3.3 Staff training and development
Staff development at both cases was considered very important, but again each had a different emphasis. Institutional funding levels impacted on how **Gamma** developed staff professional development and training support services and processes.
Development and training were instrumental to the success of Gamma’s e-learning approach (see Appendix 2, Table 5.6). At Lambda the need was to ensure that staff were comfortable with the use of educational technologies and knowledgeable about educational possibilities, rather than to provide specific training programs.

5.2.1.4 Culture
Lambda and Gamma displayed quite distinctive but contrasting cultures (as illustrated in Appendix 2, Table 5.7). Gamma’s culture could be summed as pragmatic but innovative, driven by the will to succeed and survive, and influenced by strong leadership and a sense of urgency. Tensions and uncertainties surfaced in this climate, between traditional academic, entrepreneurial and strong economically driven executive cultures. Lambda was working from a more stable, comfortable and less confrontational base, with a strong cultural identity, sense of confidence and purpose about its mission. The culture at Lambda presented a challenge to innovation programs, as the inertia brought about by reliance on stability and existing norms (e.g. the traditional role of academic staff) could close off new opportunities.

5.2.2 Nature of the e-learning innovation
A comparison of the e-learning innovation at Gamma and Lambda was useful to tease out nuances of the nature of the innovation and its relationship to the other key elements of the research question, particularly the nature of the embedding process. The innovation of e-learning in this study assumes a broad definition comprising educational and IT technologies, hardware and software; pedagogy and learning approaches; IT and administrative infrastructure; and the soft social and human systems associated with the support of e-learning.

5.2.2.1 Gamma overview
The e-learning innovation at Gamma focused primarily on online learning. The pedagogical and institutional administrative systems which underpin the distributed or distance learning dimension of e-learning were reasonably well understood by the Gamma community. From a whole organisation perspective, however, the technical, learning design and associated student and staff support elements of the innovation were more diversified, and therefore the e-learning innovation in 1998-99 could be described as emergent and still relatively immature.
In this first phase of the study, Gamma University was in a transitionary period with respect to its online environment, moving from a plethora of subject websites to a universal online system. A transformation of the teaching and learning environment was envisaged, comprising the learner management system (LMS), technological infrastructures (computers, servers, networks), human infrastructure (key positions and support units) and administrative systems. A key technology component of the e-learning innovation was the internally developed LMS system (GammaNet), which was designed as “a relatively low cost attempt to put the entire program of the University online as rapidly as possible” (Executive Director, Gamma, Interviewee A3).

5.2.2.2 Lambda overview
The nature of the innovation at the Lambda Faculty had been shaped by a quite different 15-year history of the use of IT, multimedia and computer-based learning in teaching (Interviewee A2). Unlike Gamma, Lambda’s educational use of computers and IT had been confined to on-campus activities. Computer-based learning was initially introduced as a practical solution to a raft of resourcing issues, including the high replacement cost of scientific laboratory equipment and the need for more teaching and support staff and therefore “it came down to an economic argument, rather than an educational argument” (Senior Academic Administrator, Lambda, Interviewee A2). It had always been premised on use of high-end, rich multimedia content which emulated or enhanced the existing on-campus learning experience and was not tied to a single institutional technology or system.

An evaluation of Lambda’s computer-based learning programs, however, raised pertinent questions about the Faculty’s ability to sustain its current approach, which required ongoing revision and updating with respect to both content and design. In particular, funding for the maintenance of individual programs was problematic, as was allocation of resources to programs for redesign to make them web deliverable.

Thus the e-learning innovation profile at both Gamma and Lambda grew from quite different origins and philosophies about e-learning, including diverse conceptions of quality, institutional priorities and goals (summarised in Appendix 2, Table 5.8). Examination of the various elements and “innovation streams” (Tushman et al., 1997, p. 5) provided key insights into the nature of e-learning as an example of “product” innovation (Anderson & Tushman, 1997). A brief overview of the these elements follows.
5.2.2.3 Elements of the e-learning innovation

At **Gamma University**, e-learning exemplified a product innovation with two parallel online technologies, the existing course based stand-alone websites and the new LMS, GammaNet, which together incorporated a number of technologies to create an integrated institutional online learning space. This space comprised administrative, user support and course related features (summarised in Appendix 2, Table 5.9). The e-learning technology was inextricably linked to other key dimensions of the innovation (pedagogy, curriculum, support systems, administrative procedures and policies). The interrelated nature of the innovation underpinned a raft of broader project goals relating to institutional acceptance and use (see Appendix 2, Table 5.9), supporting this study’s claim for the need for a holistic approach to the take-up of educational innovation.

**Lambda University** had committed to a far more diversified approach, exhibiting a number of technological solutions and pedagogical approaches, each customised to the particular requirements of a subject and its students. At an institutional level there was an emphasis on robust and extensive IT infrastructure, networks and library systems to underpin the innovative and high-end development being undertaken by the Faculty. A number of innovative or cutting-edge developments were supported within the Faculty, for example, the production of interactive and animated sequences or “objects” to be incorporated into computer-based programs, with a view to wider sharing via web-based delivery in the future.

5.2.2.4 Institutional views and expectations of the e-learning innovation – impact on change process

A systematic comparison of the two cases (Appendix 2, Table 5.9) highlighted two quite different innovative approaches to e-learning with respect to technologies employed, preferred pedagogy and methodology, IT and administrative systems, interpretation and implementation of quality control. The scale, scope and radicalness of the innovation adopted by the two cases also differed.

**Lambda** had adopted a more targeted approach, seeking to gain maximum benefits with specific programs, whereas the priority at **Gamma** was to expedite an institution-wide, consistent and scalable approach to e-learning. (Appendix 2, Table 5.10, compares the two approaches.) Analysis of these issues sheds light on the research
question which focuses on the relationship between the nature of the e-learning innovation and the embedding process, highlighting the evolving complexities and intersecting pathways of the various system elements.

Divergence of opinion and approach at Gamma was generally seen as a destabilising influence, but such differences at Lambda were perceived as an indicator of rigorous and healthy debate. At Lambda, for example, some interviewees argued that the pedagogical impact of e-learning was delivering a distinct educational advantage, which for the most part had been readily embraced by students and staff. The opposing view, however, was far more guarded:

On the philosophy of teaching, I think in say the last eight years, I would say [it’s had] a probably small impact…. It was seen not so much really as a way of delivering educational material or engaging the students in an intellectual activity, but more really a logistics solution. Senior Academic Administrator, Lambda, Interviewee A2.

Gamma had recently defined more clearly the nature of its e-learning innovation from an institutional perspective, one which aligned with the University’s overall plan for sustainability, viability and future growth. Gamma’s change processes, therefore, were now being designed to realise this vision and, as such, were more pervasive and directive. There was a sense of urgency at Gamma about the need to progress, and therefore less tolerance was shown towards multiple and competing e-learning solutions.

Contradictory views about the e-learning innovation at Gamma presented significant challenges for management, given its strategic priorities and timelines. The varied and conflicting opinions (summarised in Appendix 2, Table 5.11) drew attention to gaps in the expectations and priorities of the various innovation stakeholders, in particular of senior management and early adopters, and highlighted looming issues with respect to managing the upcoming organisational transitions. Senior managers, aware of these tensions, had nominated, as one of the initiative’s success measures, the capacity to manage the concerns of the early adopters to ensure that “over time, there’ll be migration of those innovative loops back into the main University system” (Executive Director, Gamma, Interviewee A3).

There was an overriding sense at Lambda that the innovation, and the way it was being managed, was unique within the sector, with its emphasis on development and design of high-end quality programs. Many staff felt they were “leading the pack”,

117
rather than relying on a tactic of importing knowledge and experience from elsewhere. Each program was largely a one-off creation, designed and developed from the ground up by a specialist team brought together for that specific project. There were only a few pockets of a more systematic approach. For example, a few departments had developed templates to enable academic staff to insert content. As a result, the nature of the e-learning innovation at Lambda was complex and multi-faceted.

In this context, managers at Lambda had tolerated a far more relaxed and diversified change process than Gamma. This approach was evidenced by the fact that, despite use of computer-based approaches for over a decade, the e-learning innovation was relatively immature in its life cycle, particularly with respect to the widespread integration of technology and pedagogy.

### 5.2.3 Nature of the change process

The key aspects of the nature of the change process which were examined are:

- the pace of change
- the direction of the organisational change
- how the change was occurring, or the type of change
- the stakeholders involved.

It is important to differentiate between the nature of the change itself, which at **Lambda University** was generally incremental or evolutionary, and the impact of the change, which overall was moderate, although in some areas it had become more radical. In these specific departments, individuals had been willing not just to become involved, but to relish change, using computers to “completely revolutionise first year teaching. So they’ve changed the whole thing” (Associate Professor, Lambda, Interviewee 8). Generally, though, there was a very strong commitment throughout all levels of the organisation to succeed and a sense of dedication on the part of a number of staff who indicated that “we really want this to work” (Faculty project group, Lambda, Interviewees 14, 15 & 16).

Change at **Gamma University** had also been evolutionary and gradual, with notable exceptions of “cutting edge” e-learning projects. Those working in the radical spaces, however, commented that “basically we’re like mavericks, and we’re being viewed that way by the other staff… by the people who aren’t involved” (Academic Program Manager, Gamma, Interviewee 8). At this time specific tactics were being implemented
which were more controlling and top-down driven, with the intention of engaging the whole University community relatively quickly in an institutionally sanctioned e-learning enterprise.

The overview of the change phenomenon at Lambda and Gamma (Appendix 2, Table 5.12) provides a useful comparison of how the change process was evolving in an interdependent way within institutional boundaries – both influencing and being influenced by the other organisational factors, particularly the innovation itself. It also provides the necessary evidence to assess how this interplay of interactions influences the ability of a university to embed innovation.

5.2.3.1 Critical incidents

Notwithstanding the patterns of change emerging at each institution, a number of critical incidents, both planned and unplanned, occurred at the case universities which changed the adoption trajectory of e-learning. At Lambda several new key appointments had an important influence, but the appointment of a new Vice-Chancellor clearly had a major impact and was emphasised by numerous interviewees:

I think for us, its been very fortuitous that the current Vice-Chancellor is very keen on, and is very aware, I think of the information explosion and… the “digital revolution”, and he’s seized the way forward for our University to be competing in the virtual university arena. So I think in the last three years, the atmosphere has changed quite a bit. There had been very little incentive previously for academic staff to get involved. Senior Academic Administrator, Lambda, Interviewee A2.

Another example of a watershed event at Lambda was the departmental curriculum review and the subsequent decision to adopt a new problem-based approach. This led to a significantly increased commitment to the development of multimedia and computer-based resource materials.

It is the capacity of each organisation to manage such incidents to their advantage that is of interest to this research. Critical incidents acted as a “change lever”, either to promote or facilitate the pace of the change (e.g. the appointment of key executives) or to flag a change of direction (e.g. the introduction of GammaNet). These incidents were important because they raised fresh questions about the innovation process,
which appeared to move suddenly from a given and known pathway to adopting a new and unfamiliar course.

5.2.4 Organisational relationships and forces

The nature of the interactions and relationships between the organisational elements emerged during the analysis phase of the research as the most significant influence on the capacity of the institutions to implement and progress the e-learning innovation. These interactions included interventions, alignments and non-alignments between the different facets of the organisation and the innovation itself. It is important to note that all these organisational forces can either facilitate or inhibit the embedding process.

5.2.4.1 Interventions

Lambda and Gamma had employed a variety of structural interventions (see Appendix 2, Table 5.13), such as the organisational professional support units and roles, with the capability to drive or influence the innovation adoption process. The most obvious evidence of interventions to staff at both was the e-learning adoption target, but it was apparent that Gamma had attributed a stronger sense of import or urgency to achieving their targets, giving weight to their more directive change strategy. Staff development, skills training and dissemination activities at Gamma assumed the role of an overall intervention strategy, designed to nurture the necessary competencies and the disposition to operate effectively in the University’s new e-learning environment:

One of the things we’ve attempted to do is to be absolutely pro-active about the provision of support for academic staff who want to move online... Our intent is that our academics become intelligent online practitioners through their own efforts. Executive Director, Gamma, Interviewee A3.

Lambda perceived less need for process interventions such as policy, procedures or compliance, favouring incentives or inducements such as their institutional teaching and learning grant scheme: “The University hasn’t stipulated ‘You must do this, or you must do that’. I think it has actually put in a lot of infrastructure. Put in a lot of money for the development of project grants, and then waiting to look and see” (Senior Academic Manager, Lambda, Interviewee A3).
5.2.4.2 Alignments and non-alignments

One of the key issues of the overall research question is the relationships between the various organisational elements which interact together to impede or alternatively to regenerate the innovation process. There can be a tendency to assume that alignment is a positive change force, the desirable state, whereas its counterpart, non-alignment, is the negative force which acts as a barrier to change. This assumption was found to be too simplistic as a generic principle, and the proposition that negative forces could also be necessary to sustain innovation is explored further.

Both cases, however, demonstrated strong organisational alignments, particularly between top-level institutional strategy and specific policies and processes which related to e-learning. At Lambda, for example, there was a comfortable fit between the University’s mission for educational excellence and quality and the strategic and operational thrust of the innovation of the Faculty case, which was driven by a pedagogical and educational, rather than a marketing, rationale (Senior Academic Manager, Lambda, Interviewee A3).

Gamma’s consistency of policy throughout all levels of the organisation was emphasised by a number of senior staff: “The School’s policy of encouraging people to put courses online aligns with the University’s policy” (Executive Academic Director, Gamma, Interviewee A6). There was also evidence of strong alignment between institutional strategy, for example to move into emerging offshore markets, and structural and process changes designed to exploit the capabilities of new electronic forms of delivery. Existing policies and processes developed for traditional forms of distance delivery, such as the University’s intellectual property policy, also served the emerging e-learning environment well, ensuring that the IP developed for teaching would still be owned by the University regardless of when or where it was created.

Organisational alignments had assisted the progression of the innovation over time in a fairly comfortable and evolutionary manner, to enable the university communities to acclimatise to some of the dimensions of the e-learning innovation, but a comfortable organisational fit had not always delivered the necessary outcomes or expected benefits from innovations in a timely way. Thus it appeared to require non-alignments or organisational tensions to prod the institution into moving on to the next phase of change, where potentially more desirable outcomes could be realised. For example, at Gamma the tension between the institutional equity agenda, which aimed to ensure...
equal access to educational resources for all students, clashed with the wishes of those who developed programs to exploit the inherent but under-utilised capabilities of the technology. In turn this tension engendered further debate about quality and accessibility of e-learning programs, a discourse which eventually assisted the evolution of the innovation with respect to policy, process and educational enhancements.

There were numerous examples of organisational incongruence or non-alignment, some of which were identified and articulated by the institutions, but some of which appeared to be hidden or just emerging. Appendix 2, Table 5.14 provides examples of non-alignments, many of which initially appeared to inhibit the adoption of the e-learning innovation. They include:

- established emphasis on research activities versus the stated institutional priority to promote innovative computer-based teaching and learning (Lambda)
- institutional management of IP and copyright versus institutional goal of promoting more development, collaboration and commercialisation of multimedia products (Lambda)
- vision of e-learning held by innovators versus the vision of University management (Gamma)
- need for supportive collaborative environment versus lack of leadership, institutional policy and process (Lambda and Gamma)
- economic and efficiency models of e-learning versus pedagogical and quality models (Gamma and Lambda)
- anomalies between capabilities of online technologies and the institutional restrictions placed on their use (Gamma)
- organisational academic and entrepreneurial culture versus management strategy and process (Gamma)

However, further analysis of some of these non-aligned issues demonstrated the potential for unexpected benefits to accrue to the cases subsequently.

5.2.5 Concluding comments — Gamma and Lambda case analysis

In summary, at Gamma University there appeared to be a close alignment between the University's overarching strategy and direction and the nature of the e-learning
innovation, but there were areas of divergence and tension at the coalface. Many institutional policies and procedures were providing the kernel of a sound enabling framework for the planned widespread take-up of the innovation, but there were substantive issues of tension in relation to the culture of academic autonomy, the strategic intent and the reality of provision of adequate funding and resources. The interventions employed by the University had been designed to bring about greater alignment (e.g. e-learning adoption targets) between strategy and the innovation, but they ignored some of the requirements associated with the embedding of the innovation, such as legitimisation.

At Lambda University, there was a sound fit between the strategies and processes for further take-up of the e-learning innovation and the aspirations and needs of the individual staff members. Indeed, there appeared to be a reasonable intermeshing or synergy between the organisational elements, the innovation itself and the change processes, throughout all levels of organisational strata – whole of faculty, department or unit level, and for the individual member of staff. There was nevertheless concern about the ability of the organisation to sustain the innovation in its current form.

5.2.6 Completion of the framework – the “Innovation Relationships Framework” (IRF)

Identification and analysis of the organisational relationship elements (alignments, non-alignments and interventions) now completes the development of the analytical framework. The significance of the interactions and relationships between the various elements and dimensions of the innovation context to the research question warrants its naming as the Innovation Relationships Framework (IRF).
5.3 Case descriptions: application of the IRF to Delta University and Epsilon University

The efficacy of the IRF was tested through its application to the two remaining cases studies, Epsilon University and Delta University. The three broad dimensions of the framework, organisational elements, the innovation, and the change process, provide the scaffolding for the analysis. Emulating a real world scenario, each case was analysed in a holistic manner, drawing on useful comparisons with the other study cases as appropriate. The brief précis of the two cases depicts only new aspects or insights relevant to the research problem, but further detail is provided in Appendix 2.

5.3.1 Epsilon University

Epsilon University had achieved alignment in 1998-1999 between the organisational elements and the e-learning innovation (which was being moulded and shaped to fit an evolving University strategy and culture). There were, however, examples of disparities.
5.3.1.1 Organisational elements

Epsilon University, with its distributed campus environment and diversified and geographically dispersed student cohort, had adopted a whole-of-institution approach to strategic, structural and process issues. The focus of the University’s e-learning strategy and policy was accessibility, student-centredness, sustainability, and “a systematic approach to the use of technology” (Executive Academic Manager, Epsilon, Interviewee A1). Epsilon was more advanced in its strategic thinking about e-learning than the other cases, having developed its online approaches as a core business strategy to align with institutional educational goals. Epsilon’s e-learning strategy was driven in part by the need to develop a competitive edge:

It’s becoming more and more evident that it [online] is becoming a more and more competitive issue as far as the University is concerned. If we don’t do it, and if we don’t do it well – and this is our main game … if we don’t use it at the University, generally we’re not going to survive. We’re not going to stay competitive. Senior Professional Support Staff, Epsilon, Interviewee 7.

There were different views, however, about the way to achieve a strategic “edge”. For some, the edge entailed being “the best at supporting students” in new forms of technology-mediated learning. For others, the ability to capture new educational markets was dependent on the development and integration of system-wide online approaches (Executive Academic Manager, Epsilon, Interviewee A1), a position which did not sit comfortably with everyone:

I’m a bit worried about the vision for the future.... Because we’ve been seen as a distance education institution for so long – we have our systems in place... And I think the systems approach that we’ve been talking about is the way they’re going at the moment. But I’m not really sure that everybody is happy with that, or that there’s full co-operation in that systems approach. Professional Support Staff, Epsilon, Interviewee 9.

Epsilon’s organisational structures and processes had been guided by the specific requirements for distance education, in particular, the support needs of off-campus students. There was, therefore, a sound organisational fit between many of the student support structures and processes. Yet non-alignments had emerged in the online context between existing support units (e.g. the IT department and the distance education support unit). Although the units operated independently within a strong institutional policy framework, the new demands of the online environment created
uncertainties about the boundary of each area’s responsibilities. Therefore, although from the organisation’s perspective structure initially worked in the distance education context, it required a rethink in the e-learning environment (see Appendix 2, Table 5.16).

Epsilon’s strong institutional policy and procedures regime in some respects had transferred effectively to the online environment (e.g. in areas such as copyright and IP ownership). Initially University policy was also seen as supportive towards innovations, particularly online course development; however, more changes to curb this support (Epsilon Learning and Teaching Technology Plan 1998) had resulted in disquiet among early adopters. At Epsilon, therefore, there were many new challenges associated with the embedding of the e-learning innovation into the University’s existing processes, structures and culture.

External interventions were also having a negative effect at Epsilon. Commonwealth Government policy, for example, prohibited universities from making access to a personal computer a condition of enrolment (with the exception of full-fee paying students). Therefore, essential course materials had to be available via traditional modes (e.g. print, phone) as well as online. This policy was seen as a significant barrier to the take-up of e-learning and a burden on the overheads borne by the University:

At the moment this situation is a major impediment to uptake. It is something the Government needs to address – if we are going to be global or international in our time – then we must have all our students using computing technology as a tool of trade.

Executive Academic Manager, Epsilon, Interviewee A1.

Epsilon, as a relatively new university, lacked the strong sense of institutional history or culture that prevailed in the older universities, providing a sense of direction and purpose. At Epsilon, this vacuum was filled by policies and procedures which more recently had begun to pull back some of the innovative activity which had become difficult to support from a resourcing perspective. E-learning enthusiasts also argued that there was not enough time to engage in development and creative activities, and felt a sense of isolation, even abandonment by the University. Some staff bemoaned the lack of a culture of sharing in relation to teaching: “I think it is a fundamental (issue) – this essentially private process we go through in relation to teaching has really got to change” (Senior Lecturer, Epsilon, Interviewee 15), highlighting the need to promote
risk taking and nurture collaboration to advance e-learning beyond the basic level of functionality it had assumed.

5.3.1.2 Nature of the innovation

The e-learning innovation at Epsilon had a head start on the other cases. Over time, however, the evolution of the innovation had created a new set of contradictions and complexities. Epsilon, like Gamma, had created an institutional e-learning approach, delivered through a common LMS platform and underpinned by the principles of universality, scalability and access (see Appendix 2, Table 5.17). Unlike Gamma, however, Epsilon’s emphasis lay on the enhancement of online communication and interaction (between students and staff, and students and their peers) rather than on content. High-end or multi-media content development, therefore, did not enjoy the status it did at Lambda University or Delta University: “we realised that there are other people who are better placed to do these multimedia packages and we would only be engaged in it in a collaborative way” (Executive Academic Manager, Epsilon, Interviewee A1). Neither did the use of more sophisticated online communication technologies enjoy high status. Many staff, therefore regarded the online technology capabilities as very basic, either from a content perspective, or because there was limited scope for “a human touch … I just think there is a place for preserving the human in this technology” (Lecturer, Epsilon, Interviewee 5).

Drawing on experience as a distance education provider, Epsilon made online student support a priority. Thus an integrated support capability (including student email, library and bookshop services, student administrative services and help services) was an essential component of the e-learning system. Course materials preparation processes were also tied to the distance education production model, where quality assurance was channelled through a centralised system of checks and procedures.

Arguably, the area of greatest disparity with respect to the e-learning innovation was the gap between the technical and conceptual potential of online technologies (notions of immediacy, currency and flexibility) and the brakes being applied to the realisation of this potential through institutional policy and centralised processes which remained anchored in the distance education era:

It was just difficult doing it their way – I think it had something to do with the fact that the quality control process takes quite a while – probably only a week, but in that time the emphasis has moved away from what the students need – this creates a few
problems. The students really liked the material I was putting in but it didn’t conform to their model … some of the processes are real barriers – the style is one thing, but once something is up it’s quite a rigmarole to get it changed … this system needs more flexibility. Lecturer, Epsilon University, Interviewee 8.

As the priority for future development centred on collaborative ways of sharing, and use of resource databases was debated, Epsilon was not in a position to sustain the development of sophisticated teaching and learning applications. The resources sharing concept, though still in an embryonic stage, had elicited a range of opinions from academic staff. One issue related to the use of shared resources, with sentiment reflecting the “not invented here” syndrome, and raising again the suspicion that sharing would undermine the University’s strengths: “I’ve got resources but am I prepared to allow my resources to be used by other universities – it’s the idea of competitive advantage” (Senior Professional Support Staff, Epsilon, Interviewee 7).

A number of the key issues and relationships can be examined as barriers or facilitators to the e-learning initiative (see Appendix 2, Table 5.18).

5.3.1.3 Nature of the change process

In 1998-99 the nature of the changes associated with e-learning at Epsilon had been steady but fairly aggressive. Management argued that the emphasis lay on maintaining a progressive rate of change, but there was also a sense of urgency about moving forward in a coordinated, some suggested unrelenting, fashion. Clear e-learning adoption targets had been set as part of Epsilon’s Teaching and Learning Plan, and the University could point to a full spectrum of e-learning stakeholders – from innovators to non-adopters.

The direction of change at this time was essentially top-down, with senior management committees having the major responsibility to formulate policies and procedures to direct institutional online learning. Many staff understood this approach:

I think the University has in one sense got it right in developing an online or technology policy which is top-down… If you are serious about all of this then you probably do need a top-down system, but at some point you have to come back up the other way. Senior Lecturer, Epsilon, Interviewee 15.
While accepting the direction of change, staff were less happy about its pace, with quite a few expressing the desire for a slower, incremental rate: “Just take it one step at a time. The students perhaps won’t become so disillusioned with the problems. If you do it slowly enough that they probably don’t even realise that they’re doing it” (Lecturer, Epsilon, Interviewee 8). Notwithstanding these concerns, there was a sense that because Epsilon had adopted a systematic approach to e-learning earlier than other universities, it was generally more accepted, and consequently was perceived as a less threatening innovation.

5.3.2 Delta University

Delta University, the second of the faculty case studies, was examined using the methodology applied to Epsilon University.

5.3.2.1 Organisational elements

In 1998, the Delta University case, unlike the other three cases, lacked a specific e-learning strategy as it was still operating on a one-off project basis. Management recognised the need for a more strategic and cohesive approach: “Part of our planning for the next five years, our new strategic plan, is to try and bring about a greater degree of integration of all that [computer-facilitated learning] across the programs. I think we are nowhere near it” (Faculty Dean, Delta, Interviewee A1).

Computer-based development had occurred broadly within the context of the wider institutional strategy of flexible delivery of teaching and learning, and recent planning within the Faculty had acknowledged

> a deliberate conscious effort on the part of the University to direct faculties along these lines…and quite clearly they [University strategic plans] align and so is the new strategic plan we are doing. For the first time it is very much a Faculty plan, but it does take on board all of the stuff in the University plans. Faculty Dean, Delta, Interviewee A1.

Delta’s emerging e-learning strategy, similar to those of Gamma and Epsilon, was conceived as a means to achieve market competitiveness:

> We certainly see what we’re doing with [(program name) as a way of retaining that dominance [in the market place] but also perhaps even extending it further and
Policy was not a strong driver of e-learning at Delta, appearing to operate in the background: “Policies are not a hindrance, but they are not very specific – they set up a structure and you have to interpret from there” (Lecturer, Delta, Interviewee 17). As was the case at Lambda, the exception lay in copyright and IP policy, which was becoming increasingly contentious, particularly among the early adopters and innovators.

Other key organisational elements relevant to the growth of e-learning at Delta were processes to support staff professional development and training. Collectively, senior management and academic staff highlighted its importance, but there was a clear mismatch between the importance attributed to training and development and the type of program on offer:

> It was useless. I didn’t learn one practical thing, too technical. …They teach you detail that you’re not interested in at the time. We need basic competencies and we also need a forum to discuss our attitudes and beliefs – of what technological literacy is all about. Lecturer, Delta, Interviewee 10.

The non-alignment between staff expectations and delivery, acted as an impediment to the uptake of innovation, as did the user-pays system introduced by the University’s IT and professional support departments.

Generally, computer-based development had evolved in the absence of a policy or structural framework at Delta. The most significant structural intervention at Delta was the substantial institutional grant money (up to $200,000 per grant) for teaching and learning projects. The Faculty had won several grants and the boost from this source of funds had underpinned much of the innovative development in computer-based learning. As a consequence, the Faculty enjoyed a reputation as an institutional leader.

Notwithstanding this, an unintended anomaly had arisen with respect to innovation uptake associated with these grants. Although winning grants (and awards for multimedia programs) had increased the level of e-learning activity within the Faculty, they had created a divisive and counter-adoption climate: “The grants system is very
competitive... they are pitting people against each other and don’t foster an inclusive culture” (Senior Professional Support, Delta, Interviewee 16). The grant scheme had become a divisive feature, a source of tension, because even though it aligned well with Faculty and University strategy, it was perceived to be more focused on competition, promotion and showcasing big innovations than on encouraging or diffusing good practice:

Grants are often self serving – I’ve never seen an outcome of a grant that says “this was bad, this didn’t work”. They are out to sell it and it becomes a product of the University which sees the opportunity to license and raise revenue. Senior Lecturer, Delta, Interviewee 14.

Furthermore, the scheme was very product-oriented, failing to acknowledge benefits that can also accrue through the innovation system processes. It was felt that undue focus on the success of the product discouraged honest examination and dissemination of outcomes, especially of failures or unexpected eventualities. Thus, far from encouraging a culture of collaboration and teamwork, the grant scheme had become a mechanism for self-advancement and Faculty marketing.

The prevailing culture within the Faculty case was a strong sense of professional identity, competitiveness, and an institution-wide tradition of innovative use of computers in teaching and learning. The strong staff identification with their profession permeated the e-learning development processes and reinforced the commitment to creating a specific product. Characteristic of the “not invented here” syndrome, it was felt that each product was unique and that as a result:

There is no reason to expect that people are going to use other people’s CBE [computer-based education] programs, any more than you expect me to use other people’s print packages, study guides or course structures. Senior Academic Manager, Delta, Interviewee A2.

5.3.2.1 Nature of the innovation
The nature of the innovation at Delta was solely concerned with the design and development of computer-based and multimedia resources, often high-end products that at the time were not suitable for online, off-campus access. Their focus was still primarily on on-campus e-learning and web-based activities, in particular content and information dissemination through its intranet, rather than on exploiting the capability of
web communication spaces on- or off-campus. Library e-resources, databases and the integration of such resources into the e-learning environment were given high priority.

There was an intention that in-house-created e-learning products could be commercialised and sold elsewhere as stand-alone resources, but there was a contradiction in that there was far less openness to the idea of using other people’s resources. (An overview of e-learning at Delta is found in Appendix 2, Table 5.19.)

The use of educational technologies within the Faculty had evolved largely independently from other initiatives occurring within Delta. Hence there was not a strong alignment with the institutional approach to online learning (as evident in Epsilon and Gamma’s universal approach to an online platform). Delta’s university-wide LMS, again an institutionally-developed proprietary system, was in its early implementation phase, although at this stage this did not feature extensively in Faculty plans.

5.3.1.3 Nature of the change process

Historically, the change process at Delta had come from the bottom-up – from the individual innovators. Recently, the Dean had shown more interest in the strategic use of technology for teaching and as a consequence the e-learning agenda was beginning to be driven from the top in a more structured manner. The pace of change had slowed from the previous almost frenzied involvement in projects, and this appeared to correlate with the level of grant funds that flowed into the system. The number of stakeholders involved in e-learning at Delta was much smaller than the other cases, with the innovators and early adopters dominating. The issues which acted as facilitators or barriers to change at Delta are summarised in Appendix 2, Table 5.20.

5.4 Issues and themes arising from the first stage analysis – the four cases

Analysis of the four cases revealed interesting findings with respect to change and innovation. One theme was the force of creativity, inventiveness and passion, especially evident in the initial exploratory phase, which tended to be opposed by the elements of uniformity, standardisation and systematic approaches. It was noteworthy, however, that innovation appeared to thrive in the absence of a relevant e-learning
policies and procedures regime. This laissez-faire environment, described as an “enterprise culture" (Interviewee A2, Gamma) or as an “ethos of innovation” (Interviewee 12, Epsilon) enabled the enthusiasts to proceed without too much interference. If, however, they ran into barriers (e.g. in funding, policy or collegial criticism) their survival strategy was to move out beyond the organisational boundary:

I guess more than anything it took me outside the system... it took me into the realms of working for commerce and industry, or if producing materials for students, doing them on my own behalf and selling them. Senior Lecturer, Delta, Interviewee 6.

Ingenuity and drive enabled the “lone rangers” (Bates, 2000) to negotiate the system successfully and to carry on with their projects, but at the same time it strengthened a discipline-centric approach and the “not invented here” culture:

The danger is that academics get very insulated... there is a real danger in thinking that because we are locked into particular discipline areas that nobody outside of that has anything to offer us... so there is a certain reservation amongst some academics to take on board others’ ideas... it’s part of the non-collegiality, non-cooperative notion. Head of School, Delta, Interviewee A4.

An emerging tension, therefore, was that this type of innovative culture mitigated against the timely dissemination or sharing of information about innovation and against the forming of collaborations. As a generalisation, communication processes were inadequate with respect to innovation diffusion, despite institutional efforts to introduce more formal dissemination strategies such as publications, written reports of the grant projects outcomes (Delta, Gamma and Lambda), and “show and tell” seminars (Lambda).

Informal networks centred on innovative practice tended to sprout up, but were more difficult to sustain, despite the stated opinion of many staff that these were more effective than formal communication or training activities. E-learning enthusiasts from Epsilon, Gamma and Delta reported that they had participated in electronic discussion forums, but did not continue to participate. Often these forums lacked leadership or support from above, as managers generally did not consider them instrumental in the institutionalisation of the innovation.
Another significant thematic finding from the analysis of the cases was the complex nature of the e-learning innovation. The technological complexity was appreciated by most; in fact, it was seen by many as a significant barrier to adoption, but it also contributed to the view that e-learning was a radical innovation. There were also hidden complexities and tensions associated with the e-learning innovation, related to conceptions of quality in higher education and the role of teaching in the sector.

Teaching was still perceived to be of less value than research (especially at Lambda and Delta), but it was also construed as an individual pursuit: “It seems to me, that you’re sort of like a sole practitioner, you’re really on your own – if you want to go and collaborate with someone you have to be proactive” (Lecturer, Delta, Interviewee 18). Furthermore, this attitude acted as a barrier to uptake: “I think it’s a fundamental (problem) – this essential private process we go through in relation to teaching has really got to change” (Senior Lecturer, Epsilon, Interviewee 15). A related issue, that of appropriate rewards and recognition for innovative teaching, was also a barrier for many, prompting leading practitioners to argue for a fundamental change in thinking about the role of teachers in technologically-mediated environments.

Another key issue was the importance of the innovation context (that is, the organisational elements identified in the IRF). Analysis of the data revealed that the relative worth of an innovation such as e-learning to the organisation can only be assessed if one has sound knowledge of the contextual factors and how they relate to the innovation. The contrary position, favoured by a few, was a simplistic interpretation of “best practice” – a “one size fits all” approach, to import the best solutions into an organisation. Generally, however, the importance of contextual relevance was appreciated at all levels of the organisation, from the executive and senior management to individual academic and professional staff.

Other findings of note arising from the data were emerging tensions associated with the innovation (e.g. between innovators and management); reaching a common understanding of the nature of the innovation; and the increasing polarisation of issues such as standardisation versus diversity. For example, the drive to increase uptake of the innovation among mainstream staff, especially at Gamma and Lambda, led to an organisational response to try to reduce the complexity of the innovation, often through simplified responses and standardisation of processes. Such issues are explored in more detail in the following section.
Analysis of the four cases in Phase One provided a useful opportunity to explore the state of change referred to in this dissertation as “embeddedness”, and the findings were invaluable in revealing new nuances and insights into the research problem of how organisations successfully embed innovation.

5.5 State of embeddedness of the e-learning innovation — the four cases

The state of embeddedness of an innovation has been defined as:

- widespread adoption or use of the innovation within the organisation, laterally and vertically
- integration of the innovation through policy, process and practice
- legitimisation of the innovation at all levels of the organisation (individual, work group and institutional)
- sustainability of the innovation with respect to core values, characteristics and benefits, as evidenced in minimisation or absence of external and internal interventions.

5.5.1 Widespread usage of the innovation

As a generalised assessment, in 1998-99 all the cases were in a relatively early phase of change, where the nature of e-learning was relatively new to the majority of staff and to the traditional teaching and learning norms of the organisation.

Use of e-learning approaches in the Delta Faculty, for example, had barely moved beyond the enthusiasts and innovators, and at the other cases it had yet to achieve a critical mass of “informed” users. Despite Delta’s 10-year history of experimentation with computer-based learning, a realistic appraisal was that only a few units were using computer-based approaches in a meaningful way. Similarly, use of web or other online technologies within the Faculty was ad hoc, and very much at the discretion of academic co-ordinators and lecturers.

At Gamma University the number of online programs, using either the new LMS, GammaNet, or an in-house or commercial platform, was limited. Even within schools seen as innovative and progressive, it was argued that most staff did not make full use of the capabilities of the technologies and the majority had yet to put their course
online (Executive Academic Director, Gamma, Interviewee A6). At **Lambda**, again, comprehensive diffusion of the e-learning innovation had not occurred. One Head of School (Interviewee A3) assessed the level of take-up of computer-based teaching approaches at less than 50%, while others rated it lower still, claiming involvement by only a few enthusiasts.

**Epsilon University**, at a fundamental level, could claim that it had achieved a critical mass of e-learning users, as 800 subjects had an online presence. Epsilon had been implementing an institutional approach to the online supported component of e-learning for two years, but still reported uneven adoption of e-learning by staff across the various faculties and schools. Within the Arts Faculty, for example, only certain “camps” used their online subject sites for teaching, and even those had minimal use of the online supported features, estimated at “about 0.05 on a scale of 0 – 5” (Lecturer, Epsilon, Interviewee 14). So while statistics at Epsilon indicated that the majority of subjects had an online presence, that is, a shell or basic information about the subject, this had yet to translate into significant involvement by academics (or students) for teaching and learning. Nevertheless, positive signs were reported at Epsilon, that even though “it’s a challenge to involve the academics... they’re increasingly becoming involved, as it increasingly becomes less of a choice to be involved” (Senior Professional Support Staff, Epsilon, Interviewee 7).

At **Gamma**, the adoption pattern indicated that even though some programs had been operating for some years, they struggled to achieve **depth** of usage by students and staff with respect to the more sophisticated or value-adding features:

> The number of students *really* engaging with the technology, [only] 5 out of the 50 are really using the online capability of chat, but God help us if they all try to use the chat session because I think 8 is absolutely tops – you cannot manage it with more than that number of students. Lecturer, Gamma, Interviewee 9.

At **Lambda**, there had been quite substantial development activity in the Faculty, with approximately 20 different projects involving teams of staff and large numbers of undergraduate students, but the majority of these projects relied on external funding and therefore had a life cycle limited by the duration and conditions of the external scheme.
**Delta** was the least advanced of the cases with respect to the level of uptake of e-learning, for even though they had supported relatively large scale computer-based projects over the past decade, there had been fewer projects than at Lambda. The projects had gradually grown larger in scale, involving more participants and with potential for wider applicability, but they had failed to achieve widespread diffusion. Conversely, at **Lambda**, there was a strong sense of inevitability about the gathering momentum of use of educational technologies and a general view that there would be a critical mass of users within five years, in what was described as “the next phase of change” (Senior Academic Manager, Lambda, Interviewee A5).

Generally speaking, usage patterns were low or unpredictable across all cases’ academic areas, even within those with an entrepreneurial or cutting edge reputation, but there were signs that the situation was changing. The following observation made at **Gamma** was indicative of the view expressed elsewhere:

> I think we are about half way along. We’ve learnt some lessons already. We’re not delivering significant things online. …there are some things we need to develop out of that experience, but we’ve learnt a lot from the experiences we’ve already had in delivering and using traditional external delivery techniques. We’ve learnt the complexity. Senior Administrative Manager, Gamma, Interviewee A2.

### 5.5.2 Integration of the innovation

As a concept, organisational integration of innovation has many facets, including the standardisation and routinisation of institutional policies, practices and processes (Rogers, 1995), and the notion of alignment of key organisational elements. Integrative activities must build on a shared or common understanding of an innovation within a particular organisational context, which, in the cases analysed, was generally found to be relatively immature.

#### 5.5.2.1 Shared understanding of the innovation

Developing and articulating a broadly shared understanding of an innovation, such as e-learning, is a critical stage in the adoption life cycle. A reasonable level of organisational consensus should be considered a milestone to be reached before attempts to introduce compulsory regulations or to mandate behaviour. All the case studies had attempted to reduce internal ambiguities about the nature of the innovation, often manifested in extended debate about the meaning of terms such as
flexible learning, flexible delivery, open learning, computer-based learning, computer-based education, online learning and online delivery. Participants generally acknowledged the importance of the process of defining the nature of the e-learning innovation as a teaching and learning experience within a unique context, but expressed frustration at the diversity of views which still prevailed.

Staff at Lambda and Epsilon had achieved some consensus about the nature and the strategic direction of e-learning, and, while there were still dissenters, there was less confusion, and their respective organisations had been able to move forward to address other issues. Gamma University was more at a crossroads in this journey, with two competing visions of e-learning vying with each other. Despite the fact, therefore, that there was broad agreement about the value of distance education (as a component of e-learning), Gamma had yet to gain acceptance for a single institutionally tailored conception of the online aspect of the innovation.

While the views of users at Gamma were polarised, at Delta staff were more confused about the nature of computer-based and online learning methods than in the other cases. This was a good indication that Delta was still in an early stage of the adoption cycle. In fact, many staff had little understanding or even desire to learn about e-learning. A small but dedicated cohort of innovators and early adopters had a distinct view about the value and potential of computer-based approaches, and had engaged key management, but they had failed to involve their peers, and consequently mainstream staff had largely chosen to opt out.

5.5.2.2 “Routinisation” of policies and procedures

Another critical aspect of the integration process is the routinisation of an innovation through organisational policies and processes related to e-learning. The development of policy and process is an indicator that the organisation itself has a clearer understanding of the nature of the innovation and of the direction it wants to take. At this stage, the institution should be better placed to develop organisation-wide standards, policies and processes to manage the innovation. However, there is a high risk in using policy or rules as the mechanism to drive change, if fundamental issues about the nature of an innovation remain unresolved. This was apparent at Gamma where the unintended consequences of hastily conceived policy eventuated (for example, one school implemented a policy that all student emails would be answered with 24 hours, which proved untenable).
At Epsilon University, routine e-learning processes were reasonably well advanced, though not problem-free. Epsilon had migrated many of its established distance education procedures (such as management of quality control, IP and development turnaround times) to the online environment. However, the non-alignment of some of these distance education processes with the online environment had created a barrier to embedding.

Gamma University, like Epsilon, was strongly focused on policy and process, but ongoing institutional deliberations within the organisation had stalled attempts to routinise process and devise sound policy. Where there was consensus (again regarding copyright and IP), policy and procedures were effective. But where there was lack of consensus, in relation to the use of a universal LMS platform or development of content, there was resistance to complying with processes or policies.

The case faculties at Lambda and Delta had concentrated on the standardisation of project-related processes and methodologies, rather than on broad systemic institutional policy and processes. Again, this was an important indicator of the level of embeddedness e-learning had achieved within these institutions. At Lambda, the scale of development work in one department serviced by Faculty support units had necessitated adoption of detailed systems and processes to meet accountability and tight development schedules, but these processes were not widely promulgated across the Faculty.

Standardised routines and procedures can create a more stable environment which enables the majority of staff and students to engage with the innovation, but this is insufficient to claim that an innovation has been integrated into an organisation’s culture and practice. Compliance with policy and procedures is an indicator that new practices have been adopted, but compliance is not the best indicator that such behaviours will be sustained. If, however, the innovation is seen as legitimate throughout all levels of organisation, reliance on external rules and policies is lessened.

5.5.3 Legitimisation of the innovation

At the executive or senior management level at Epsilon, Gamma and Lambda, e-learning had crossed the divide between being considered a marginal activity to being
a legitimate and ongoing core activity. **Delta** was less advanced in this respect, but senior management was in the process of defining “how” rather than “if” e-learning fitted into its strategic plan.

At **Gamma** and **Epsilon**, despite extensive application of policy and process to foster innovation uptake, there was sufficient contradictory evidence to suggest that large numbers of academic and professional staff had not internalised the institutional version of e-learning, nor had it been integrated into their ideological views or pedagogical practice. Leadership and mentoring, however, played a significant role in engendering a sense of legitimacy about the innovation throughout the organisation, and where positive instances of this occurred there was a much stronger belief in the value of the innovation.

**Lambda** demonstrated strong leadership from the top, particularly with respect to the position taken by its Vice-Chancellor. Successful integration nevertheless requires legitimisation of the innovation through all levels of the organisation. Individual members of staff must be able to make sense of the nature of the innovation on a personal level, to internalise its core attributes, and to make a commitment to support and contribute to its ongoing evolution. The case data revealed that individuals’ commitment was related to their level of motivation, not only to become involved but, just as importantly, to maintain involvement. Most of the case institutions had yet to address the motivation issue adequately, preferring to concentrate on training which taught staff *how* to get involved, e.g. focusing on IT skills, rather than *why* they might get involved. The latter required addressing the predispositions and attitudes of staff towards e-learning and their emerging new roles.

**Epsilon** too had made a strong commitment to staff training and support, by locating professional support staff in the schools and departments, as well as by introducing key academic mentoring roles. Yet, while helpful for some, particularly those who were open to change, this commitment failed to address the underlying barriers of non-users: “no one has put pressure on me to comply and until they do I probably won’t” (Senior Lecturer, Epsilon, Interviewee 16).

Educational evaluation processes acted as a strong motivator for mainstream staff to explore the use of new technologies. “Essentially I’m a teacher. I mean, if I can see that students are gaining or getting, or able to learn better or more effectively, that they are enjoying it — that has to be number one for me” (Academic Program Manager,
Gamma, Interviewee 11). At Lambda too, if staff were shown evidence of positive learning outcomes and experiences for students, this became a strong motivator both to become involved and to sustain their involvement.

Analysis of the case data adds weight to the notion that sustaining an innovation of the magnitude and complexity of e-learning requires legitimisation of the innovation throughout all structural levels of an organisation.

### 5.5.4 Sustainability of the innovation

Management interventions proved crucial to sustain the levels of e-learning activity in the cases. The interventions took the form of both “carrots” (e.g. teaching grant funds at Lambda and Delta) and “sticks” (e.g. institutional regulations at Gamma and Epsilon). Some were planned as shorter term interventions, such as grant schemes or fixed term appointments, in the expectation that the innovation would be bedded down within that timeframe. Analysis of the status of e-learning at the case institutions suggests that many interventions would need to be in place for much longer periods, as none had achieved a critical mass of committed and informed users.

Even though Epsilon University was more advanced along the change continuum, with strong procedural processes in place, it had still found it necessary to introduce structural interventions, such as the academic mentor positions, to maintain the momentum of the innovation. It was too early at any of the case institutions to assess whether the innovations, in either their current or their envisioned form, were sustainable in the long run. There were, however, some positive signs of the potential to sustain e-learning. Lambda, for example, had made steady progress overall, weathering the cycles of rapid change, upheaval, regression, and then relative stability – suggesting an organisational resilience to the uncertainties and complexities inherent in the e-learning innovation.

### 5.5.5 Overview of embedding in the four cases and future issues

The criteria which appeared to be most important with respect to the early phases of embedding the e-learning innovation were:
• an ability to construct and articulate an organisational vision and common concept of e-learning which was inclusive of the diverse nuances
• the development and implementation of specific policies, procedures, support mechanisms and incentives to encourage use, but only after the institution had reached a level of consensus about the innovation in context
• an appreciation of the complex and progressive nature of the change processes associated with adoption and integration of innovation
• a willingness on the part of the institution to adapt its own environment to the challenges and opportunities presented by the new approaches.

The cases which demonstrated a willingness, if only in small pockets, to meet these criteria were able in some degree to engender a sense of ownership and legitimacy about what they were doing. None of the case institutions, however, had yet demonstrated a level of integrated use which was sustainable, and thus all were judged to be in a relatively early phase of embedding the innovation. The overriding assessment of the cases at this time was of unrealised potential with respect to e-learning; moreover, there were undiscovered issues which impacted on the institutions’ ability to realise potential.

The data highlighted a number of significant issues or dimensions which could not be adequately represented or explained through the analytical framework (IRF). In particular, it was felt that a more sophisticated appreciation of the different phases of change was needed, along with a more in-depth perspective of the nuances associated with the holistic and complex nature of the relationships between the various organisation dimensions, elements and agents. Resolution of these somewhat fuzzy issues remained elusive, and consequently the answers derived thus far shed only limited light on the research question. Existing theories of organisational change failed to provide the depth of insight required in the particular higher education context, so a new set of conceptual tools was sought to deal with the processual, time dependent and complex aspects of the phenomenon. The tools chosen to further understanding about these questions were underpinned and informed by the systems family of theories.
5.6 Systems theories informing a process approach

Systems theories provide an overarching theoretical paradigm which addresses in a holistic fashion the issues related to the diverse components and complex interrelationships of the research problem. It can be argued that the overall research problem, that is the organisational ability to embed innovation, is a complex system in its own right, which has been represented and analysed to some degree using the IRF. For this exemplar of a complex system it is important to provide an orientation to the systems theory literature, and in particular to complexity theories.

5.6.1 General systems theory

The research problem draws broadly on key principles of general systems theory (Kuhn & Beam, 1982; Von Bertalanffy, 1968), which emphasises interrelationships and connectivity between the various elements or sub-systems comprising a whole entity. Systems theory had its origins in part in engineering, mathematical and technological systems (Kline, 1995; Kuhn & Beam, 1982) but later developments applied systems concepts to biological, ecological and social sciences (Wheatley, 1992). These developments resonate most closely with the questions raised in this research. Specifically, social systems (Beer, 1980; Luhmann 1995) are pertinent to this study.

Systems theorists acknowledge the processual nature of social enquiry, in particular the importance of input, throughput, output and feedback (Beer, 1980; Burrell & Morgan, 1979; Katz & Kahn, 1978; Kreps, 1990). This paradigm provides an all-encompassing heuristic model of organisational processes, with widespread application across the social sciences, and is thus of particular relevance to this study. The importance of the relationships between the parts of the whole and the identification and exploration of activities and interactions which occur around the boundary of the system are universal concepts in systems theories.

The boundary is a fundamental attribute of all systems, an invisible demarcation line delineating the system from the external environment and defining what belongs to the system (Luhmann, 1995), and thus creates a strong sense of identity (Wheatley, 1992). Considerable research has focused on the boundary and the management of boundary issues, where, due to the constant pressure exerted by environment influences, the system is at its most vulnerable and the likelihood for change is greatest. This was evident in the case universities, where issues of ownership and
control of e-learning centred on demarcation of the organisational boundaries associated with the innovation.

Social, physical and regulatory factors all impact on organisational systems, constraining or enhancing the scale and scope of activities. For example, an important environmental variable is competitiveness. In more competitive environments, it is argued, organisations employ greater operational controls and interventions (Pfeffer & Leblebici, 1973). The potential of these external forces to penetrate, shape or constrain the entire system (Burrell & Morgan, 1979; Kuhn & Beam, 1982; Luhmann, 1995) has led a number of theorists to explore the concept of closed and open systems (Katz & Kahn, 1978; Rickards, 1985; Wheatley, 1992).

The boundary is well defined and rigid in a closed system, which seeks to exclude interference from the external environment in order to maintain a permanent state of equilibrium, to maximise stability and to minimise unpredictability within the system. The theorised desire to curtail unpredictability in conservative systems has led to criticism (Grint, 1991; Rickards, 1985; Stacey, 2000) that systems thinking is somewhat deterministic in its approach, removing or limiting individuals’ free choice to change direction based on new information or inputs.

Open systems, however, are characterised by constant exchange with the environment across a permeable boundary: they are in a state of flux or continual movement, importing and exporting between the system and the external milieu. The boundary acts as a regulatory system, filtering and facilitating imports and exports, and therefore the management of boundary interactions is crucial to the health of the system.

Open systems strive for a state of homeostasis, to remain constant as a whole and in their phases, despite the constant flow of component materials (Katz & Kahn, 1978; Kuhn & Beam, 1982). This can be maintained through control and adaptive feedback mechanisms (interactions), both negative and positive. Negative feedback has a self-correcting system function of counteracting change by reducing to zero the discrepancy between the actual outcome of an action and the desired outcome, thus maintaining order and balance among the system components (Stacey, 2000; Sterman, 2000). Positive feedback is a self-reinforcing loop, serving to amplify and magnify responses and information, and leading to a state of disequilibrium which in turn can facilitate growth and adaptation (Sterman, 2000; Wheatley, 1992).
Feedback loops, positive and negative, have a particular influence on organisational behaviours, an influence that increases in significance in complex interactions and relationship patterns. Complex non-linear and cyclic patterns are of particular interest to this study, as they can facilitate or cause systems to oscillate from predominantly positive to negative feedback modalities (Stacey, 2000; Weick, 1979), a symptomatic response within universities to the diversity of perspectives and expectations associated with change and the e-learning innovation (Alexander & MacKenzie, 1998; Commonwealth of Australia, 2001).

Patterns of relationships between the system and the environment and within the component parts of the system are fundamental concepts of systems theory and central to this study. Open systems theories provide insight into the interdependencies of the social and technical aspects of a system (Stacey, 2000) and the relationships among the different organisational sub-systems. Stacey argues that general systems theory emphasises alignment between the two interconnecting sub-systems, the social and technical, thereby realising the desirable state of stable equilibrium. Kline (1995) highlights this link, using the term “sociotechnical system” to denote the “coupling” of the social and technical parts into a unified system constructed by humans to control or manage the complexity of the environment (p. 60). Kline also suggests that sociotechnical systems are the most pervasive and complex subset of human systems. Such insights are particularly relevant to this study, where much of the efficacy of e-learning is tied in with the nature of the relationships occurring at the nexus between the technological and human aspects of the innovation.

Maintenance mechanisms, both controlling and cultural processes, are required to manage an orderly balance between the system parts or sub-systems (Lawrence & Lorsch, 1967). General systems theory, however, also recognises the destabilising effect of adaptive mechanisms that reside in the sub-system structure, and the resulting conflict which must be managed (Stacey, 2000; Von Bertalanffy, 1968). Wheatley (1992, p. 90) refers to this apparent intrigue or paradox in open systems as “an inherent tension between stability and openness, a constant tup of war, an either/or”.

The mediating interactions between system parts can have a synergistic effect, in that the total combined outputs from the system are greater than the sum of the individual components. Kreps refers to the principle of nonsummativity:
By coordinating the interdependent activities of system components, the system produces extra energy, or synergy. The synergistic aspects of system processes are not merely additive; coordinated system processes combine to accomplish far more than independent system processes (Kreps, 1990, p. 94).

The key revelations from systems theory which pertain to this research are the importance of the system boundary and its relationship to the environment and the nature of the interactions, specifically the interdependencies between the system components. Extensions of the principles of general systems theories, and solutions to some of the limitations of earlier theories such as mechanistic approaches, were addressed by later systems theory, cybernetics, contingency and organisational learning.

One of the implicit principles of general systems theory relates to the intended purpose or the goal of the system. According to Rickards (1985) the tendency in “designed” engineering or scientifically-based systems is to articulate a well defined goal, but in “softer” social systems, overall goals are fuzzier and open to debate (pp. 27-28). The presence of ambiguity and complication in “soft” systems has informed systems thinking in organisational theory, leading to exploration of a complex systems perspective.

5.6.2 Complex systems approaches

The earlier systems theories are useful in offering a holistic and relational theoretical perspective, but their preference for system harmony and stability can spawn a reductionist methodology which labels complexity as an aberration. Universities, as traditional institutions, typically value stability, are suspicious of external interventions or change, and therefore align with such a perspective. It is these very aberrations which now promise useful insights into the complex nature of change and innovative practice.

Complexity can be understood in terms of the number of elements or sub-systems that comprise a system, essentially a quantitative approach. In later systems theories, the distinguishing feature of complex systems theory is emphasis on the active nature of the interactions between the elements over time (rather than the number or combinations of elements), which Sterman (2000, p. 21) explains as the difference
between “dynamic” and “combinatorial” complexity. Axelrod and Cohen highlight the
dynamic nature of movement within systems:

For us, “complexity” does not simply denote “many moving parts.” Instead, complexity
indicates that the system consists of parts which interact in ways that heavily influence
the probabilities of later events. Complexity often results in features, called emergent
properties, which are properties of the system that the separate parts do not have

They distinguish complex systems from “complicated” systems, the latter representing
the additive contributions of numerous factors that can be broken down independently
and considered in isolation from the relationships each holds with other elements
(Axelrod & Cohen, 1999). Another feature of dynamic complexity pertains to the
relentless change and interaction between the structure of the system and the goals of
the sub-systems, to the point of requiring constant attention and threatening to become
unmanageable (Kuhn & Beam, 1982). Evidence of this was found in the case data, as
management introduced ongoing structural changes, new positions and units, to
ameliorate the seemingly unrestrained activities occurring at structurally lower levels of
the organisation. Cybernetics systems approaches are engaged to manage such
environments.

5.6.3 Systems dynamics theory

Systems dynamics theory (Forrester, 1971; Sterman, 2000; Weick, 1979; Wheatley,
1992) builds on the intellectual tradition of cybernetics, but with notable variations. The
models developed by systems dynamicists are increasingly complex (Kline, 1995) as
they pursue more vigorously the effects of non-linear structures and positive or
amplifying feedback loops within the system (rather than the dampening changes
introduced by negative feedback from the external environment). Complex systems
display unstable behaviours as they are influenced by negative dampening and
positive expanding feedback, sequentially or simultaneously. The dynamics of the
system therefore arise primarily from the co-existence and interactions of multiple
feedback loops, potentially coupled in multiple time dimensions (Sterman, 2000). The
resulting iterative behaviour patterns offer some insight into organisational interaction
cycles and the accompanying unpredictability that resides within the system (Stacey,
2000). The notion of direct cause and effect, fundamental to cybernetics, is thus
supplanted by a non-linear and circular form of causality which raises the question of precedence: which comes first?

The degree of causal impact of these sets of complex interrelationships has been described in terms of loose and tight coupling (Perrow, 1984; Weick, 1979). Loose coupling occurs when there is a weak or obscure connection between the parts of a system, when the actions of one group within an organisation may not be immediately apparent to another. This was found in the case universities’ early innovative phases, where various e-learning projects were undertaken in relative isolation. Loosely coupled systems frequently exhibit a buffer or time delay in the sequence of events between a decision (or event) and its effect on a system, a phenomenon which tends to introduce uncertainty and ambiguity. This phenomenon, also described as a “weak signal” or trend (Leonie, 2005), has low predictability but potentially high impact and is of particular significance in contexts dealing with innovation in uncertain environments. In 1993-95, for example, the Internet was a weak signal, which subsequently experienced an exponential rise to become a mega-trend (Leonie, 2005).

The strong linkages characteristic of tightly coupled systems are often preferred by managers, who seek to reduce the system lag through just-in-time inventories, work practices and well-defined routines, but as Stacey (2000) argues, these strategies are less effective in unpredictable circumstances. Allen (1994, p. 4) also questions the predictive capability of systems dynamics in complex systems: “However interesting a systems dynamics model might be, it cannot anticipate the changes that may still occur in the evolutionary tree from which the ‘moment’ studied is taken”.

Systems dynamics draws on cognitive and social psychology, economics, mathematics and engineering to develop models, simulations, and other tools for application in organisational arenas as a method to improve learning in complex systems. For example, the mental model (Forrester, 1958; Senge, 1990; Stacey, 2000) incorporates an array of attributes (belief systems, cognitive maps, typologies) to explore how a system operates, the network of causes and effects and other relevant aspects to the framing of a problem (Sterman, 2000). Mental models share some attributes with “world views” (L-change, 2003, pp. 45-48) which influence the way decision makers guide or direct change.

The dynamic nature of the interactions in systems dynamics underpins the ability of organisational entities to create their own internal systems, a self-designing capability.
Self-designing or self-organising systems rely on loosely coupled mechanisms to meet the unexpected challenges of complex organisational life (Stacey, 2000) and thus have particular usefulness in the unpredictable environments facing contemporary universities. The self-designing concept, according to Weick (1977), cultivates experimentation and innovative solutions, tolerates doubts and contradictions, and relies on outcomes, rather than rigid controls, as a means to system renewal and growth. Self-organising systems ameliorate the dualities between the external and the internal struggle, and as Wheatley (1992, p. 90) argues, “seem capable of maintaining an identity while changing form”. The self-organising process, common to all complex system theories, therefore aligns well with the inherent fuzziness and adaptability of innovation.

### 5.6.4 Dissipative theories

Prigogine’s (1980) work has highlighted the importance of dynamics over structure within systems, demonstrating that new unpredictable forms develop in non-stable states away from the equilibrium. Dissipative theories (Prigogine & Stengers, 1984) offer a more radical perspective than system dynamics, describing emerging new forms and spontaneous system self-organisation as a “collective response of the whole population” (Stacey, 2000, p. 272). Furthermore, within dissipative theories, changes incited by external environmental perturbations or internal fluctuations can occur independently or in combination (Byrne, 1998).

The internal system disturbances and fluctuations continuously test the system boundary, prompting a self-organising process at the “bifurcation points” (Prigogine & Stengers, 1984, p. 160) and producing a unique new system pattern and a potentially radically different trajectory (Stacey, 2000, p. 272). The extreme location of the change within the whole system, far from the centre of equilibrium, prevents the new pattern from being repeated, adapted or assimilated back into the whole, enabling small changes to amplify. Eventually these amplifications intensify, opening up the wider system to change, further adaptation and growth. Harvey and Reed (1994, pp. 377-378) describe dissipative systems as “the most general expressions of deterministic chaos found in nature… capable of evolutionary behaviour” with a capacity to bring in energy from the external environment, transform it into more complex internal structural forms, and, contiguously, to “export disorganisation” back into the environment.
An intriguing empathy between dissipative systems concepts and some of the central issues of this thesis is evident in the following statement:

The dissipative social systems paradigm assumes social order is not always possible, nor is it necessarily desirable. It does not begin... by asking the Hobbesian question, “How is order possible?”... Instead it addresses the more perplexing question, “How do the mechanisms producing social order, periodically produce chaos and pave the way for more radical social transformations?” (Harvey & Reed, 1994, pp. 390–391.

Discourse surrounding ideas of dissipative systems theory has led researchers (e.g. Axelrod & Cohen, 1999; Byrne, 1998; Hayles, 1991) to extrapolate to chaos and complexity concepts. Much of the debate in the literature, Byrne (1998) suggests, centres on a dichotomy: chaos as the absence of order, as anti-order or randomness, versus chaos as “not-order”, which Hayles (1991) argues alludes to a preceding or hidden order within a system, an order simply not revealed. Byrne (1998, p. 16) sums up the two positions as “the order that lies hidden within chaos”, and “the order that emerges from chaos”. This emergent order, also referred to as “un-order” in the literature, connotes not “the opposite of order”, but the paradox of embryonic order (Kurtz & Snowden, 2003).

Kurtz and Snowden (2003), in the development of the Cynefin framework, question “the assumption of order” in contemporary social environments, distinguishing between a system’s ordered domains, that is, the quadrants comprising “known” and “knowable” relationships, events and knowledge; un-ordered domains, that is, the “chaos” and “complex” quadrants; and the domain of disorder (as opposed to un-order), where competing and conflicting disturbances denote a loss or absence of orderliness (pp. 467-470).

From a management perspective the relevance of this argument is that if the chaotic can be understood in terms of complexity, rather than as the absence of order, then rationalism is not necessarily abandoned forever and innovative opportunities emanating from these creative spaces will flourish (Kurtz & Snowden, 2003).
5.6.5 Complex adaptive theories

Complex adaptive theories generally operate at a more micro-level of analysis, at the level of interaction between a system’s autonomous entities or agents (or more radically between the agents and the external environment). The interactions thus evolve the whole system towards a new self-organised form (Ashmos, Duchon, McDaniel & Huonker, 2002; Axelrod & Cohen, 1999; Stacey, 2000). Self-organisation here is understood as the emergence of order (or a new configuration of disorder) out of a state of disarray and complexity. This conception highlights the essential role of disorder or mess within systems in generating new order:

Contrary to some of our most deep-seated beliefs, mess is the material from which life and creativity are built and it seems that they are built, not according to some overall prior design, but through a process of spontaneous self organisation that produces emergent outcomes (Stacey, 2000, p. 294).

Seen in this light, the emergent behaviour characteristic of complex adaptive systems is therefore a form of self-organisation which is a spontaneous, bottom-up process that cannot be manipulated or controlled through a deliberate interventionist design process. Even though the outcome cannot be foreshadowed, inherent order resides within the system, and will be revealed through the interactions and experiences of the system. The final outcome nonetheless is of no less significance than if the process had been managed, and it indicates a deep-seated rather than superficial change within the system (Stacey, 2000). The general systems principle of equifinality, “the tendency towards a characteristic final state from different initial states and in different ways, based upon dynamic interaction” (Von Bertalanffy, 1968, p. 46), appears to apply, in the sense that a given system output is not necessarily determined by the initial conditions but can be reached by diverse and unexplained pathways evolving within the system (Kreps, 1990). Not knowing and not controlling the spontaneous interactions, one can merely trust the outcome.

The evolving pathways or trajectories attributable to non-linear systems create what Stacey (2000, p. 266) refers to as the state of “bounded instability” which occurs far from the system equilibrium, as the system moves from the stable to the unstable. A “no man’s land” which displays highly complex behaviour, “bounded instability” represents a paradox of the co-existence of opposite forces: the system does not settle into routine recognisable patterns, but neither does it spin off uncontrollably into
the explosive disordered state, constrained by the hidden and irregular patterns characteristic of this intervening state.

Complex adaptive systems enhance the complex system’s self-organising principle to the concept of co-evolution, which entails an inbuilt capacity from within the system for learning and adaptation. A useful description of this internal and mutually adaptive co-evolutionary process is:

changes in the underlying elements of the system, i.e. systems gradually shed elements or connections of the system that may have been useful in the past, and they adopt new elements and patterns of interrelationships that may be useful in the future… The important point is that the system is not simply trying to adapt to a static environment, but rather the system is learning to adapt to an environment that is itself adapting to the system (Ashmos et al., 2002, p. 192).

Evolution towards an emergent new form can be instigated from the external environment, or alternatively, the emergence of new forms may depend on internal agent diversity to evolve towards radically new and unpredictable attractors. The first of these schools of thought, a more radical perspective, is represented by researchers such as Kauffman (1995) and Goodwin (1994), while Holland (1998) and Gell-Mann (1994) represent the latter school. Where the self-organising process is triggered by an external event, Kauffman (1995) argues that the self-organising process itself creates a system change which in turn prompts a reaction in the environment, resulting in an ongoing process of mutual adaptation or co-evolution. The evolutionary changes take place within the underlying elements of the system, involving the gradual removal of unwanted elements and adoption of new ones (Ashmos et al., 2002). Co-evolution is a particularly powerful theoretical concept, which can serve to enlighten and inform, but it introduces considerably more complexity into the system through an increased number of agent interactions or connections. Furthermore, co-evolution by definition purports that neither the system nor the environment remains static, that change is ever present in both, a notion which resonates with the contemporary climate in the higher education sector.

The notion of co-evolution, therefore, is particularly relevant to this study, where strong empirical evidence was found of ongoing processes of mutual adaptation between the nature of the e-learning innovation and the organisational elements (context). Systems theories which acknowledge the complex nature of these co-dependent relationships
therefore facilitate new insights into these critical interactions. This point was exemplified in the fluctuating relationship between technological and pedagogical elements which worked together to shape the e-learning environment.

Organisational responses to increased complexity and ever present change vary, according to Boisot and Child (1999). One response is “complexity reduction” (Boisot & Child), an attempt to simplify, routinise and decrease disorder and sophistication, as represented in innovation diffusion and adoption models (e.g. Rogers, 1995), through formalisation of processes and roles. Boisot and Child, however, prefer an alternative approach, “complexity absorption”, in which the system can hold “multiple and sometimes conflicting representations of environmental variety, retaining in their behaviour repertoire a range of responses, each of which operates at a lower level of specificity” (Boisot & Child, 1999, p. 238). This again is a critical concept to this study and is explored in more detail in later chapters.

5.7 System theories and organisations

The assumption is made in much of the organisational literature (e.g. Beer, 1980; De Geus, 1997; Fullan, 1999; Senge, 1990; Sterman, 2000; Wheatley, 1992) that systems theories can be applied to human endeavours, to living systems such as organisations. This study also adopts this stance, conceiving the university as an organisation, and therefore a brief exploration of the organisation as a social system is warranted.

Von Bertalanffy (1968) applied open systems theories to social as well as natural phenomenon, and Kuhn and Beam (1982, p. 17) argued that “social system and organization are synonymous”. A more rigorous application of systems concepts emerged through the work of the cyberneticists (Ashby, 1956; Beer, 1980; Kuhn & Beam, 1982; Wiener, 1948), and in particular theories of strategic choice (Chandler, 1962; Katz & Kahn, 1978). Systems dynamics, it can be argued, promote an engineering or mechanistic approach to the management of organisational life:

Systems of information feedback control are fundamental to all life and human endeavour, from the slow pace of biological evolution to the launching of the latest satellite. A feedback control system exists wherever the environment causes a decision which in turn affects the original environment (Forrester, 1958, p. 4).
Much of contemporary organisational theory and management thought has a foundation in open system theories, but more precisely in those which purport an orthodox view of systems, premised on the building blocks of inputs, throughputs and outputs, feedback mechanisms, interdependencies, a “boundary” and its corollary the environment (Hall, 1996; Robbins, Bergman, Stagg, & Coulter, 2000). Despite the fact that the machine system model of the organisation (Burns & Stalker, 1961; Khandwalla, 1977) is widely regarded as inadequate for today (Ashmos et al., 2002; Weick, 1995), many management practices are underpinned by the principles of traditional systems theory, treating organisations as machine-like, predictable and manipulable (Morgan, 1997). The cybernetic principles of linear cause and effect relationships, control and predictability have thus informed many familiar management practices, in particular the development of intricate and highly prescribed rules, organisational hierarchies and control mechanisms, which paradoxically generate simple and unambiguous organisational responses. Exemplifying the above are approaches to the organisation of work, such as the “Fordist” mass production assembly line (Mintzberg & Quinn, 1991, p. 482), time management processes (Robbins et al., 2000) and management information control systems (Stacey, 2000).

The work on learning organisations (Argyris & Schön, 1978; Fullan, 1999; Senge, 1990), drawing on systems theories approaches and in particular on contemporary environmental factors of complexity, has been applied widely in organisational contexts. For example, Argyris (2004) posits the importance of interventions which facilitate double-loop learning in order to minimise a defensive reasoning mind-set which inhibits organisational learning.

Ashmos et al. (2002), Axelrod and Cohen (1999) and others view modern organisations as complex adaptive systems. As such, the organisation has simple rule systems which allow complex responses and outcomes through complicated processes such as participative decision making (Ashmos et al., 2002, p. 190). The paradox is that the rules that guide sophisticated behaviours and outcomes are generic and of a high order, leaving considerable room for interpretation, whereas those that produce unambiguous and predictable results, but not always the best outcome, are frequently complex and elaborate (Ashmos et al., 2002; Kauffman; 1995).

This cursory overview supports the widespread applicably of system theories to social systems (e.g. Byrne, 1998), but it is important to note recent challenges to the
cybernetists’ stance, such as the work of Stacey, Griffin and Shaw (2000). The view of Stacey et al. is that while the organisation is a system, it is not a tool that humans design and use, nor a series of interactions between entities that humans act upon and make choices about, as posited in strategic choice theory (Chandler, 1962). Rather, it is an experience or a process of interactions between humans. Essentially the organisation is the interactions between humans: “The organization is not the tool of joint action. It is joint action, that is, a pattern of co-operative interaction continually recreated and potentially transformed at the same time” (Stacey et al., 2000, p. 187).

This emphasis on processual activity and interactions resonates with the early findings of the first phase of this study, which suggested that the embedding process was inextricably linked with the continuous, interdependent and evolutionary nature of the e-learning innovation.

5.8 Conclusion

Three major areas of findings accrued from the Phase One analysis described in this chapter: a set of significant themes and issues; an in-depth exploration of the embedding concept by examining the “state of embeddedness” in the four cases; and an additional theoretical perspective of the concept of change and relationships through systems theories.

The key themes and issues distilled from the four cases included the tensions arising from intersecting system elements or forces, such as creativity versus uniformity and teaching versus research, and the significance of other systemic relationships within higher education organisations, including collaborations and networks. The complexity of the relationships, the innovation itself and the environment were also highlighted as critical factors affecting the capacity of the universities to embed e-learning. These issues and factors appeared to impact on the ability of the case institutions to effect long-lasting change. Consequently, these key issues were followed up in the subsequent second phase of data collection and analysis, which included the development and testing of a number of key propositions.

The investigation of systems theories, in particular complexity theories, also achieved a number of useful outcomes with respect to the research design. The concept of the organisation as a complex adaptive system, for example, enabled new reflections and insights about a university’s contextual role and the issues surrounding organisational
change and innovation. In particular, the nascent construct of embedding innovation could be examined as part of an evolutionary and engaging process, involving all system dimensions.

The importance of the evolving nature of the embedding process was considered sufficient to pursue that aspect in the second follow up investigative phase entailing two cases, Gamma and Lambda. This second empirical phase, described in Chapter Six, was designed to examine the newly emerging aspects of the critical dimensions of the research problem, in particular the processual nature of change and the complexity of the system relationships entailed in embedding innovation.
Chapter 6: Second Phase Analysis — Lambda and Gamma Cases and Development of Second Framework

Introduction

This chapter extends the empirical work of the study, providing an overview of the Phase Two activities and findings. This includes:

• a later assessment of the extent to which the e-learning innovation had evolved (or been embedded) in the case organisations, Lambda and Gamma, thus providing a longitudinal analysis of the concept
• a mapping of the new empirical data from Lambda and Gamma against the IRF to examine further the efficacy of the framework as a sense-making tool
• the development of a second analytical framework
• further exploration of the key issues which had emerged from Stage One analysis, in particular devising and testing three propositions about the nature of the embedding process

6.1 Analysis of second stage data

Two of the original cases, Lambda University and Gamma University, were revisited in 2003-2004. The methodology is detailed in Chapter Four, but briefly, the data consisted of interviews (in person and by telephone) with four of the Stage One participants and an examination of more recent institutional documents and websites. One participant (Interviewee 8) from the Gamma case study had left the University and at Lambda one participant (Interviewee 9) had assumed a new role as Acting Head, LMU.

The first step of the analysis involved an organisational case overview of (a) the changes that had occurred since Phase One with respect to the innovation of e-learning; (b) the organisational contextual elements (structure, process, strategy and culture); and (c) the nature of the change process. This analytical data provided the baseline information for conducting a more in-depth analysis, honing in on specific issues related to the overriding research topic concerning embedding of innovation. It
was therefore practicable to use the four criteria (adoption, integration, legitimisation and sustainability) to make an assessment of the degree of embedding which had occurred at Lambda and Gamma.

6.1.1 Lambda University

Stage One analysis highlighted the importance of organisational context with respect to evaluating the nature of system relationships between the e-learning innovation and the other organisational elements. Therefore, an overview of the subsequent changes that had unfolded at Lambda with respect to the elements which define organisational context contributes to a growing understanding of the nature of these relationships.

6.1.1.1 Lambda — organisational elements (context)

Strategy and culture were still basically consistent with the position at Lambda in 1998-99. In 2003 Lambda's strategy continued to focus on becoming a world class university, through maintaining the highest educational standards, attracting the best students and working towards an internationally recognised research profile. Organisational culture baulks at rapid directional shifts (Schein, 1992; Weick & Sutcliffe, 2001) and, consistent with a well established university, Lambda’s culture was still infused with the traditional values of academic autonomy, striving for excellence, high standards and professionalism.

There had been a number of developments, however, in relation to organisational structure and process, both of which had become more centralised and formalised since 1999 (although considerable tolerance was still extended to individual and departmental autonomy). The case Faculty had strengthened its commitment to an integrated and centralised support structure for e-learning, as seen by the number of units, positions and allocation of resources (see Appendix 3, Table 6.1). Furthermore, the professional service units identified in Stage One were now better integrated structurally into the organisation. As a consequence, it was reported (Acting Head, LMU, Lambda, Interviewee 9) that there was greater acceptance of the legitimacy of the role of such units, and of the professional support staff therein, to contribute to the organisational planning of the future of e-learning.

Lambda also maintained a high priority on its technological and IT infrastructure, emphasising aspects such as reliability and accessibility, especially the provision of
24/7 service. The LMS was now considered a mission critical component of the educational IT infrastructure. Therefore the Faculty was wary about the possibility of migrating the existing Faculty LMS to an institutional platform, where it was felt “we wouldn’t be the highest priority... if there was a problem they wouldn’t be able to guarantee that we would be number one priority for support. Whereas within the Faculty we can” (Senior Academic Administrator, Lambda, Interviewee A2).

Funding structures and processes associated with provision of IT, multimedia and e-learning had also undergone change since 1998-99. At the time of the first stage interviews, there was heavy reliance on the University’s central grant scheme for funds for multimedia projects, but the scheme was now drawing to a close. Significantly, the Faculty had assumed greater responsibility for funding e-learning from its core funds, but typically these funds proved to be inadequate to cover the real costs of development of high quality materials, and new sources of external funds (from outside bodies) were sought to support high-end development and collaborative projects.

Processes at the operational level, with respect to course design, content development and evaluation, had also been refined and normalised, and in essence had become routine. There were, for example, new policies and processes with respect to accessibility for the disabled, more extensive use of templates, and quality assurance measures for subjects relying on extensive use of e-resources. To maintain quality standards and meet high volume turnaround in specific subjects the Faculty had gradually introduced new centralised measures and controls:

We don’t allow any academic to individually place material onto our intranet system. That passes through quite a complex system of quality control into templates that have been designed, together with the Education Unit. And the materials are provided to us, and then rewritten, agreed and then pass through two sets of quality control till they’re finally loaded up then checked again so there are three places in which the quality control is done. Senior Academic Administrator, Lambda, Interviewee A2.

These rules were not mandated across the Faculty, however, as some academic staff preferred to use the university-wide LMS and to put up resources independently of central control processes.
The contextual climate three years later at Lambda had not changed radically. There was a discernable, if not uniform shift within it, to centralisation of services and processes within the Faculty and a gradual firming of the role of e-learning within organisational culture.

6.1.1.2 Lambda — nature of the innovation

The nature of the innovation of e-learning at Lambda had matured and broadened since 1998-99, with respect to the use of technologies (see Appendix 3, Table 6.2), reach (more off-campus activities) and the diversity of teaching and learning activities, incorporating more emphasis on online resources and activities generally. The Lambda Faculty’s interpretation of “online” was clearer, as “those resources and interactions that could be viewed or accessed through a browser and networked – either through an intranet (on-campus) or internet (off-campus)” (Acting Head LMU, Lambda, Interviewee 9).

The Faculty departments’ pedagogical and learning approaches were still primarily resource-based, involving development and access to high quality materials. This remained a defining characteristic of the Lambda innovation. Thus overall there was still far less emphasis on using communication tools to facilitate student online interactions: “synchronous discussion groups – we have really not had much interest in those... . In general we haven’t found much use for, you know, chat rooms and that sort of thing” (Senior Academic Administrator, Lambda, Interviewee A2).

A comparison of e-learning technologies and applications between Phases One and Two (see Appendix 3, Table 6.2) illustrates an evolutionary trend towards more online use, but Lambda still retained its preference for diversified use of technologies and a willingness to explore more cutting edge developments (such as authentic 3D immersive environments and video-over-IP conferencing). Furthermore, the resource-based approach led in an evolutionary way to a strategic interest in learning objects, specifically their reuse, as a vital component of the e-learning innovation.

In 2003 Lambda’s e-learning focus and associated key challenges were teaching and learning quality, and accessibility and integration of various technologies and modes of delivery.
6.1.1.2.1 Quality

Quality at Lambda was equated with excellence, with respect to both teaching and learning process and learning outcomes. Lambda’s conception of quality was a distinctive characteristic of its understanding of e-learning, and a distinguishing feature of the case. Uncertainties arise, however, about the meaning of quality in an educational context. For example, should it be a subjective assessment or a set of institutionally defined standards? The potentially conflicting set of values is illustrated well by the manner in which Lambda’s quality assurance processes intersected with values of teaching held by the staff (and institution) as an individually constructed activity, where quality resides with the teacher and discipline specialist.

Lambda’s approach to negotiating this potential bifurcation point was to tolerate a number of exceptions, thus retaining existing principles of autonomy but within a more narrowly defined context of teaching activity. For example, a greater degree of licence was given to staff to put their online materials onto the web, if they used the University (rather than Faculty) online platform. Although it was acknowledged that this resulted in variable quality, this approach was popular with those staff who favoured more traditional delivery modes (lectures and tutorials) because it allowed them greater flexibility and immediacy to do things without going through the centralised processes. This type of application, frequently consisting of supplementary materials such as PowerPoint slides, contrasted with the resource-based approach used in laboratories and tutorial sessions. The concern was, nevertheless, “I don’t think that is entirely satisfactory. It’s just that we don’t have time to go through it all” (Senior Academic Administrator, Lambda, Interviewee A2). This highlighted issues related to scarcity of resources rather than adherence to the principle of diversity.

Diverse conceptions of quality also arose with respect to the development of learning environments conducive to student discussion and interaction. Lambda faithfully maintained that an on-campus environment, with the richness and nuances possible from FTF communication, aligned with its goals of excellence and quality education. This philosophy permeated the approach to multimedia resources development and influenced the stance on limited use of communication tools in online environments. Thus all Lambda’s technologically-mediated communication strategies, such as its videoconferencing system to clinical sites, aimed to provide students with “that sense of presence of the instructor and the materials, and the sense that the materials come from the experts” (Senior Academic Administrator, Lambda, Interviewee A2).
The online issues imposed by bandwidth restrictions and off-campus accessibility, for example, did not permit adequate support of natural real-time human communication. This limitation had influenced the decision to adopt “the lowest common denominator” guidelines with respect to file sizes, screen size and resolution for online development. The nature of these limitations therefore mitigated against any trend towards an online, distance education conception of e-learning, and yet, there were departments at Lambda that, in fact, had ensured that all their digital resources were web-enabled.

6.1.1.2.2 Accessibility and integration
During Phase One, the accessibility focus had been primarily on availability of computers and adequate IT infrastructure for students on campus, but by Phase Two this conception had broadened to include access for students outside the normal university student administrative system. Accessibility now also entailed the timely availability of resources, that is, the well-timed delivery or release of material in accordance with the timetable and curriculum requirements of particular classes.

Finally, accessibility now included broadening the reach of services and availability of resources to additional locations, but it was a more complex issue than merely considering the number of sites (on- or off-campus) that could be serviced. Significantly, it also related to issues of equity and usability, for example, for students with disabilities. Lambda had introduced policies and procedures to ensure compliance with legal and statutory requirements for web design and for accessibility standards (in accordance with level one of the Australian Accessibility Standards). This represented a significant broadening of Lambda’s conception of e-learning, in that it was now considered to be a mainstream learning approach and therefore it had to be available to all students, rather than to the previous more narrowly defined cohort of students, those with specific attributes or characteristics (e.g. on-campus, not disabled, full-time, etc.).

The most significant challenge identified by management with respect to integration issues concerned technical integration. In particular, Lambda saw the integration of various online technologies and infrastructures as critical to the ability to meet the Faculty’s overall strategic goals.

6.1.1.3 Lambda — nature of the change process
The comparative analysis of the innovation development at Lambda illustrates the evolutionary change process with respect to e-learning. At Lambda the interviewees
spoke of change that was “inevitable”, a strategy which was essentially incremental, one which carefully considered modifications and built steadily on previous adaptations. The preference to avoid rash or radical change was evident in the e-learning IT strategy which was guided by the safety tactic of “getting things right when you are fairly close to home on campus because that is relatively easy: it’s not too difficult to run an intranet within a building or between buildings when you can run over to the next room and sort it out” (Senior Academic Administrator, Lambda, Interviewee A2).

Lambda favoured a consensual approach to change, and although there were University IT and web-based implementation targets and plans, in many instances the real drivers for change appeared to be related to curriculum and new pedagogical approaches, rather than to e-learning (Lambda was far more negotiable about the latter). Notwithstanding the relatively cautious approach at that time, the overall long term vision was for a more radical or pervasive level of change in teaching and learning, one where advanced use of technologies was coupled with comparatively sweeping changes in curriculum and pedagogy.

6.1.1.4 Lambda — degree of embedding

The criteria posited to assess the degree of embedding of innovation in this study are: achieving widespread adoption (that is attaining a critical mass of users); successful integration or fusion of the innovation into core business; legitimacy of the innovation (as measured at different levels of granularity throughout the organisation); and sustainability. It is acknowledged that these are not strictly independent and discrete variables. Rather, there is often considerable overlap and synergy between these constructs, but considered as a combined set, the criteria prove useful to gain a deeper understanding about the nature of e-learning and the attendant changes within the case institutions.

Lambda’s position in 2003 revealed distinct advances with respect to the concept of embedding, particularly in relation to the “widespread adoption” criterion. The Lambda Faculty, for example, had in fact exceeded its “usage” target of 50% of staff using multimedia by the end of 2002. This was despite the fact that these targets were institution-wide targets set by the University, viewed as externally imposed and, therefore, not particularly strongly promoted by the Faculty. The issues raised at the Faculty level about departmental rather than wider university targets challenged the
subsequent assumptions made by administrators and decision makers about the usefulness of these targets:

I had some difficulty with that (departmental target) and spoke against the idea because there are so many courses in which it might not be beneficial to any particular online course, and it tends to promote the idea of just putting up a website so you can tick the box and the quality of the material is then not necessarily part of the target. Senior Academic Administrator, Lambda, Interviewee A2.

Investigation at a finer level of organisational granularity revealed greater inconsistencies about the level of uptake between departments. A 2002 survey, for example, showed that two departments had achieved 100% usage (in fact, one department had 200 staff actively using multimedia), but in another department the opposite applied as no staff had engaged with e-learning. Notwithstanding these reservations about the uptake of e-learning, the Lambda Faculty could claim to have reached a critical mass of adopters, with 400 out of the 500 salaried staff (excluding sessional staff) having engaged with e-learning (Senior Academic Administrator, Lambda, Interviewee A2).

There were also new subtleties about the nature of the use of e-learning. Off-site usage, now recognised to be of increasing importance, especially in nominated departments, had been overlooked when establishing institutional e-learning metrics. Off-campus usage was low: “We’ve got a long way to go yet, I’d say another two years or so before we’ve achieved that objective” (Senior Academic Administrator, Lambda, Interviewee A2), but nevertheless it added significantly to the diversity of existing metrics, increasing the complexity of the previously homogeneous accessibility dimension as it was applied in the late 1990s.

The value of institutional targets in decision making has been questioned from the perspective of whether such targets should be used as an indicator of the degree of acceptance of an innovation. Such an extrapolation can be misleading, and certainly at Lambda, despite the positive adoption statistics, outstanding issues remained about the level of staff acceptance of e-learning: “There’s still a healthy scepticism regarding the teaching and learning benefits among a number of the academic staff” (Acting Head, LMU, Lambda, Interviewee 9). Active debate about e-learning was regarded favourably (a positive sign of its increasing legitimacy beyond the early adopters). Faculty staff therefore were prepared to continue questioning, probing and thinking.
about the efficacy of educational technology, rather than “blindly accepting the hype” (Acting Head, LMU, Lambda, Interviewee 9).

There was also new evidence to suggest that e-learning was gaining acceptance, through its steady integration into organisational practice and ideology. The gradual growth in acceptance was underpinned by an ongoing synergy between the institutional and the Faculty position on e-learning, where strong alignments had developed between various system elements, for example between the nature of the e-learning innovation, organisational strategy and culture. The Faculty operated within the wider university guidelines on multimedia development and IT strategy, but it had also developed its own quite specific strategies to progress e-learning, for example to manage increased student numbers and to develop authentic e-learning environments:

There are many areas where we strategically respond... numbers have increased, in fact they have gone up 30% since we last spoke. Now that presents us with problems in getting students access to patients’ experiences and one of the ways we can help them to deal with that is by using IT to present those cases... We are also using more IT in the form of authentic environments... by taking them through what they are going to see in the clinic beforehand in a 3D textured immersive environment. Senior Academic Administrator, Lambda, Interviewee A2.

As indicated previously, there was also an overall empathy with the Faculty’s conception of quality in relation to e-learning, even as it was adapting, and the University's overall strategic mission to strive for excellence and to be “the best”. It was acknowledged that there were several pathways that could lead to excellence and, in this spirit, the Faculty had demonstrated a willingness and a capacity to be flexible, aligning with the University’s approach not to push a single common position on all matters nor to eschew variation. This openness to developing mutually constructed or even multiple conceptions of e-learning facilitated the legitimisation of the e-learning innovation through all levels of the organisation. It would, however, be misleading to suggest that the innovation had achieved a universal legitimisation status, as many staff remained neutral or even sceptical towards computer-based and online learning.

The fourth criterion to assess the degree to which the innovation had been embedded was the level of sustainability it had achieved. In other words, could e-learning exist in its own right or was it heavily reliant on interventions such as grant monies, a champion, or management directives? It was clear that e-learning had achieved a
momentum of its own at Lambda – there was a sense that there was no turning back. It had never relied on policy to sustain the innovation, and its earlier dependency on patronage and champions (e.g. in particular the Vice-Chancellor) had diminished.

Furthermore, survival of e-learning had moved beyond a critical dependency on non-faculty funding, though external funding was still important. The grant scheme by 2002 was drawing to a close and from about 2001 this was coupled with a gradual roll-back of the centralised monies (Senior Academic Administrator, Interviewee A2). Funds for centralised services and infrastructure, such as the LMS, were now available from core rather than “soft” Faculty funds. There was, however, still a dependence on grant monies for much content development and for specific projects, and as a consequence, the external institutional collaboration scheme begun several years earlier between Lambda and another university had become far more prominent. New sources from government-funded projects such as one on telematics were also evident. Clearly, to sustain both the level and quality of e-learning development activities, there was still a need for funds outside the Faculty’s recurrent budget allocation.

Overall assessment of the degree of embedding of e-learning within Lambda was that the Faculty had achieved considerable success across all four factors or criteria, although further progress was needed with respect to the latter two criteria. A level of momentum had been reached, nevertheless, which made it improbable that the innovation would be discontinued. The interviewees argued that the overall strategic direction within the Faculty had remained on track (e-learning was still not driven by cost-saving or marketing needs), that benefits were accruing to the students, and learning outcomes (based on the Education Unit evaluations) were positive.

6.1.2 Gamma University

6.1.2.1 Gamma — organisational elements (context)

Gamma’s strategy and culture had also remained fairly consistent since Stage One. The University mission stressed flexibility, openness and innovation, with a priority on enhancing its international reach. Gamma’s strategic intent promoted activity that was “intelligent in its use of new and emerging technologies”, “innovative, collaborative and enterprising”, and “student-centred, service oriented and multidisciplinary” (Gamma Performance Portfolio 2003, p. 1).
Gamma had maintained a strong commitment to its charter which emphasised the underlying core values of access and equity. At the same time, the University had in some ways firmed its commitment to a service and enterprise culture, which would bring about growth in order to achieve greater financial independence and diversity of income source. The strong tie to the culture of equity, however, continued in some instances to create tensions with entrepreneurialism and certain e-learning approaches.

In 2002-2003 Gamma University had applied its “whole of institution”, corporate approach to all administrative, structural, policy and procedure matters relating to e-learning, addressing many of the gaps identified in Stage One. Evidence of Gamma’s commitment to e-learning service and support through the structural integration and centralisation of functions is found in Appendix 3, Table 6.2. At all levels of the organisation, the corporate structure was designed to engender alignment and consistency of application of organisational goals and strategy. There was, for example, a new structure and portfolio management approach to facilitate the coordination and management of entrepreneurial and collaborative activities, which reflected the University’s decision to “consciously and deliberately through staff development activities and performance management processes... develop a strong service culture of collaboration... across organisational and physical boundaries” (Gamma Performance Portfolio 2003, p. 23).

Like Lambda, Gamma was building on and adapting its existing structures, strategy and processes. For example, the GLC had made important changes to the key position of the Online Learning Manager and had extended the principle of “local” presence by placing a professional support person in each Division. Academic support activities had been devolved through a newer role, “online advisor”, which essentially replaced the position of editor in the former distance education model.

These structural changes to staff roles and positions were often prompted by, or leveraged off, external interventions such as technology advances, funding restrictions or new business and service models: “We had one or two people who were web authors and we needed about 200 academics who could do it... it was a numbers thing as well, because we had to cut budgets at the same time (Online Learning Manager, Gamma, Interviewee 4). The online advisor role, for example, was indicative of an organisational response to the criticism of earlier staff training programs, which
academics had complained were out of touch with their needs. Structurally, therefore, there was an ongoing roll-out of what was conceived as a balanced model of centrally managed but locally situated and delivered services. Underpinning this approach, the institutional principle of devolving responsibility for the quality and development of online learning back to the academic elements remained intact, so that “most of the effort to actually produce resources is pretty much devolved to the desktop… Academics just pick up a template and do their study guide or their online resource or whatever” (Online Learning Manager, Gamma, Interviewee 4).

6.1.2.1 Processes
Changes in organisational process continued to complement the structure in the implementation of Gamma’s e-learning strategy. Gamma’s management had adopted a corporate-like model, with an emphasis on ordered and standard operational procedures, underpinned by principles of sound policy and commitment to processes such as “best practice”, benchmarking and “continuous improvement”.

Detailed planning and review processes (involving all levels of the organisation) were built into Gamma’s yearly cycle of management activities, culminating in a corporate review report which provided the blueprint for the subsequent year’s priorities and activities. There appeared to be little left to chance or serendipity within a tightly framed set of processes and budgetary allocations.

Specific processes illustrating the strong corporate approach include internal auditing, benchmarking, risk management and quality assurance. The institutional scale of these initiatives demonstrated the University’s commitment to a whole of organisation set of processes. Benchmarking, for example, occurred “widely and at various levels in the University” (Gamma Performance Portfolio 2003, p 24) and was integrated into the university-wide review process, with a priority attached to the teaching and learning arena.

Quality assurance was also emphasised. Gamma had sought wider industry acknowledgement for quality processes, having applied for EQUIS accreditation, and it went to great lengths to ensure that “quality permeates all of governance and management” (Gamma Performance Portfolio 2003, p. 18). It is important nonetheless to appreciate that Gamma’s interpretation of quality was tied closely to measurement and assessment processes. Quality at Gamma was linked to agreed and consistent standards, processes and practices to ensure that these standards were met (for
example, the online templates were a measure designed to ensure consistency and quality of learning materials).

While promoting the role of sound process, Gamma was also “cognisant of the need to balance review and planning with implementation and achievement”, and it was “working to streamline its processes while maintaining focus on quality improvement” (Gamma Performance Portfolio 2003, p. 18). The University had an ongoing program of process improvement, which included use of guidelines, templates and extensive online resources for the teaching and learning context. Teaching and learning budgetary processes also aligned with a pragmatic corporate approach and therefore the financial imperatives related to “balancing bricks and mortar with the need to capitalise on advances in information and communication technologies... and to achieve operational efficiencies” (Gamma Performance Portfolio 2003, p. 16).

Gamma still relied heavily on policy as a means of framing the operational aspects of e-learning. An example of a new policy in this arena related to website accessibility for people with disabilities. It was claimed (Online Learning Manager, Interviewee 4) that Gamma had the most accessible university web-site in Australia.

In summary, Gamma’s management approach was to create a system-wide schematic or blueprint that relied on strong leadership and top-down driven policies and processes, but one that was always informed by relatively high levels of staff input through, for example, participation in annual review and planning processes.

6.1.2.2 Gamma — nature of the innovation

The nature of e-learning at Gamma had evolved within its particular teaching and learning framework, retaining a focus on flexible and student-centred learning approaches. The framework, revised in 2002 for the 2010-2015 plan (Gamma Academic Profile paper), referred to:

the pursuit of a strategic and distinctive approach to teaching and learning built on established distance education expertise. This afforded a base for more flexible delivery of programs in addition to traditional campus based and distance education models, and early involvement with transnational education. Gamma Performance Portfolio 2003, p. 29.
Gamma now saw itself as one of Australia’s “leading online educational sites”, incorporating a range of study modes and technology-enabled, accessible student services (see Appendix 3, Table 6.5). GammaNet was now well established as the universal online development and delivery platform, providing a broader range of functionality. A comparison of the e-learning technologies employed from Stage One and Stage Two is provided in Appendix 3, Table 6.5. With respect to the online learning approach there was a gradual but discernable migration away from course content to an emphasis on human oriented communication and interactions: “People have started to come back from that digital dump-type paradigm and [are] actually reducing the amount of content they put up online and focusing on the interactive features” (Online Learning Manager, Gamma, Interviewee 4).

Notwithstanding these developments, the University carefully controlled the number of innovations and changes introduced into the system. Only a limited number of new features would be supported as the system changes were contemplated. The focus of the online system, aligned with institutional strategy, was “interoperability, scalability and functionality — in that order” (Online Learning Manager, Gamma, Interviewee 4). This aspiration, however, relied on a range of other organisational supports and structures, including appropriate IT infrastructure and support services to enable staff and students to develop the skills to exploit the potential of online learning. The e-learning model at Gamma was still premised on the principle of devolution of responsibility for the development of online resources and the overall quality of learning experience and outcomes to the academic community.

6.1.2.3 Gamma — nature of the change process

The nature of the overall change process at Gamma University, as was the case with Lambda, was both evolutionary and revolutionary. The evolutionary change components at Gamma were still infused with its history of distance education and use of educational technologies to serve diverse and distributed student cohorts. The intervening years, however, had seen more radical change, associated with the implementation of various components of the transitioning towards an embedded model of e-learning.

The change processes associated with the adoption of GammaNet, for example, were more radical and far-reaching in scope and intent. So too was the extent of the structural and procedural changes associated with the establishment of new
organisational units, positions and policies, all of which had wider implications culturally and ideologically for the organisation and its constituents, beyond the necessary administrative and logistic requirements which accompany structural change.

The cultural change elements, including a grab bag of attitudes – resistance, uncertainty, tension, opportunism, enthusiasm and fear – were indicative of the conceptual and ideological change which occurs at all levels of an organisation experiencing significant and perpetual change. The radical nature of the change process entailed moving Gamma from a model where the institution previously had assumed much of the responsibility for the quality of learning processes, through a “factory production” model of designing, preparing and delivering course materials, to a new paradigm where the individual was responsible. For example, academic staff were now responsible for the preparation of course materials, and students were also asked to take greater responsibility for their learning in a student-centred model. For these reasons much emphasis at Gamma was placed on staff training and development and on student support, and resources were shifted from “doing” to “supporting” and “advising” within the University.

The overall pace of change at Gamma since Stage One was relatively rapid in comparison with the rate in other case studies and across the sector, as in many ways the interviewees felt they had made a later start than other institutions. This had benefits, in that the institution, drawing on the experience of others, could move ahead vigorously and without too many distractions. But there were also drawbacks. For example, some individuals felt quite disaffected by the pace of change and some of the innovators felt they bore the brunt of being at the forefront of an institutional revolution:

If I had my time again I would do things differently... I mean it all evolved too quickly and it was very very successful, probably too successful for a lot of people. ... and I’ve always found that whatever I’ve done with technology and innovation – I’ve always appeared a bit ahead of my time... but if the market’s not ready for you.
Former Academic Program Manager, Gamma, Interviewee 8.

6.1.2.4 Gamma — degree of embedding

An assessment of the extent of embedding e-learning at Gamma was that it too had achieved the goal of widespread adoption and, in fact, had attained a critical mass of
users, staff and students. All the original institutional targets for online learning were reported to be on track, and the target that all courses were to have an online presence by 2005 had been met by 2003.

A more complex institutional goal was that every student should study at least one subject online, which, as was pointed out (Online Learning Manager, Gamma, Interviewee 4), was a difficult institutional target to meet because the onus in this case rested with the individual student – it was essentially an individual choice about the desirability of studying online. This again raises interesting issues about the embedding indicators of acceptance and legitimacy. Although overall the institution could claim a positive take-up of e-learning, from a fundamental perspective, market acceptance of the e-learning “product” required the student as the online “customer” to demonstrate a preference for an online learning product. In this sense it was far too early for Gamma to judge success.

The level of use and acceptance was clearly related to individual motivation and incentives. For instance, where a clear logistic rationale for e-learning participation existed – for example holding a course in emergency situations such as the SARS outbreak, or for supervision of off-campus postgraduate students, uptake was higher. Furthermore, the introduction of new online communication tools such as Centra enhanced the online experience for offshore students and contributed to an overall appreciation of and acceptance of the value of e-learning. It was interesting to note, however, that despite Gamma’s widespread usage and attainment of a critical mass of online users, the long-term strategic potential of e-learning, as assessed by key players, had yet to be realised: “A lot of rhetoric in the early days was that it was going to empower transnational teaching – [so far] that’s not the case here” (Online Learning Manager, Gamma, Interviewee 4).

The legitimacy of an innovation, as the third criterion for embedding, is assessed at all levels of granularity of an organisation. At the lowest level at Gamma, that is the individual staff member or student, the outcome was best described as patchy. At the highest level of the organisation, however, legitimacy was well established, supported actively by the Vice-Chancellor, the University Executive and the key senior managers and directors. E-learning was being driven from the institutional perspective and accordingly had been comprehensively integrated into institutional processes:
We can do things across the University here because we’re corporately managed and so we have university-wide policies across the board which are pretty well implemented and followed through. So decisions like “we will have one on-line learning system” and that gets implemented and pretty well supported... so a whole lot of things can happen with less resources. Online Learning Manager, Gamma, Interviewee 4.

Clearly, while there was extensive evidence of innovation integration and activity to effect innovation legitimacy throughout the University, the ability to retain the commitment of the early innovators and entrepreneurs had proved challenging. Early adopters were acknowledged and, to some degree, tolerated within the system, but for a number of them, the corporate regime of directive policies and processes would be problematic:

the early adopters ... we always said you can keep doing what you’re doing, we’re not going to stop you, just sort of fit in with how the whole system works... there was always a danger of a centre like us being seen as the big bad nasties who are out of touch and so on, and you know I think that’s often valid. Online Learning Manager, Gamma, Interviewee 4.

Despite Gamma’s overall intention of accommodating the front-runners, some individuals and programs did not adapt well, and over time, as the University took a firmer position with respect to its long term strategy: “The writing was on the wall in that we were told that everything had to be subsumed into the University system and that we could no longer operate two systems” (Former Academic Program Manager, Gamma, Interviewee 8). From the perspective of an entrepreneurial, free-wheeling spirit, the corporate approach worked against the legitimisation of the innovation: “It was more about control, you know… and quickly things were structured back… the whole format was completely restructured… the technology we were using was completely disbandoned [sic]… shut down” (Former Academic Program Manager, Gamma, Interviewee 8).

Change also impacted on other areas of the University, with redundancies for some staff whose responsibility had been production of learning materials. Changes to roles and positions frequently came up against deep-seated beliefs or cultural barriers: values held regardless of whether the changes from the institutional perspective were well-intentioned, sound or well-executed. So, for example, the former editors who were invited to apply for the new online advisor positions did not succeed, in part due to the
fact that they were required to give up their conception of their role and expertise as professional editors, adopting instead a new coaching or facilitator role. The change represented a radical shift:

They had a lot more control over the end product in the distance education production process, whereas with this new role they had no control over the end product and all they are doing is helping the academic... and I think they sense a bit of a loss about not being able to put a book on a shelf at the end of the process and say, “I produced that book” ... and you know they got a real sense of achievement out of that – which they lost. Online Learning Manager, Gamma, Interviewee 4.

At higher levels of the University, the innovation had achieved greater organisational legitimacy through the institutionally sanctioned processes to advance principles such as accessibility, scalability and reliability of e-learning. For example, high priority was given to increasing the reach of IT infrastructures, the scalability of online solutions and interoperability, and the integrity or robustness of those solutions. New initiatives were managed from the top through a clearly defined and managed process of measures to ensure that a common set of improvements and outcomes were not only achieved, but were also well-articulated and disseminated.

At this time, e-learning at Gamma had attained a high level of integration into policy, process and practice and, arguably, sustainability. There was considerable structural embedding, such as committees to set directions and to oversee process improvements, organisational units and new positions to support use and facilitate uptake. Gamma’s policy and process framework was well established at an operational as well as a strategic level and was integrated into the organisation structurally as well as procedurally.

The key to sustainability, however, as posited in this dissertation, is the degree of dependency of the innovation on interventions. The GLC, for example, had consistently argued that while it had an important role in setting and implementing the University e-learning agenda, its role was not to police or intervene, but to provide advice and assistance. Gamma had less reliance on fixed term interventions, such as grant schemes, but a more recent key intervention was the staff promotion scheme. The scheme, again primarily a top-down intervention, was introduced to address the concerns of mainstream staff that online teaching was not sufficiently recognised by the University (see Appendix 3, Table 6.4). At Gamma, like Lambda, there was no
turning back the clock for e-learning, as it was moving towards a level of sustainability, but interventions were still important to maintain the momentum of the innovation.

In summary, Gamma demonstrated that a considerable degree of embedding of the e-learning innovation had occurred between Phases One and Two. It had weathered a more disruptive path than Lambda, with respect to managing the impacts and radical changes affecting staff, and this internal assessment of e-learning is defensible:

> I think we have made a reasonable job of fulfilling that [10 year] vision and now it’s time for a new vision... [we] are putting together a new online strategy paper aiming to stretch the envelope a little bit further, and that’s going to be pretty important... and I think there are some hard decisions to be made. Online Learning Manager, Gamma, Interviewee 4.

Gamma could claim a reasonable degree of success with respect to widespread adoption, integration and even aspects of the legitimacy criteria of the embedding concept, but it had reached a critical position in relation to sustainability as it was actively considering the future of e-learning. There was little doubt that e-learning would continue, but it was argued that the need had arrived for a rejuvenation of the e-learning innovation, one which would enable Gamma to remain at the forefront of e-learning. Much of the emphasis for the future, however, continued to be on efficiency processes, human work practices and technologies such as content management systems and solutions that “empower” or made “more strategic and clever use of our time” (Online Learning Manager, Gamma, Interviewee 4).

The process of comparing and analysing the embedded status of two of the cases revealed a great deal about how each institution had approached the whole phenomenon related to innovation adoption. In particular, it was evident that the two cases had taken very different approaches, and that the embedding process itself was both highly contextual and complex. Further insight into the question of the level or degree of embedding at Gamma and Lambda can be achieved by mapping the principal elements of the organisational system against the analytical framework (IRF).

### 6.2 Mapping of the case studies against the IRF

The framework can be used as a vehicle to graphically highlight and explore the relationships between these elements as an interconnected system, bounded by the
organisational boundary. A simplistic overview of the distinguishing features of Gamma University is mapped in Figure 6.1.

Figure 6.1 Innovation Relationships Framework – Gamma system elements

An additional layer of information is added to framework, depicting the nature of the relationships between organisational elements. The strength of the relationships between the various components of the broader global elements, for example, between quality and process, and between technology and process (HR work practices), can also be represented on the framework (see Figure 6.2).
The association between technology innovation (GammaNet) and institutional policy (one LMS platform only would be supported by the University) is clearly evident, as are other aspects of the innovation, such as the incorporation of new streaming technologies, reported to have “caused us to have quite a change in the work processes of our AV staff” (Online Learning Manager, Gamma, Interviewee 4). In the latter example, the direct causal effect highlighted is represented by a one-way arrow, but it is probable that, over time, this would evolve into a two-way relationship as work practices gradually effected change in the capabilities and uses of the streaming technologies.

Similarly, the strong alignment between the e-learning innovation’s concept of quality and organisational quality processes is evident in a number of ways. At Gamma, teaching and learning quality was the responsibility of the individual course coordinator, but this was conceived within strong institutionally defined and sanctioned management practices, which included the setting of key performance indicators (KPIs), notions of best practice, quality assurance, planning, review, performance assessment and continuous improvement processes. For example, the link between quality and process is evident in Gamma’s approach to evaluation and assessment, where quality achievement was determined against KPIs “with associated targets that set measurable outcomes” (Gamma Performance Portfolio 2003, p. 13).
Achievement or success, therefore, was inextricably tied to quantifiable measurement, as defined by indicators and targets. In the e-learning context, these indicators also included measures of participation and accessibility. Organisational integration of these processes was wide, across the whole organisation: “a systematic University-wide approach to the management of quality within a continuous improvement model” (Gamma Performance Portfolio 2003, p. 10). It was also deep, down through levels of the organisation: “reflection on success against KPI targets and the revision of these targets, at all levels of the institution, is an integral part of annual review and planning” (Gamma Performance Portfolio 2003, p. 13).

It can be argued that the very language used to describe the processes which framed e-learning at Gamma, with terms such as “quality assurance” and “process re-engineering”, is indicative of a particular epistemological position or stance, one that values the domain of the known, the ordered and the managed (Kurtz & Snowden, 2003) and which aligns with Gamma’s strategic approach to change. This position suggests, for example, that one is able to organise or manage situations in order to make assurances or guarantees with respect to delivering quality.

Gamma’s organisational structures (see Appendix 3, Table 6.3) also reflected this position, so it can be argued that the close alignment and ensuing synergy between structure, strategy and process ultimately strengthened their effectiveness, both singularly and collectively. The IRF represents these relationships (see Figure 6.3), within each of the main system dimensions (e.g. organisational elements). The relationship between strategy (equity and access principles) and organisational policy (new web accessibility policy) is another example (see Figure 6.3).
Figure 6.3 also highlights the weaker relationships and the relative isolation of the fourth element, culture, an aspect of organisational life which frequently proves to be problematic in the management of organisational change. This occurs especially when the change is radical, or has radical elements that do not align well with an organisation’s culture or with the aspirations of its constituents. Thus at Gamma many of the tensions and barriers emanated from a mismatch or non-alignment between the cultural beliefs and values of enthusiastic stakeholders – their “world view of e-learning” (L-change, 2004) and the key principles of the e-learning innovation (e.g. scalability, universal functionality) as defined by institutional managers (see Figure 6.4). Thus the new staff promotions scheme was implemented as an intervention to counteract a potential “cultural divide” at Gamma between the goals of the innovation and the existing priorities and values of staff.

Figure 6.4 Gamma – Non-alignments
The **Lambda** case offers another example of how the IRF can be applied, illustrating the close alignment between the nature of the change process (incremental, evolutionary and consensual) with an organisational culture that endorsed collegiality, prestige and, arguably, elitism. The IRF is applied in this instance to highlight system interventions (internal and external) as well as alignments between system elements.

At Lambda the government scheme for allocating research quantum and the university-wide staff promotion schemes both acted as influential external interventions to the Faculty case study, in that they acted as significant motivators influencing staff decisions to become involved with e-learning (see Figure 6.5). Other interventions discussed previously are also represented in the IRF.

**Figure 6.5 Lambda – System relationships**

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**6.2.1 Levels of analysis**

The IRF framework can also be applied to different planes of organisational granularity in order to explore innovation and change issues between levels. Thus, where considerable activity was undertaken by an individual or a relatively small discrete
work group, for example experimenting with the use of new technologies at Gamma, this had often taken place in isolation from the rest of the institution, at a different level or plane of granularity. In other analytical situations, for example at Lambda with respect to IP policy, an interesting array of perspectives centred on the issue can again be represented at different levels of granularity, as shown in Figure 6.6.

Figure 6.6 System levels of analysis. Organisational element – Intellectual property

6.3 Strengths and weakness of the Innovation Relationships Framework (IRF)

The framework is a useful descriptive or illustrative tool to assist in the process of understanding or making sense of complex systems. Its strengths lie in illustrating the importance of taking a system-wide approach to implementing innovation and in the
focus it places on the interactive nature of the relationships between the system elements – alignments or synergies, barriers and interventions, both within and external to the system.

Although the IRF presents a comprehensive picture of the activity and relationships taking place within an organisation, it does not include a longitudinal perspective. It cannot depict a critical dimension of change, progress over a period of time, the evolutionary and revolutionary changes that occur within and between the various elements, agents and dimensions of the system, the birth and extinction of system entities. The need to be able to show such transitions and changes is crucial to the advancement of this study.

The limitations of the IRF therefore highlight the need for a complementary analytical tool, a second framework to capture and describe the longitudinal perspective of the embedding process. Such a framework might also point to changes in the nature of an innovation, the contextual organisational features and/or the responses to that change over a period of time. This capability would permit tracking the development of an innovation such as e-learning within a university, to determine the extent and efficacy of organisational responses to specific phases of development. For this purpose, the next step was to explore how the various factors, issues and system elements might be investigated within a second, complementary framework.

This process was informed concurrently by the findings from explorations of the study’s second stage propositions. The overriding proposition was that there are three key dimensions that organisations must be able to manage within their own institutional context in order to move beyond a superficial level of adoption. Three key propositions therefore were constructed around these three dimensions: intersections and transitions between organisational elements; innovation complexity; and collaboration.

6.4 Development of a second analytical framework – Innovation Longitudinal Framework (ILF)

It is clear from the analysis of Lambda and Gamma Universities that the e-learning innovation at both had undergone considerable change in the years from Phase One to Phase Two. Using a second framework (ILF), and drawing on all the cases, it is
possible to identify additional characteristics of the e-learning innovation through various stages of the embedding process.

It was evident from the first analysis of the cases that the e-learning innovation in the early stages tends to be small in scale, relatively self-contained within its own system boundary, with minimal interaction with other elements in the system, and having strong ownership by an individual or a relatively small group of stakeholders. These features or characteristics tended to give the innovation a specific discipline or distinctive professional focus. As a relatively new import into the organisation (in none of the cases was e-learning a completely internally developed concept) the innovation lacked clarity about “what it was” and therefore was open to many different interpretations. Quality, although a key dimension of the e-learning innovation, was frequently a matter of the professional judgement of an individual, often coloured by a discipline-centric set of criteria rather than an institutional perspective. A common attribute, however, was that there was a sense of creative energy and enthusiasm associated with the innovation.

At this stage, the innovation was located at the periphery or boundary of the organisation (Farrell, 1994), away from the centre of organisational control, where there were few institutional interventions and management oversight was low key, even “laissez-faire”. At this stage, if relevant organisational policies or procedures existed which impacted on the innovation, they could have the effect of hindering rather than facilitating its progress. Again this was highlighted at Gamma with respect to administrative processes for offshore programs, and at Lambda and Delta Universities in relation to IP policy. So while an innovation in its initial start-up may have had an organisational champion (e.g. the Vice-Chancellor at Gamma), the majority of people were at best neutral towards it, but many were sceptical or fearful, as evident in the comments: “but a lot of new things are pushed onto us” and “you are a bad teacher if you don’t have everything of the latest technology” (focus group comments, Delta University). Furthermore the innovation may well have been competing with other innovations within the same research and development space (see Figure 6.7).
Following this early experimental or innovatory phase (Figure 6.7, Stage 1(a)), if the innovation survived, it usually had attracted additional disciples, gathered some momentum, grown in scope and ambition, and begun to move towards the organisational centre (Figure 6.7, Stage 1(b)). The cases demonstrated that as the innovation moved towards the organisational centre, it encountered other innovatory projects and initiatives, all competing for legitimacy and space. In 1998-99, in many instances these competing initiatives were supported by innovation and teaching and learning grants, or entrepreneurial activities promoted at the faculty or departmental level. In some cases growth and support for the innovation was achieved through short term alliances and coalitions of key players, and occasionally through collaboration, or merging of projects. In other cases, for example at Lambda and Delta, a number of e-learning projects coexisted for a considerable period of time, each with the support of its respective patrons and departments.

At this point, however, there was a recognition of the need to move the innovation into wider circles of influence, to seek alignment with other organisational agents and to negotiate with other stakeholders. This occurred at Gamma, for example, when GammaNet incorporated some existing online technologies that had been developed earlier by other areas of the University (see Figure 6.8). Alternatively, this stage can be a vulnerable time for an innovation, as some do not compete successfully and eventually become extinct (see Figure 6.8). At Lambda, for instance, an early web-based commercial initiative was wound up because ultimately its objectives and priorities did not align with the strategic intent of the Faculty: “so they took a particular line, which was the development of search engines for the web, and web page delivery, which was not really the primary interest of the Faculty” (Senior Academic Administrator, Lambda, Interviewee A2).
Figure 6.8. Innovation Phase. Stage 2

The timeline for this type of development can vary, reflecting either an evolutionary or a revolutionary change process, but often this phase is characterised by fairly rapid growth spurts, as a number of new ideas and practices emerge and gain wider acceptance. Both Gamma and Epsilon mentioned rapid take-off of various dimensions of their e-learning innovation.

As greater awareness of the innovation occurred across the organisation and the innovation itself gained momentum, institutional interventions began to be applied to guide its direction. As previously noted, specific interventions were introduced in the case universities: Lambda, Epsilon and Gamma, for example, identified adoption or usage targets; Lambda and Delta had institutional large grant schemes; and Gamma had staff development programs and promotion schemes. As the institution began to take greater control through interventions and other strategies, tensions often emerged between the original “owners” (the e-learning innovators) and the university:

We have had a very nasty experience… that got channelled through the Dean’s Office, and the way it was put to the people who had originally worked on the project was in terms of “We are going to allow [institution named] to do whatever they like with this, we’re just telling you”. In other words, no recognition of any ownership or moral rights. Senior Lecturer, Delta, Interviewee 6.

Alignments or non-alignments between the innovation and the organisational elements impact on the nature and evolutionary direction of the innovation. For example, the tension at Gamma between institutional strategy and culture influenced the early rate
and direction of the uptake (described as “patchy”) of GammaNet. Likewise, it could be argued that at Lambda in the mid-to late 1990s, the gap between the early web-based activities and Faculty priorities skewed attitudes of key Faculty members with respect to the online dimension of e-learning.

This first phase of system behaviour and events, termed the “Innovation Phase” in the ILF, was characterised by exploratory, imaginative and creative activities, where the focus of the change process centred on the nature of the innovation itself. The two stages under the Innovation Phase are together called the “Product-centric Domain” because the focus of activity centres on the innovation as a product.

As the innovation moved closer to achieving a critical mass of users, it underwent greater forms of adaptation from its original form, taking on more organisational values and needs, rather than simply following the course of its original owners. In other words, the shape of the innovation was moulding to fit the organisation and, as a result, it gradually began to occupy more and more organisational space (see Figure 6.9).

Notwithstanding these developments, there were still a number of unplanned or inexplicable eventualities, some of which appeared to be self-organising (Weick, 1977), in the sense that they occurred in the apparent absence of interventions or planned strategy, but nevertheless often produced an acceptable outcome. A Lambda story, where a large externally funded project underwent a 180° change of direction, exemplified this:

Interviewee: We just got started on the shell development and we found we were repeating [re-inventing] the wheel… [named organisation’s] shell was clearly much better than anything we had even put on the drawing board…

Question: How did you discover that shell?

Interviewee: …Not through anything advertised or promoted – just knowing people…

Question: Serendipity?

Interviewee: Yes, yes. So we ended up with a very nice collaborative relationship… And the success has been unbelievable.

Senior Academic Manager, Lambda, Interviewee A6.
During the first stage of the “Embedding Phase”, the “Business Domain”, the focus of the change process shifts more towards organisational processes and business activity. Survival to this point indicates that the innovation has now grown considerably in size and scale (see Figure 6.9), having reached a critical mass of users, and having either merged with or fended off competing innovations, as was the case with GammaNet. The innovation has now become a mainstream activity, permeating the organisation both laterally (across faculties, divisions and departments) and vertically (down through organisational structures to touch the individuals therein).

Epsilon could claim the greatest overall usage in 1998-99 and Delta the least (Delta had not really moved beyond the Innovation Phase). By 2002-03 Gamma could claim significant lateral adoption, but Lambda had the best examples of vertical penetration (e.g. two departments had 100% usage). Generally, once the innovation had entered the Business Domain there was greater consistency and understanding of its meaning amongst its constituents. Many of the early ambiguities and interpretations, for example, had been removed or clarified through discourse, debate, organisational policy and processes. This is a highly organisational contextual phase (Klein & Sorra, 1996). In 2002, for example, Lambda staff were reportedly confident in defining what online learning meant (Acting Head, LMU, Interviewee 9) and Gamma had established many of the building blocks of its e-learning framework.

The Phase Two analysis of the state of embedding at both Lambda and Gamma revealed that the e-learning innovation had achieved a degree of legitimacy which enabled it to occupy a more central position within the organisation. There remained, however, a small “non-take-up” space between the innovation and the organisational boundary, termed the “moat”, where the later adopters, resisters, or newly emerging innovators congregated (see Figure 6.9, Stage 2). The view was held by some
stakeholders that at this point the innovation had been fully “institutionalised” (Armenakis, Harris & Field, 1999) and therefore fully embedded.

Significantly, ownership of the innovation had now largely been transferred to the business or organisation. At times this was the cause of considerable anxiety, alienation or bitterness on the part of the original owners: “It panned out to the detriment of what I was doing… it was a matter of ‘well this is the way it is going to be and you’ll have to go our way’” (Former Academic Program Manager, Gamma, Interviewee 8). The administration and future development of the innovation had now been transferred largely to university managers and professional specialists, typically located in central units rather than at the departmental coalface.

A significant number of new policies and procedures associated with the innovation had been developed, such as Gamma’s broadly based staff development and training programs. Many of the organisational procedures were designed to bring order and stability into what had been seen as an undisciplined or unchecked experiment. Gamma and Lambda, for example, introduced templates as a quality control mechanism. Organisational sanctions to protect the value of the innovation also appeared (new IP policy at Lambda), with directives in favour of a single approved or supported online system within a university (Gamma).

An important part of these business processes were the measures that were introduced to evaluate success (critical success factors). At Epsilon and Gamma these centred very much on systematic and uniform institutionally-defined standards and benchmarks.

Notwithstanding the varying degrees of organisational influence in the four cases, the defining characteristic at this stage was the desire for organisational coherence, stability and standards (Salaman & Storey, 2002) which aligned as closely as possible with the organisational mission. At Gamma, for example, the language of, and driving forces behind, the innovation’s development clearly had a business focus, with return-on-investment, market needs, consistency, efficiencies and economies of scale adopted as key criteria to assess the effectiveness of e-learning. The innovation was now far more mature than in the early “Product-centric” stage. Quality assurance standards dictated process, and the innovation had a momentum of its own, associated with the size and scale to which it had grown and which had enabled it to compete successfully with any new challenging innovations.
Once a user critical mass milestone had been reached, the organisation often displayed a sense of achievement that the innovation had matured and had been integrated or embedded into organisational life. Processes to verify online usage were used to provide evidence of successful innovation implementation: “Why I say that is we keep track of statistics about how many times students look at the online subject material, how many times they post to forums, how much use they make” (Senior IT Manager, Epsilon, Interviewee A2).

An alternative and unexpected, almost subversive, pathway of innovation decline can occur, however, during the Business Domain (see Figure 6.10). At this point internal norms, rules and mandates associated with the innovation appear to be well entrenched. Yet this can be a critical turning point for many innovations, because even though the innovation has almost reached saturation levels in size and influence, the innovation itself cannot remain static – it must grow, shrink or change in character.

Figure 6.10 Embedding Phase – Business Domain. Stage 1. Innovation decline

The pathway to decline can begin with unmet expectations. For an organisation, it may be lack of return-on-investment (Alexander & McKenzie, 1998) and for an individual the inherent visionary and empowering characteristics of the innovation may have become stale and lacking in creativity, weighed down by routine procedures and processes. Newer innovations or permutations continue to emerge within the system, such as the need for a new LMS at Lambda, creating new organisational tensions and a sense of urgency about the need to find fresh meaning and benefit from the innovation. Unless there is a change, a rebirth, it is likely that the innovation might enter the next step of decline (Figure 6.10, Stage 1(b)) which can be further exacerbated by its owner (the organisation itself) seeking ways of phasing out the
innovation altogether (Figure 6.10, Stage 1(c)), even while outwardly appearing to show support. The organisation employs business principles, rationales and reasoning in its responses, but at the heart of the problem for the individual are the emotional drivers, the personal values, which give the innovation its legitimacy.

Analysis of the data collected about Gamma in 2002-03 indicated that it was positioned in the Business Domain, but was grappling with issues of regeneration and shared understanding among the community. Gamma University was approaching a crossroads with respect to redefining the nature and key elements of its e-learning innovation. Lambda had also entered the Business Domain, but arguably in 2003 was not facing the same critical decisions that could impact on the ultimate survival or growth of the e-learning innovation.

A compiled version of the ILF is shown in Figure 6.11. The development of this second framework was useful in unpacking the nuances and conundrums associated with the progressive nature of change. There remained outstanding questions and issues which emerged from the analysis of first stage data which informed the construction of three propositions and formed a key part of the second data collection stage.

Figure 6.11  ILF Innovation and Embedding Phases

<table>
<thead>
<tr>
<th>Innovation Phase</th>
<th>Embedding Phase</th>
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</thead>
<tbody>
<tr>
<td>Product-centric Domain</td>
<td>Business Domain</td>
</tr>
<tr>
<td>Stage 1</td>
<td>Stage 2</td>
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- Product-centric Domain
- Business Domain
6.5 Analysis of propositions

The propositions were premised on key issues from the empirical and theoretical data about the important ingredients, and the degree of institutional oversight required, to embed an innovation such as e-learning into organisational culture and practice.

The first proposition focused on the transitions and intersections (“points of confluence” and “bifurcation points”) of the elements and streams of activities within the organisational system. The proposition was “the ability of a university to negotiate the system intersections and transitions influences the degree to which e-learning can be embedded in that university”. The “intersections” of the system consist of streams or spheres of activities, events or relationships, and the “transitions” are the system movements from one phase of change to another (e.g. Kurtz & Snowden, 2003; Rogers, 1995; Tornatzky & Fleisher, 1990).

The second proposition centred on the concept of system complexity and the ability of an organisation to recognise and incorporate new complexities and ideas into an existing innovation. The proposition was “complexity is an integral part of an innovation, therefore it cannot be ignored or eliminated without destroying the kernel of the innovation itself”, and ergo, its long term viability.

The final proposition, which also has a longitudinal perspective, was “the efficacy of the innovation is related, in some measure, to the ability to sustain partnerships and collaborations”.

6.5.1 Proposition 1 — managing the intersections and transitions

The second framework (ILF) focuses on progression, transitions and intersections of organisational elements or entities. The first proposition is concerned with these interactions, in particular with the ability of an organisation to manage the intersections – the “points of confluence”, – or the “bifurcation points” of the system elements.

A key finding of this research concerns the movement of an innovation within a system, from the organisational periphery to its centre or hub, as it moves from the Innovation to the Embedding Phase (ILF), a transition often epitomised by numerous
layers of decision making and debate about control: centralised versus decentralised services, academic freedom versus organisational efficiency and accountability. Within the higher education sector there is general consensus about the need for a centralised approach for IT infrastructure (Hayes, 2004; King; 2001), but beyond this, views are fragmented. Gamma and Lambda, for example, both supported in principle a well-integrated, institutional approach to IT infrastructure, but the issues were complex and contradictory:

The other thing that happens within this nested hierarchy of the organisations of the departments versus the Faculty versus the University versus the collaborations networks that we’ve got, there is a move to centralise for the purposes of efficiency while we move into creativity which exists at the local areas, so the increased standardisation if you like and the overall quality assurance of the organisation is likely to lead us to more centralised systems but less differentiation. Senior Academic Administrator, Lambda, Interviewee A2.

The polarisation of issues, such as a centralised versus decentralised service, is a problematic response in universities. A commonly sought organisational response was to seek immediately to restore equilibrium into the system (Lawrence & Lorsch, 1967), but, within the unique context of each institution, it often proved difficult to manage the intersecting or colliding trajectories associated with the polarisation of such issues. There were significant matters of underlying tension, such as between standard procedures and norms to ensure efficiency versus flexibility, and openness to encouraging creativity and spontaneity. These converging lines of disparity each had the potential to “derail” the e-learning initiative.

For some time, these discrete elements, entities or activity streams appear to co-exist, travelling in parallel, but ultimately some converge or intersect at a critical point, a site or an apex of turbulence and uncertainty (Stacey & Griffin, 2005; Stacey, 2000). In some cases, after a period of insecurity and jostling, this may transpire to be a point of confluence, a merging or fusion of elements, streams or ideas. So for example at Gamma, earlier notions held by some about online courses with respect to serving transnational or off-campus students versus views of others about more traditional distance education or FTF approaches, had given way to a “blended” learning approach (Thorne, 2003). As another example, some of the earlier competing technologies developed in the Business Faculty were later integrated into a single institutional LMS platform, GammaNet.
Similarly, at Lambda in 1999, opposing methodologies were on a collision path. Again the example concerns on-campus versus distance education and the use of e-learning methodologies and technologies, particularly those involving Internet and web-based approaches. Phase Two data revealed, however, there had been some resolution, by sanctioning off-campus e-learning delivery for clinical and postgraduate programs, and retaining on-campus modes for the remaining programs, the bulk of which were undergraduate. Lambda’s solution, therefore, rather than being a point of confluence, represented in some ways a bifurcation point, a more distinct and partitioned separation of the two methodologies at a decision point articulating two relatively distinct branches (precipitated to some degree by the external intervention of a grant of conferencing technologies). Lambda’s solution had the result of attributing legitimacy to off-campus modes, through the very act of cordonning off external teaching activities to a specific type of program or student (e.g. continuing professional education or students performing off-site clinical work). Lambda’s approach contrasted with that of Gamma, which actively encouraged a blended approach where there were to be no distinctions between on- and off-campus (Executive Director, Gamma, Interviewee A3). At the time, therefore, Gamma’s decision acted as a point of confluence.

Another key issue at Lambda was the tension emerging between traditional pedagogical models and new business models, as applied in the teaching and learning arena:

The threat I see is moving the business model too firmly into the university teaching and learning model because, I mean for example, we were just reviewed by the Gartner organisation about the IT landscape and they take a very centralist approach in standardisation and procedures... and that works very well in the business where effectively you work on a roll-out model of a particular system [which] will be used by everybody where there aren’t any options... But one of the values of universities, to my mind, has been the individual creativity and one of the things this University produced as a result of putting 12 and a half million dollars into various projects over a four year period was that it produced 230 different groups of people who are now working together and publishing and thinking things that they didn’t think before. And they did that from reaching into their own intellectual resources and their colleagues developing those liaisons, not by responding to a top-down approach that “you shall put your materials into this template because that’s what I tell you”. And I have a very strong feeling that this is not going to be the way
to produce a world class university. Senior Academic Administrator, Lambda, Interviewee A2.

The intersection of a business model with a more traditional collegiate model had yet to be resolved at Lambda and to a lesser extent at Gamma. Achieving “organisational balance” appears to be an attribute connected with the ability to manage these intersections; for example, balancing the need for standards, efficiency and uniform processes against the benefits of individual creativity. This conundrum is aptly illustrated in the above reflection (Senior Academic Administrator, Lambda, Interviewee A2), and lies at the heart of the second proposition which relates to managing system complexities.

6.5.2 Proposition 2 — embracing complexity

Complexity is inextricably linked with innovation and in particular with e-learning. Proposition 2 states that to sustain an innovation one must be able to nurture and incorporate individual creativities and new complexities into the standardised, institutionally-sanctioned model. Otherwise, the essence of innovation – inventiveness and ingenuity – is buried in institutional processes and procedures, individuals lose their interest and commitment, and the organisation loses its capacity to excel and to retain the imaginative spark that fires innovation and keeps it alive. This in essence captures the dilemma of another organisational tension, complexity versus simplicity.

At Lambda this was exemplified in the emerging idea of re-using learning objects. Ostensibly, use of learning objects was a logical and straightforward solution to Lambda’s ongoing problem regarding the cost and potential inefficiencies associated with multiple individuals producing their own but similar computer-based learning resources. Further examination of this issue, however, revealed multiple complexities associated with the concept of uptake or reuse of learning objects, raised by interviewees in Phase Two. For example, how generic does one make the learning object? On one hand, there is an argument that the more generic the object, that is, the closer it is to the raw asset, the more likely it is to be used by others who can then introduce their own text, questions and other contextual features. However, a contradictory force is at play. An informal survey conducted by Lambda revealed that individuals were apparently not particularly interested in the basic expression of an object, that is, the simple image or animation, nor in being able to access or drop this into a learning management system:
because the expert teachers had access to all those individual materials from their own resources or across the web. What they’re interested in is the year’s work we have put into the educational context, so in that case it seems that that has sufficient value to attract somebody to use rather than build their own – not to spend $100,000 a year doing it. Senior Academic Administrator, Lambda, Interviewee A2.

There are no universal answers to the complexity issue. Contradictions abound and often the simplest and seemingly most efficient option to encourage uptake and reuse is not necessarily the most efficacious in the long term. A critical question from an organisational perspective is “How does each organisation manage the interplay between capturing the need for efficiency with the benefits that flow from more complex opportunities, taking into account the overall goal of building effective learning experiences?”.

At Gamma, an example which illustrates aptly the conundrum of dealing with complexity relates to the issue of technological complexity. During investigation of options to improve GammaNet’s functionality, the procurement process highlighted the multiple perspectives and expectations of Gamma’s online learning user groups. The procurement process included a comprehensive round of consultations to gauge the needs and wants of the user community, but in the end the key decision-making criteria were business-related factors, such as universal applicability and cost effectiveness, rather than innovation factors such as creativity or inventiveness:

One of the challenges I’ve always had is what I call feature-lust; people want more and more features – and sometimes that is quite justified, sometimes it’s quite idiosyncratic. For example, in that process where we got funding for Centra, I had a list of 14 features I had requests for. I put in an initial expression of interest for 14 things and ended up applying for two – because the money just wasn’t there. Online Learning Manager, Gamma, Interviewee 4.

The criteria for selecting the two features emphasised scalable solutions which could be applied universally. Thus more sophisticated or educationally adventurous features, such as a virtual simulation package and a voice discussion board, were not supported because, as it was argued, these only had appeal to a small number of innovators or champions.
The ability of an organisation to cope successfully with the issue of complexity was also well illustrated empirically with respect to IP issues. Lambda’s IP concerns centred on the design and development of learning objects, where there were policy issues causing “real tension between the role of the academic and general staff” (Acting Head, LMU, Lambda Interviewee 9). Lambda’s policy permitted IP assignment to the originators of learning materials, but a distinction was made between the various ways individual team members had contributed to the development. Academic staff were given the role of “creator” and general staff the role of “contributor” (with some exceptions) but, despite considerable effort in developing this approach, problems persisted:

It’s been a complicating factor because... you have to decide whether somebody is a creator or a contributor and the general recognition is that somebody working on the general staff is doing a job under instruction and is simply carrying out their work as though they were effectively the same as a contractor and that wouldn’t be regarded as having produced academic intellectual property. Now there are situations though in which a member of general staff might have done more creative work even though they happen to be in a particular salary structure and that might then be recognised by the other creators and by the University. But I think it leads to difficulties in management of courses because if I hand out the work to people and say “right you work on this project, you work on that project... and one of them works out to be taken up by a publisher and given world-wide exclusive distribution and they then return a large amount of money to the University and to the individual it would be grossly unfair if someone happened to work on that project rather than another one, if I assigned this work to them. If they were the creator of the product, as it’s become, then it would be seen as quite fair... so there are some real issues in going too far down that track and we haven’t really hit those problems but we’re just about to. Senior Academic Administrator, Lambda, Interviewee A2.

The sensitivity of this issue in some ways underpins one of the most complex and confronting ideas related to the e-learning concept, the potential disaggregation of the academic concept of teaching. At Lambda the traditional perception of the academic teacher was as the course creator, owner, knowledge specialist and the person in control of student learning and assessment. There had been a shift, however, with respect to this role, as more staff had passed on the task of preparation of e-learning materials to other professionals. And although there was some appreciation of the need for a new role and for academics to “re-invent” themselves in different ways, the majority had not really confronted the nature of the problem:
It's a challenge that most people in business came to a long time ago which is moving from being the content expert to being the management expert to being the strategic planner. So I think that is a staff development, a career development mode that we have probably not recognised sufficiently and for some people it is probably not a good thing to do so. I think we need in universities to be careful that we don't close off the content expert area too soon for too many people. Senior Academic Administrator, Lambda, Interviewee A2.

At Gamma the process was more advanced, with a recognition of the inevitability of changes to the traditional teaching role and the reallocation of former responsibilities:

Well yes, these support positions are actually the first step in that... because they are actually taking on the roles which academics used to do themselves... I mean there’s quite a bit of disaggregation of assessment already with markers and so on... I think there is going to be more disaggregation with this process as we go forward. Online Learning Manager, Gamma, Interviewee 4.

An important observation about the two approaches was that at Gamma the move towards evolving a new academic role appeared to be driven more by university top-down processes, while Lambda was cautious about being too directive. Another longstanding issue adding to the complexity of the role of the academic was the conflicting priority between teaching (or the development of teaching resources) and research. Lambda had made little progress with this issue since Phase One. A senior administrator assessed it as “marginal”, although it was conceded:

There’s more of an appreciation that there’s a problem and that is the first step. We recognise now that people are as reluctant as they always have been to take positions where they might not achieve their publication rate. Senior Academic Administrator, Lambda, Interviewee A2.

The Lambda Faculty interim solution, recognised as acceptable by the University promotion’s committee, was that staff were to set aside one day per week for research, but it was acknowledged that in “trying to rework the system to recognise the changing needs e-learning demands of the system... we are being rather driven by the external system rather than my perception of what research is really about.” (Senior Academic Administrator, Lambda, Interviewee A2). Gamma, however, had intervened more
comprehensively and decisively with a whole new promotions system (see Appendix 3, Table 6.4).

Emerging new professional roles for staff illustrated another dimension of complexity of management in e-learning environments, that is, the ability to work together and the importance of collaborations and partnerships.

6.5.3 Proposition 3 — collaborations

The final proposition is that the long-term efficacy of an innovation is related, in some measure, to the ability to form and sustain partnerships and collaborations. Increasingly, the importance of collaboration to sustain innovation and as a source of new energy, ideas and vitality, was highlighted: “Five years ago business was saying ‘business today is all about alliances, not about competition’, and I think universities are just coming to that stage now” (Senior Academic Administrator, Lambda, Interviewee A2).

Similarly, within senior levels of governance at Gamma, the importance of institutional partnerships (with industry, other educational providers and the community) was emphasised. Gamma’s membership of the Australian Technology Network was cited as an example, a partnership which involved a number of shared projects and professional development activities in support of e-learning. Gamma also demonstrated a willingness to partner with various commercial entities and cited an existing arrangement with (a named company).

At Lambda, institutional collaborative networks, such as Universitas 21, were also touted. Lambda valued highly the formal collaborative grant scheme established with (University named), which had grown in importance in the preceding few years. This collaboration, in addition to development projects, involved sharing of strategic processes, audit trail processes, glossary materials and even IP (e.g. computer code). Furthermore, it was pointed out that much of the cutting edge e-learning research and development capacity was possible only through collaborative effort:

I think because none of us are going to be able to realise the potential of the resource we’ve got on our own. Now I mean nobody can do this. The BBC can’t produce all their own content... most of the big publishers are now doing exactly the same thing and I think universities should do exactly that. I don’t think we diminish
our differentiating factors in competing for students by sharing the resources to deliver our materials. Senior Academic Administrator, Lambda, Interviewee A2.

A similar argument was made at Gamma about the need to stop “re-inventing the wheel” and to share, but at the same time frustration about the process was aired: “It just seems crazy to me, but no one university will give up its courseware to use another’s, so I think that if [organisation named] could develop really good courseware which everyone wanted, there would be some potential there” (Online Learning Manager, Gamma, Interviewee 4).

At Gamma, there was tacit support for the increasing importance of collaboration, but a number of staff were cynical about the reality of the situation: “I get the feeling that they don’t share my view. I think, you know, if I say such things that people will nod but there’s no action in that regard” (Online Learning Manager, Gamma, Interviewee 4). In other words, it was argued that while there was approval in principle, in practice many staff were disinclined to pursue alliances and collaborations for fear of losing a competitive advantage. Furthermore, operational and strategic complexities in some ways were seen to outweigh potential benefits. So, for example, with respect to transnational activities (especially those involving e-learning) Gamma had reined partnerships in, adopting a far more measured and cautious approach. Overall, at an operational level the University appeared to be more comfortable establishing its own direction than in seeking ways of defining or furthering e-learning through alliances and partnerships. Clearly some stakeholders had questioned the University’s will, and in some respects its internal expertise, to lead or manage collaborative initiatives.

Analysis of Phase Two data revealed that both cases found it difficult to manage collaborations successfully. The ability to negotiate IP with respect to collaborations at Lambda continued to be a potential inhibitor: “IP policy overall is good but there are still problems with respect to external collaborations” (Acting Head, LMU, Lambda Interviewee 9).

There is an important distinction to be made between internal collaborative projects (for example between individuals and university departments) and formal external collaborations or alliances. Individuals or groups from within or beyond an organisation can join in a cooperative venture, employing collaborative processes and tools such as teamwork practices, production processes, shared marketing or distribution channels, for a given period of time. But this does not necessarily constitute a collaboration. The
concept of collaboration is more comprehensive, incorporating elements of an ongoing partnership between two or more parties, extending beyond organisational boundaries, underpinned by organisational (rather than individual project member) commitments and formalised agreements, and ideally resulting in an active, ongoing relationship which shares risks and outlays and produces mutual benefits for all (Grigg, 2001; White, 2002).

University staff often referred to internal projects as collaborations, but in fact they could more aptly be termed co-operative activities, as they entailed working with staff from university support groups on a project for a specific period of time. This is quite a different notion from a corporately structured collaboration, intended to be sustained over an indefinite or long-term timeframe and returning a much broader and diverse set of benefits to multiple parties.

Within the Australian higher education sector, long-term collaborations have yet to prove particularly viable (Grigg, 2001). While enjoying specific successes, for example, Universitas 21 has not had the anticipated market penetration for its courses, the partnership between University of Southern Queensland and NextEd was not sustained, and similar reservations were expressed at Gamma about the value of GUA as:

one of those entrepreneurial start-up type of things... it’s gone through different models of delivery that we were trying to set up, and interestingly, each successive model becomes a little less reliant on online as time has gone by... so they are all important but they don’t change life on a daily basis. Online Learning Manager, Gamma, Interviewee 4.

6.5.4 Overview of analysis of propositions

The initial exploration of the three propositions revealed some valuable insights with respect to the question of the ability of an organisation such as a university to embed the innovation of e-learning. Proposition 1, managing the organisational transitions and the intersecting pathways or trajectories of events, attached considerable importance to the ability to facilitate the progression of the e-learning innovation forward to the next phase. Good examples, provided by Lambda but of equal applicability to the other cases, were the issues associated with an academic’s chosen discipline or profession and the “not-invented here” syndrome, both of which acted as a barrier to
advancement. Institutions also demonstrated conflicting messages with respect to the staff promotion and recognition pathways associated with the decision whether to acquire or develop a learning resource. For example, academic staff are rewarded for developing their own teaching materials (a computer program, a web object or a new textbook), regardless of whether an adequate teaching resource already exists:

So, in a university, we are assigned credit for what we've done, so if I produce a [teaching] package, I can put that on my CV and my promotions committee will look at that and say, “yes, you've achieved that”, it's like a publication and we can recognise that and give it a value in a promotional/performance indicator system.
Senior Academic Administrator, Lambda, Interviewee A2

The work practice better suited to collaboration, efficiency and cost effectiveness is the business model, where:

If you work for a company and you were to say “I’m going to buy one from... and save us $100,000”, I would get a bonus. In the university, you don’t, you get the absence of an item on your CV and I think until we can deal with that in a business sense and a promotions sense, I don’t think we are going to get very far with this.
Senior Academic Administrator, Lambda, Interviewee A2.

This example highlights the ever-present issue associated with Proposition 2, the simplicity versus complexity contradiction. Zemsky and Massy (2004, pp. 7-8) articulate the “simplify” versus “complexify” dichotomy with respect to e-learning as an innovation, arguing that what is required to promote e-learning to the next stage is a dominant design or methodology. Many of the participants interviewed extolled the importance of simplifying e-learning, as this had a far reaching impact on a number of elements comprising the e-learning innovation, such as processes, user interfaces, functionality and so on – all reduced to a basic form, modularised, standardised or restricted in some way. This was an appropriate response to some of the problems facing institutions at the time, but in other cases the minimalist principle was applied generically rather than targeted at specific areas of concern, potentially undoing or limiting long term benefits or opportunities that could accrue from the early groundwork of the Innovative Phase. Thus quality assurance processes, e.g. basic templates, standard interfaces, routine processes and development regimes, were introduced to ensure a quality learning experience for students. Yet the contradiction was that many of the “value-added”, albeit more complex elements that innovators wanted to retain
(or investigate) and which ultimately may have enhanced quality were disallowed, because they fell outside either policy or process guidelines.

The challenge of growing and sustaining e-learning, therefore, is that to achieve quality and effective learning outcomes, complex conceptual understandings and processes must be negotiated behind the scenes by the all stakeholders of the innovation: teachers, developers, educational evaluators, learners, administrators and decision makers.

Proposition 3 dealt with collaboration, another complex but essential dimension of e-learning. Although there was broad consensus in the cases studied that collaborations were critical to the success of e-learning, there was still much to be done with respect to enhancing the capacity of universities to sustain these initiatives. In all the cases, there was a dearth of expert and professional IT skills, and limited capacity to retain these skills within the sector. This was highlighted at Lambda as an area where sharing and collaboration between institutions could work well, and yet there appeared to be little appreciation of the barriers to achieving this goal that were imposed by existing HR policies, work practices and cultural norms. In the institutions examined, non-academic staff were generally allocated to projects on the basis that they were available and already on staff, rather than being assigned to specific projects on the basis of their particular professional skills, talents, ability to fit into the team, or indeed even to lead or project-manage a collaborative initiative. In particular, it was evident that there was at times a lack of appreciation of the importance of “soft” collaborative skills, the absence of which often undermined the good intentions of the partnership. Pollard identifies a number of these nuances and interactions that frequently work against collaboration and, in fact, might well apply to a typical university:

And have you ever watched a “negotiation”, an attempt to arrive at consensus, turn into a debate? These activities never seem to produce true win/win collaboration, and I wonder if they ever really have. The closest we ever seem to get to collaboration is agreement on which individual will do which parts of a “group” project, and the occasional acceptance by one person of another’s idea. These modest work allocation and knowledge transfer tasks are what misnamed “collaboration” tools facilitate…. Pollard, 2004, online.

Problems associated with collaboration may be traced in part to the multiple roles or “identities” (L-change, 2004) of individuals within an organisation (and in the wider
society) at any one time. For example, an individual can have concurrent identities as a member of staff and a student, and even within an identity hold multiple "world views" (L-change, 2004) about this role or identity (e.g. as a consumer of education and a traditional student; or a member of a profession and a university teacher). These multiple and co-existing views inform individuals` behaviour and influence their motivations and intentions. Humans, therefore, are not limited to acting in accordance with predetermined rules. Indeed, intentionality plays a large role in human patterns of complexity:

Intention, then emerges in the conversational life of a group of people... the intention an individual expresses has emerged in the conversational interaction with others. Intention and choice are not lonely acts but themes organised by and organising relationships at the same time (Stacey, 2000, p. 367).

Likewise, there appeared to be compounding problems associated with the multiple contextual environments involving collaboration. Several levels of contextual granularity were operating at Lambda and Gamma Universities on both a horizontal plane (inter-organisational context) and a vertical plane (the collaborating organisation; teams and individuals) (see Figure 6.12). For example at Lambda, there were a number of projects which entailed collaboration with external organisations, both commercial and other universities, while at the same time engaging various organisational levels of the Lambda Faculty itself, including departmental groups and units and individuals. This created difficulties as groups and individuals wrestled with personal and group allegiances, values and multiple roles within the collaborative project and within the organisation.
A complicating factor about context in collaborative environments is that the collaboration must meld its own unique context, but at the same time remain sympathetic to the intersecting specific contexts of the collaborating organisations.

### 6.6 Finalisation of the second framework

The insights drawn from exploration of the three propositions prompted the progression of the ILF to the landmark stage of the embedding process (see Figure 6.12). This stage, termed the “Complex Domain”, draws on the second stage data analysis as well as the literature related to complexity.
It is the contention of this study that the Complex Domain evolves from the necessity of the innovation to move beyond the physical and intellectual constraints of the Business Domain, to be rejuvenated through the input of new ideas and energies and the fusion of newer but complementary value-adding innovations. In the Complex Domain, the size of the e-learning innovation is extensive Figure 6.13, Stages 1(a) – 1(c)), unlike in the initial early stages when it was localised and small (Figure 6.7, Stages 1(a) – 1(b)). The nature of the innovation, its shape or organisational footprint, is very different, having undergone significant internal adaptations and changes. During the Complex Stages, one would expect the innovation to comprise more diverse, sophisticated and multifarious elements. One would also expect to see organisational processes that accommodate or facilitate greater intuitiveness, adaptation and creativity, but within a framework that clearly articulates a corporate strategy and an appreciation for the need for agreed business process.

As the transition to and within this third domain is highly malleable and iterative, one might expect to see a greater awareness of and institutional ability to harness self-organisation and co-evolution (processes), fundamental principles of complexity theory (Ashmos et al., 2002; Axelrod & Cohen, 1999), in order to maximise the potential benefits of the emerging new ideas and innovations. In some respects these fresh new ideas pull the e-learning innovation towards the organisational periphery or boundary again, towards the edge of chaos (Hayles, 1991; Lewin, 1999), or at least into the organisational space of bounded instability which offers new potential and regeneration (see Figure 6.13, Stage 1(b)).

Initial evidence about the characteristics of this stage suggests that it is populated by a number of uncertainties and contradictions about the nature or value of the innovation, reminiscent of the initial stage of the Innovation Phase. The difference, however, is
that the organisation has now reached a stage of maturity where such confrontations or tensions can be tolerated, even welcomed, rather than seen as threatening to the very existence of the innovation.

The primary responsibility of the organisation, therefore, is to ensure that these competing tendencies do not destroy the innovation. Again in some ways it is a question of balance: to be able to retain the benefits and lessons learned from the earlier phases, the useful policy frameworks and systems functions, but to avoid the tendency to smother or to disenfranchise the fledging new creative elements. Allowing uncertainties and even tensions to exist, but not to dominate, is an essential strategy associated with complexity absorption (Boisot & Child, 1999). It requires considerable understanding, flexibility and capacity on the part of leaders and organisations, as the natural tendency appears to be to control or micro-manage new developments.

Management heavy-handedness, such as constantly introducing new regulations, standards, processes or policies before the real benefits of new ideas can develop or be assessed, also runs the risk of alienating the new players, the ones who inject the vitality which is essential to the long-term health of the innovation. The boundary of the innovation itself, and its position within the organisation, is actually being redefined at this stage (see Figure 6.13, Stage 1(c)). The real challenge is to find safe ways to give expression to this new exploratory creative phase without jeopardising the overall integrity of the innovation itself.

The ILF, illustrated in its entirety in Figure 6.14, depicts graphically the notion of progressive states or phases of change. Appendix 3, Table 6.4, provides a detailed summary of the key components of each phase and its associated stages. The potential, more likely probable, iterative and cyclic nature of activities between the Business and the Complex Domains is illustrated in Figure 6.14, suggesting that in innovations which are sustained over a long period of time, the emphasis or focus will naturally move back and forth in an organisational context between these two phases (Kurtz & Snowden, 2003). The direction of the change therefore is two-way or perhaps more accurately circular, whereas in the first Product-centric Domain the change is more uni-directional and the overall direction is forward to the Business Domain.
Figure 6.14 ILF completed Innovation Phase

Product-centric Domain

Stage 1

Stage 2

Embedding Phase

Business Domain

Complex Domain

Merging innovation

The original innovation
6.7 Conclusion

This chapter adds a new dimension to the concept of embedding, a longitudinal perspective, by examining new data about the use of e-learning in two of the cases, Lambda and Gamma, several years after the first phase investigation. The development of a second framework, the ILF, enabled new insights to be developed about change patterns in general and, more specifically, about the nature of embedding as a complex and iterative process, evolving in the context of an organisational system. The efficacy of the two frameworks is examined further in the following chapter.

The three propositions, premised on issues arising from Phase One data, focused on system transitions and intersections, complexity and collaborations, and also informed the development of the ILF. The findings from these propositions shed new light on various aspects of the research problem, in particular the significant influences which affect an organisation’s ability to guide change, as Kotter (1990, 1996) describes it, the ability “to make change stick” in organisations. In the context of this study, the key to organisational success appears to rest with the ability to steer an innovation from the initial emergence of an idea in the Innovative Stage through to the Complex Domain.
Chapter 7: Theorisation of the Frameworks

Introduction

Two frameworks, the Innovation Relationships Framework (IRF) and the Innovation Longitudinal Framework (ILF) (see Figures 7.1 and 7.2), were utilised extensively as part of the analysis of the university cases data. It is now necessary to demonstrate the efficacy of these frameworks from a theoretical as well as an empirical perspective. This chapter tests the efficacy of the frameworks in order to cast light on the research question “How do organisations, specifically universities, successfully embed the innovation of e-learning?”

Figure 7.1 Framework One – Innovation Relationships Framework
Both frameworks draw extensively on systems, organisational and change theories, particularly the broad field of literature which asserts that systems theory can be applied to human endeavours and living systems such as organisations (Fullan, 1999; Senge, 1990; Sterman, 2000; Wheatley, 1992). Both frameworks are strongly premised on a number of key principles of systems theory, the first and in many ways most fundamental of which is the system boundary.

**7.1 System boundary**

The system boundary is central to this research problem, since it represents the limit of the organisation's direct control or pervasive influence over the innovative process.
occurring within, and a demarcation between the organisation and its environment. The boundary, as represented in the IRF, encloses the dimensions which lie at the heart of the research problem: the organisational elements (structure, strategy, process and culture); the nature of the innovation; and the nature of the change process.

Boundaries are subject to interpretation, depending on their context or their application purpose. Traditionally a boundary has been perceived as a barrier or obstacle, designed to separate, protect or isolate groups, entities or environments from each other (Katz & Kahn, 1978; Rycroft & Kash, 1999). For example, interviewees at Delta, Gamma and Lambda Universities all carefully defined the boundary of the organisation with respect to collaborative and marketing opportunities involving sharing or re-use of their e-resources. The effectiveness of the boundary as a barrier can vary, but essentially its purpose is to delineate or filter the values, activities and actions of a system from the wider environment (Kreps, 1990).

The boundary therefore determines the limits by which we can assess the state of the organisational system, but it is not impermeable, and here lies another paradox. As Luhmann (1995, p. 28) reminds us, boundaries “have the double function of separating and connecting system and environment”, and Wheatley (1992, p. 18) agrees: “what we observe… are boundaries that both preserve us from and connect us to the infinite complexity of the outside world”. Luhmann offers a further insight which underpins the construction of these frameworks:

As soon as boundaries are defined sharply, elements must be attributed either to the system or to the environment. Yet relations between system and environment can exist. Thus a boundary separates elements, but not necessarily relations. It separates events, but lets causal effects pass through (Luhmann, 1995, pp. 28-29).

Alternatively, boundaries can be described as “phase changes” (Kurtz & Snowden, 2003, p. 474) signalling an interval in time or space where movement occurs between different states or situations, as is evident between the domains and phases of the ILF. This type of boundary is conceived as permeable, even fuzzy. Transition changes between different system domains or states were apparent in the empirical data collected between Phases One and Two of this study. For example, at Gamma during Phase One, many of the critical organisational embedding issues were clustered around the boundary between the Product-centric Domain (Innovation Phase) and the
Business Domain (Embedding Phase). There was, for example, considerable focus and debate around e-learning policy issues and structural interventions (illustrated in Appendix 2, Tables 5.2, 5.3, 5.4 and 5.5) which would support the institutionalisation of e-learning in a way which furthered Gamma’s organisational strategy and aims:

The university is very strong on policy with respect to flexible learning as it has come from distance education. … there is an expectation that staff will become involved in online. Senior Academic Director, Gamma, Interviewee A6.

At the time of the second empirical phase of the study, however, the organisational challenge facing managers at Gamma was less concerned with the introduction of basic business processes and more with the ability to sustain the e-learning innovation, in particular the ability to migrate e-learning from the Business Domain to the Complex Domain:

We’ve kind of gone through a 10-year cycle which started in ’93 with a new teaching/learning environment prediction on to 2003. I think we’ve done a reasonable job of fulfilling that vision and now it’s time for a new vision. Online Learning Manager, Gamma, Interviewee 4.

The nature of the boundary (that is, its inherent characteristics) is particularly significant with respect to the degree of difficulty required to migrate or move across this boundary space. The nature of this boundary movement relates to the ease (degree of difficulty), universality (anyone can do it), speed, or location of crossing or breaching the boundary (Kurtz & Snowden, 2003). So for many staff, crossing the boundary from playing and experimenting with the innovation of e-learning to its universal use and institutionalisation raised significant barriers:

I think it’s [online] a wonderful innovation for students and a wonderful resource for teaching excellence. However, I think the time required to do a proper job needs to be acknowledged in teaching loads. If academics are going to take it on seriously, then I think it has to be factored into their workloads, not just put on top as an additional extra. And I think that’s what a lot of the reluctance is about. And I think that until that’s sorted out, there’s going to be a huge resistance. Senior Lecturer, Epsilon University, Interviewee 12.

The ability of the organisation to manage these transitional boundary activities and processes, articulated in Proposition 1, is therefore critical to the embedding of the
innovation. Delta had struggled in this regard and consequently, at the time of Phase One of the study, had failed to progress beyond the Innovation Phase of the ILF. Gamma and Epsilon had progressed to the Business Domain but had yet to manage successfully the next boundary crossing to the Complex Domain:

I think the way the place is managed... we can do things across the University here because, you know, we're corporately managed and so we have university-wide policies across the board which are pretty well implemented and followed. Online Learning Manager, Gamma, Interviewee 4.

In a similar way, boundaries can exist between levels of organisational analysis: individuals, work groups, faculties, whole of institution, and external environment (see Figure 6.6).

7.1.1 Boundary behaviours

Boundary issues, such as the exchanges or interactions between the organisational system and the external environment, the various system elements or entities, and the levels of granularity of activity within the system, are fundamental to the research question. Many of these interactions are identified in the two frameworks as interventions across system boundaries, and as reactionary effects that occur as organisational elements and agents diverge or converge, intersect, overlap and merge (see Figures 6.2, 6.4 and 6.5).

The significance of boundary behaviour is evident in the context of a study of innovation, as is the range of actions and responses available to the entities and individuals operating in this space. Additional examples of boundary behaviour occurred at both Delta and Gamma, when early innovators decided to opt out of the mainstream institutional e-learning approach; in other words, they did not cross the boundary into the ordered domain (Kurtz & Snowden, 2003) or Business Domain (ILF). At Lambda, another example was highlighted when the mainstream or “late majority” (Rogers, 1995) began to participate in e-learning only after being convinced that the approach was educationally effective by the formal evaluation of learning outcomes and experiences of trusted colleagues. Kurtz and Snowden (2003) summarise the variety of possible boundary behaviours: individuals can cross a boundary; approach in anticipation of crossing; observe and engage in some exchanges but decide against crossing; or enter this space with the intention of managing it, without necessarily
crossing or withdrawing. The significance of boundary behaviour from an organisational perspective is highlighted in the following observation:

The way they [people] think about moving between domains is as important as they way they think about the domain they are in, because a move across the boundaries requires a shift to a different model of understanding and interpretation as well a different leadership style. Understanding differences between the different movement in the framework increases the response sophistication of a decision making group to rapid change (Kurtz & Snowden, 2003, p. 475).

Thus, for example, having an increased awareness of the fact that one is crossing a boundary allows one to be more prepared for the challenges of the new environment on the other side, or perhaps to modify one’s behaviour or decisions about the crossing or even whether to cross. Awareness and development of organisational strategies to manage the range of boundary crossing issues and behaviours are therefore fundamental to the organisation’s capacity to progress the innovation from the Innovation Phase right through to the Complex Phase of the ILF. Kurtz and Snowden’s (2003) interpretation of the boundary is particularly relevant to the ILF, as a phased change model which grapples with issues of progression and regression of innovation over extended periods of time, but it is also applicable to boundary issues that develop through the interactions of the various organisational elements and levels of system activity in the IRF.

7.1.2 Boundary location and innovation

The location of the boundary at the periphery of a system is especially pertinent to this research, as it is the position where new ideas and innovations are frequently born and nurtured, and significantly, it is the area of greatest system flux, characterised by interactions associated with “edge of chaos” and “bounded instability” (Stacey, 2000).

The ILF depicts graphically, if somewhat ideally, the migrating position of the innovation within the organisational boundary over the life cycle of the innovation (Farrell, 1994; Hanna, 2003; Peters, 1983) as well as the innovation’s size and scale (Fossum, 1989; Ledford et al., 1991; Quinn, 1996; Rogers, 1995; Rycroft & Kash, 1999). The ILF also addresses the concept of multiple innovations or innovation streams (Tornatzky & Fleisher, 1990; Tushman et al., 1997), concepts of fit, adaptation (Dunphy & Stace, 1990) and merging innovations and innovation sub-sets (Rogers, 1995).
At Gamma, for example, the birth of GammaNet in the Innovation Phase was traced from a small idea at the edge of the system to the centre of the organisation, as it gained support, simultaneously competing and merging with existing e-learning innovations. By 2000-2001, GammaNet had crossed the boundary into the Business Domain of the Embedding Phase, and, having attained a critical mass of users, occupied a central position in the University. At the time of the second data collection, GammaNet was again experiencing instability and challenges from competing ideas and e-learning technologies:

There are some decisions to be made I think, some hard decisions... up until now I think we’ve been able to – we’ll just keep doing more and more and more, keep adding more strings to our bow and we need to now start to think, well do we actually need all those strings? Online Learning Manager, Gamma, Interviewee 4.

This instability is illustrated in Stage Two of the Business Domain in the ILF, but the outcome – a gradual demise or a regeneration by crossing into the Complex Domain – had yet to be resolved.

7.2 System relationships

Analysis of empirical data in both Phases One and Two demonstrated the importance of the relationships and interconnections between the various parts of a system on the uptake and embedding of the e-learning innovation. This is also a universal tenet of systems theories, that nothing exists independently of its relationship with something else (Lewin & Regine, 2001; Olson & Eoyang, 2001; Prigogine & Stengers, 1984). It is essential, therefore, that the IRF visually and conceptually demonstrates this strong sense of connectedness between system parts and accommodates the myriad of forms or pathways made by these connections or links.

The interactions between the various system elements are two-way and multidimensional, synchronous and asynchronous. The interdependence which forms or emerges between the system elements, referred to as “agents” in complex adaptive theory (Ashmos et al., 2002), is a co-evolutionary process, where “multiple populations of agents are adapting to each other” (Axelrod & Cohen, 1999, p. 8), and it gives rise to a sense of perpetual motion: alignment, disengagement, adaptation, re-engagement and so on.
The IRF, as a snapshot in time, depicts the bi- and multi-directional character of these relationships (see Figure 6.5), but it is limited in its ability to represent the evolutionary and cyclic nature of the relationships, particularly over a longitudinal time-frame. The latter is better captured in the longitudinal perspective presented in the second framework, the ILF.

### 7.2.1 Alignments and non-alignments

One of the dominant relationships highlighted in the IRF is organisational alignment or congruence, a key indicator of the degree of compatibility or synergy that can develop between the systems components (Nadler & Tushman, 1997). Strong alignment or coherence between the organisational elements (for example, at Epsilon, between e-learning strategy and use of online communication technologies) is a common organisational goal, to bring about greater organisational effectiveness (Beer, 1980; Miles & Snow, 1990; Mintzberg, 1984; Nadler & Tushman, 1997; Perrow, 1986).

The inherent complexity of organisations, however, highlights the weaknesses of an over-reliance on congruency and fit (Siggelkow, 2001) as an organisational aspiration. Order, stability and the absence of conflict (perceived as a consequence of tightly aligned or coupled system elements) have been described as elusive states within constantly evolving and changing systems (Prahalad, 2000; Weick & Sutcliffe, 2001; Wheatley, 1992). Issues which impact on the degrees of alignment within organisations explored in Chapter Six, such as tensions between organisational strategy and the properties of the e-learning innovation, or inappropriate organisational structure with respect to strategy, can be represented in the IRF, but the overall levels of system alignment and stability are better explicated in the ILF. For example, non-alignments or organisation gaps (see Appendix 2, Table 5.14), such as the IP policy at Lambda and organisational cultural/strategy tensions at Gamma, are depicted by the concept of a moat between the established e-learning innovation and the organisational boundary. The degree of the gap or non-fit between the established or dominant e-learning innovation and newer or weaker competing innovations is also depicted in the ILF.
The concept of the dominant design or innovation has been advocated as a key development or requirement for the sustainability of e-learning (Zemsky & Massy, 2004). At Gamma, the emerging dominant design (GammaNet) cohabited in the organisational environment with competing innovations such as alternative online delivery platforms supported by individual schools or external companies. Some of the competing innovations however, aligned more closely with the dominant innovation and eventually merged, or some of their features merged, with GammaNet. Others, however, such as the platform developed by an external provider for an offshore course, did not survive and had been dismantled by the time of Phase Two of the study. The concept of the dominant innovation design resonates with the drivers and elements associated with the Business Domain (ILF). There is, however, conflicting evidence in the arguments by senior officers at Gamma and Lambda as to whether the advantages afforded by adopting a dominant design, such as economic returns accruing from scalability and efficiency of a single approach, are sufficient to sustain the innovation beyond the Business Domain: “[This position] needs to be challenged purely on the basis of the technological capability – at one level online will achieve economies, but they are not necessarily economies that achieve the outcomes that were originally seen” (Senior Administrative Manager, Gamma, Interviewee A2).

As was found in the empirical data, closely aligned or converging system elements or streams can intersect, as did the pedagogical principles of distance education and the technological capabilities of the e-learning innovation. These critical points of confluence or bifurcation points are evident in both frameworks, and have enduring significance with respect to the capacity of an organisation to embed innovation, as aptly demonstrated in the comment about different strategic approaches to e-learning at Gamma:
You’ve got two forces acting. You’ve got a top-down force from the institution and you’ve got a bottom-up swelling of the masses who want to do this thing and the two don’t seem to be well aligned. I suppose it tends to be the top-down approach that had put a lot of restrictions on the way things should be done, whereas maybe they should be providing lots of opportunities and that. Someone else said they should be providing the “sound” for the “sound kit”. Academic Program Manager, Gamma, Interviewee 11.

Complexity theory research has facilitated the identification of leverage points, the intersections of the interactions, which are open or resistant to interventions. The nature of the interventions, however, may have significant or unpredictable impacts. Policy interventions can often have unpredictable impacts, as was highlighted with respect to the development of online policies at Gamma (see Appendix 2, Table 5.3).

7.2.2 Interventions

Interventions, as specific types of relationships, are clearly identified in the IRF and are implicit in the organisational responses described in the various phases of the ILF. Interventions, both internal and external to the system, are characterised as intrusions which disrupt or alter the existing patterns of interaction within organisational systems. Argyris (2000, p. 117), for example, makes certain assumptions about the nature and the intent of the intervening action: “To intervene is to enter into an ongoing system of relationship… for the purpose of helping them”. Argyris posits that the system and the intervention exist independently of each other but, significantly, that the intent of an intervention is positive, that is, to assist or benefit the recipient system (Argyris, 2000). Interventions, thus conceived, are planned actions designed to bring about an improvement to a current state, for the benefit of the whole.

Furthermore, such planned interventions are construed largely as controlling mechanisms, designed to manage the interactions between system agents or organisational elements, in varying degrees of influence and effectiveness. At one extreme of the control continuum interventions demand compliance. Examples include those mandated through legislation, rules and policies (such as the government-imposed IP legislation highlighted at Delta and Lambda, and the government regulations about student computer access raised at Epsilon). Less strident mandates rely on incentives such as promotions, rewards, staff training or institutional grants (Johnston, 2001). Lambda’s grants scheme acted as a positive inducement to guide
rather than enforce change, and was very successful in this regard: “I think the provision of seed funding from the University has been very important, a major stimulus... that’s led to increasing quality of the products we’ve been developing” (Executive Academic Manager, Lambda, Interviewee A1).

All interventions, internal and external, formal and less formal, can be represented in the frameworks (see Figure 6.5). Internal interventions are important management devices to corral the organisation towards a desired goal. They may be proactive strategies or plans adopted by leaders and key decision makers to enable the continuing success, health and growth of the organisation. This was evident at Epsilon where a number of processes, such as quality control of production of learning resources, were increasingly managed centrally within the University. Internal interventions can also be reactive, for example to curb or redirect innovations or changes within. Hannan and Silver (2000, p. 7) referred to the processes of “guided” and “directed” innovation, where the activities associated with the innovation become increasingly top-level strategic, institutionalised and centralised, rather than dispersed throughout the lower levels (departments, work or project groups) of an organisation. In the late 1990s, through incentives such as grants and funding schemes, the higher education UK policy framework promoted innovation for national purposes, conceiving experimentation to be centrally generated, rather than individually created.

The timing and positioning of these interventions can be seen as key leverage points or critical incidents (Kain, 2004; Tripp, 1993) within the organisational life cycle, designed to move the locus of control of an innovation. Establishing a new professional support unit typifies a structural intervention depicted in the system movements from the Product-centric to the Business Domain in the ILF.

External interventions originating from outside organisations such as government, industry or market sectors tend to prompt associated internal “reactionary” responses or interventions. In the higher education context, examples of external interventions are government funding processes, legislation and governance of universities. Examples in recent years in Australian universities are attempts to modify universities’ governing bodies and councils (Department of Education Science and Training, 2003; Meek & Wood, 1997), deregulation of fee-paying courses, promotion of quality through audits and reviews (such as the Australian University Quality Agency) and competitive national grant schemes such as the AUTC grants. External interventions are frequently seen by internal constituents as more directive or controlling, creating more overt,
potentially disruptive or urgent organisational responses. In complex systems theory these “perturbations” (Byrne, 1998, pp. 22-23) or fluctuations create the unstable and potentially creative environment which amasses around the organisational boundary.

Planned management-initiated interventions are grounded in systems theories, such as cybernetics and strategic choice, which promote strong cause and effect relationships and predictability of outcomes (Ashby, 1956; Beer, 1980; Sterman, 2000). This approach sits comfortably within organisational environments and domains which are ordered and better understood, analogous to Kurtz and Snowden’s (2003) “known” and “knowable” domains. Equally these strategies and processes are characteristic of the nature of activities depicted in the Business Domain stages of the ILF.

The types of intervention described so far are intentional or planned. However, neither framework excludes the possibility of serendipitous or unplanned intrusions into the system, such as the early retirement of a key executive. Furthermore, the weakness of planned interventions can be over-reliance on the part of the organisation on predictability of outcomes. Policy intervention is an example of a planned intervention that can have unintended consequences. Unplanned and unexpected intrusions can have the effect of pushing the system towards the unordered domains (Kurtz & Snowden, 2003) of organisational activity. This occurred, for example, at Lambda when a chance meeting between two colleagues from different universities revealed that much of the intended development work on a multimedia project already existed. The entire project plan was discarded, the project was catapulted back into unknown and hung in the balance, but the end result was that a reworked plan and collaboration between the two universities produced a better than expected outcome.

7.3 Progressive or staged change

A fundamental aspect of change developed in the argument of this dissertation is the progressive nature of the change process. This is the distinctive feature of the ILF, with its focus on a longitudinal perspective of the innovation process (Pettigrew et al., 2001), from the inception of the innovation through to its embedding. As such, this second framework draws on key concepts from a number of processual models of change (Greiner, 1972; Kotter, 1996; Quinn, 1996). In particular, the framework is underpinned by a number of concepts:
• “freezing” and “unfreezing” (Lewin, 1951) of the organisational environment as the innovation moves from the Product-centric Domain through to the Business Domain
• innovation awareness (Rogers, 1995) in the Product-centric Domain and routinisation (Rogers, 1995) of procedures and organisational processes in the Business Domain
• growth and decline (Greiner, 1972) throughout
• integration (Yin, 1979) in the Business and Complex Domains.

As previously discussed (Chapter Three) each of the theoretical models of change cited above which informed the development of the ILF depicts a linear chronological advancement of an innovation from its initial, embryonic state, through various phases of disruption and growth, to stabilisation (or decline). It is important to note, however, with respect to the ILF, that although the change process is broadly represented as a sequential progression, it is also influenced by Tornatzky and Fleisher’s (1990) “life cycle patterns” of interchange and two-way movement. Evidence for this type of movement occurs in the domains of the ILF and their internal phases. The nature of these patterns of movement is highly contextual, non-linear (but not entirely random), at times cyclical or iterative.

The nature of the interactions captured between the ILF’s domains and phases draws on the work of Kurtz and Snowden (2003), recognising individual events or clusters of activities occurring within essentially ordered or non-ordered domains. Additional complexity enters the system, with multiple innovations or innovation subsets (Tushman et al., 1997) evident simultaneously in one or more domains within the organisation (see Figure 7.2).

The top level phases, Innovation and Embedding, depict a macro-view of the overall progression of an innovation from initiation to its ultimate achievement. Three lower order domains, Product-centric, Business and Complex, were developed as sub-sets of the phases, with each domain being further divided into a number of stages (see Figure 7.4).
The Product-centric Domain has e-learning as a product innovation as its primary focus, and when applied within the university sector, the innovation is strongly influenced by the innovator’s home discipline (Becher & Trowler, 2001). In all the case studies, the e-learning innovations were centred in the academic schools, underpinned by the values and beliefs of the special nature of the innovator’s discipline. The focus of the innovation process, however, shifts to an institutional perspective in the Business Domain, to processes and to institution-wide rather than discipline-centred factors that assist in the routinisation and legitimisation of the innovation. The Complex Domain embraces many of the elements of the previous domains, but uniquely is where many of the complexities and complications associated with the rejuvenation and revival of the innovation arise.

In addition to the particular movements occurring around the internal domain system boundaries (product, business and complex), broader system-wide trends occur. Kurtz and Snowden (2003) describe these generalised shifts or trends of change as consisting of circular broad sweeping motions, either clockwise or anti-clockwise in direction, which engulf the entire system over time (see Figure 7.5).
Kurtz and Snowden depict the forces of “the past” that cause a clockwise drift:

People living together and sharing mutual needs lead to the emergence of ideas; convenience leads to stabilization and ordering of the ideas; tradition solidifies the ideas into ritual; and sometimes, either lack of maintenance or the build up of biases leads to the breakdown (Kurtz & Snowden, 2003, p. 479).

The counter movement, anti-clockwise, represents the forces of “the future”:

The death of people and obsolescence of roles cause what is known to be forgotten and require seeking; new generations filled with curiosity begin new explorations that question the validity of established patterns; the energy of youth breaks the rules and brings radical shifts in power and perspective; and sometimes imposition of order is the result (Kurtz & Snowden, 2003, p. 479).

Complexity is further increased in the system because the two broad patterns of movement can, indeed most frequently do, occur simultaneously, pulling the system in opposite directions and setting up internal tensions. Layers of movements cohabit in this organisational space: transitions and exchanges between the system and the external environment, broad trends or patterns of movement within the system, and specific internal boundary engagements associated with particular organisational events or activities.

Through the development and application of the frameworks, several fundamental aspects of organisational systems pertinent to the research problem have been highlighted. These include:
• the significance of boundary issues, especially the transactions, behaviours and movements that occur around the boundary
• the vital role of the relationships between the system elements, and the ensuing attention that university leaders need to give to the issues surrounding the interconnectedness of system parts (alignments, tensions, interventions)
• the progressive and complex nature of the patterns of change.

In addition to the processual temporal perspective offered by the ILF, the IRF addresses the issue of levels of analysis.

7.3.1 Levels of analysis

The importance of the unit or level of analysis of a system has been demonstrated in the literature and empirically (see Figure 6.6). The IRF represents a snapshot or vertical slice in time through an organisational system, which can be represented at various levels of system granularity (e.g. work group, department/faculty or whole of organisation), as depicted in Figure 7.6.
For example, if a university department or work group is the organisational case of a study, it would be represented on the IRF as the pale blue area (inside the boundary) and the external environment could be represented by various levels of immediate influence (mauve: faculty/division; green: whole university) and beyond in ever widening circles to include the higher education sector and society.

A key finding of this thesis is the ability of leaders and managers to comprehend the nuances of the change process, particularly the complex nature of the direction of movement associated with the engagement of the elements and agents within an organisation, horizontally (across the organisation), vertically (through the various organisational levels of analysis represented above) and longitudinally through the phases of change (exemplified in the ILF). The ability to effect conscious control over these internal transitions and intersections is critical to the ability of an organisation to
embed innovation. In the frameworks an attempt is made to represent the complex nature of the transitions and movements. Used to gain a holistic view of organisational change, the frameworks should therefore assist managers to embed innovation.

7.4 Complexity

Complexity, it has been argued, is endemic to contemporary organisational life, reflecting the nature of environments which are becoming increasingly complicated, not because every issue or transaction is complex, but because of the co-existence of the known and unknown, the straightforward and problematic, the simple and the convoluted. The foundation concepts of complex systems perspectives are therefore integral to the building of both frameworks.

The strength of complexity research is not in making detailed predictions. Rather, it is a perspective that posits “new kinds of questions and possible actions” (Axelrod & Cohen, 1999, p. 19). It is in fact this new questioning and challenging which introduces a renewed vigour to the innovation, vigour which is essential to its survival, as posited in this study’s second proposition. For example, key complex issues arising again as organisations moved beyond the Business Domain were related to the quality of the e-learning innovation and policy:

There is a move to centralise for purposes of efficiency while we move into creativity which exists at the local areas, so the increased standardisation if you like and the overall quality assurance of the organisation is likely to lead us to more centralised systems but less differentiation, and I think that might appear on the surface… the threat I see is moving the business model too firmly into the university teaching and learning model. Senior Academic Administrator, Lambda, Interviewee A2.

A number of the relationships articulated in the two frameworks are informed by the precepts of complexity theories, including the dynamic nature of movement and interactions, adaptation, self-organisation and co-evolution, chaos, paradox of co-existing states, stability and instability, equilibrium and balance (Ashmos et al., 2002; Axelrod & Cohen, 1999; Hayles, 1991; Kauffman, 1995; Luhmann, 1995; Prigogine & Stengers, 1984; Stacey, 2000). Byrne argues:

Outcomes are determined not by single causes but by multiple causes, and these causes may, and usually do, interact in a non-additive fashion. In other words, the combined effect is not necessarily the sum of the separate effects. It may be greater
or less, because factors can reinforce or cancel out each other in non-linear ways. (Byrne, 1998, p. 20).

The ILF, as a temporal representational tool, incorporates both the sequential nature of innovation transitions as well as the more complex non-linear patterns of evolution, the cyclic or iterative interactions which advance innovation from the chaotic and unpredictable to the stable and manageable and back to the uncertain. For example, an innovation can die, or become a redundant or greatly diminished activity during the initial, chaotic or self-organising period of the Innovation Phase (ILF). The demise of a fledgling innovation can be due to the increasing dominance of competing innovations, or the innovation can gradually succumb to a pattern of entropy depicted in general system theories (Tubbs, 1998). Entropy, the process by which systems are unable to avail themselves of unused energy in a positive way, does not permit exchange of information between system elements, and thus the system moves towards disorganisation or death (Luhmann, 1995; Tubbs, 1998). This occurred at Delta, for example, which had ceased to use several of the early computer-based learning resources, primarily because the original developer of the resource had left the organisation or a new member of staff was teaching the relevant course. The energy and positive momentum attributed to the original project had thus dissipated as the owner had failed to engage the other crucial system agents, and the resource had gradually withered.

The death or extinction of a specific innovation is final, but rather than writing off the innovation as a failure, as too often occurs in universities (Ehrmann, 2000), there is an opportunity to view the ensuing disorganisation as a positive chance to re-engage in the messy and chaotic process of self-reorganisation or “autopoiesis” (Prigogine & Stengers, 1984). This chaotic state, rather than being suppressed, could be embraced as a natural and healthy component of the innovative life cycle, an essential part of the change process that legitimises innovation within the psyche of an organisation. The need to embrace complexity, however, challenges the predilection of some systems theorists for organisations to constantly maintain a state of equilibrium or homeostasis (Kuhn & Beam, 1982).

In this environment of seeming contradictions (stability and instability, extinction and rebirth), new forms (innovations) emerge at the system boundary with apparent but temporary stability. These events and forms are identified in both the Innovation Phase and the Embedding Phase of the ILF. Stacey (2000, p. 298) suggests that while this
“looks like punctuated equilibrium”, what is actually occurring is a self-organising process of randomly forming alternative forms which can suddenly displace the existing form. This dynamic state, referred to as the “edge of chaos” in complex systems theory, thus produces the new but also contributes or leads to extinction events.

A key insight into the notion of bounded instability (Stacey, 2000), and complexity theories more generally, is the paradox that the creative and the new arise in the absence of an overall master plan to design the new. This environment has been described as letting a “thousand flowers bloom”, where:

There was no prescription for the University. And that was because in the developmental stage there’s no agreement about the standard that should be implemented... We’ve had the individual schools developing their own thing. Pro Vice-Chancellor, Academic Division, Gamma, Interviewee A1.

This paradoxical state is evident in the ILF during the initial Innovative Phase and the more mature Complex Domain of the Embedding Phase. The statement that “paradox is at the heart of innovation in organisations” (Salaman & Storey, 2002, p. 160) is therefore compelling in the context of this study. The paradox and tension arises from the innovation’s “pressing need for survival in the short-term [which] requires efficient exploitation of current competencies... coherence, coordination and stability” (Salaman & Storey, 2002, p. 160). Yet the long term viability of the e-learning innovation “requires the discovery and development of new competencies and this requires the loosening and replacement of these erstwhile virtues” (Nooteboom, 2000, quoted in Salaman and Storey, 2002, p. 160).

Unpredictability permeates complex systems, dominating specific organisational structures and processes and undermining the capacity of managers to consistently implement and manage top-down or centre-out control (strategy) within organisations. The “unordered” domains of a system (Kurtz & Snowden, 2003), the ILF’s Innovative Phase and Complex Domain of the Embedding Phase, are characterised by unruly patterns of interactions which can rapidly escalate “to amplify tiny changes in starting conditions into major alterations of consequent behaviour” (Stacey, 2000, p. 267). The degree of alteration give clues as to the magnitude of the impending change, but the ability to predict, much less determine, the path or direction of such changes is remote.
(Prigogine & Stengers, 1984). Stacey argues that within this state of bounded instability, and operating far from the system equilibrium:

Tiny changes that could not possibly be detected, measured or recorded could lead the system to completely different, qualitatively different, states of behaviour. This means for all practical purposes, that the effects between cause and effect are lost in the detail of what happens. For all practical purposes the links between cause and effect have disappeared, making it impossible to identify the specific consequences of a specific action and to identify the specific cause of a specific event. Instead it is necessary to think in terms of general qualitative patterns related to the system as a whole (Stacey, 2000, p. 267).

So for example at Lambda University, a small pilot project established to test the use of computers to supplement wet laboratory experiments in a particular department “...completely revolutionise[d] their first year teaching. So they changed the whole thing.” (Associate Professor, Lambda, Interviewee 8). The end result was not caused by the pilot but was brought about by a series of unplanned, even untraceable, events and interactions, involving staff changes, new leadership, student expectations, funding opportunities and so on.

These states or incidents contrast with strategic choice (Beer, 1980; Miles & Snow, 1978) and learning organisation theory (Argyris & Schön, 1978; Senge, 1990), which favour a controlled or managed evolution of innovation adoption, based on carefully planned and strategic manipulation of leverage points (or interventions) within the system environment. The institutionalised management of e-learning at Epsilon, emulating many of the distance education processes and interventions (such as the creation of the role of educational support officers) exemplifies a strategic choice approach. Although the early Innovative Phase of the ILF is characterised by instability and confusion, if the innovation survives, a gradual evolution towards a more stable existence follows in the Business Domain, through planned organisational interventions and processes.

A key point of difference of the ILF from existing change models is that the ILF progresses beyond the settled environment of stability and routinisation (Rogers, 1995), to another phase of system instability, an “unfreezing” stage (Lewin, 1951), where once again the system becomes embroiled in complexities and uncertainty. This is not to suggest that all the advances and organisational learning (Argyris & Schön,
of the previous phases are lost, but now these stabilising processes, structures and strategies must co-exist with a new set of disruptive and complex influences entering the system. This third Complex Domain in the ILF explores what Tierney called the “chiaroscuro of reform”, the interplay of the contrasts of dark and light within the one space that highlights differences rather than uniformity, promising a renaissance in post-modern organisations (Tierney, 1999, pp. 121-151).

Wheatley refers to this as the principle of complementarity, arguing the futility of thinking about things as “polar opposites”, contending instead that: “It is not an ‘either or’ question… Absolute prediction and uniformity are impossible. We must learn to tolerate fuzziness – every event, relationship, entity possesses characteristics that represent two or more different manifestations – all diverse forms can coexist” (Wheatley, 1992, pp. 34-35).

Stacey argues that this dynamic flows from both the connections between and the diversity of types of system agents, and is essential for the emergence of novelty (Stacey, 2000). Diversity within the system is fundamental, despite its propensity for introducing ambiguity, which was especially evident at Lambda, and during the Innovative Phase, ILF at Gamma and Delta, where an understanding of the e-learning innovation was left to individual interpretation. The distinction about the diverse nature of the innovation in the more mature Embedding Phase is that the majority of the constituents shared a common understanding of the core principles of the e-learning innovation, but sought creative new ways to enhance its development.

The ILF also provides key pointers to the stages of the change process at which various stakeholders or interest groups, for example early adopters, late majority, and laggards (Rogers, 1995), become involved throughout the entire process. Throughout these stages we can witness a shift in agency (Ashmos et al., 2002), away from the initial state where autonomous individuals or lone rangers (Bates, 2000) operate as a cottage industry in the Innovation Phase. With the passage of time, however, as we witness a system evolution, the thrust of the interactions transfers to the “whole of organisation” level of the system.
7.5 Summary

The IRF offers a snapshot of the process of organisational change with a system such as a university, a frozen capture of a time-frame which highlights the relationships between various elements or parts of the system.

The ILF implicitly relies on many of the precepts explored in detail in the development of the Innovation Relationships Framework, such as organisational boundaries, system environments, and relationships between organisational elements (e.g. alignments, interventions, intersections), as well as the inherent characteristics or dimensions of innovation.

7.5.1 Strengths and limitations of the frameworks

The development of frameworks was useful initially as a working method to probe the emerging issues and relationships associated with the research questions. In the subsequent analytical phases, the frameworks were applied successfully to new data, providing:

- a holistic approach to understanding the nature of change within organisations, especially the interrelationships between system elements
- a mechanism to focus on the nature of movement, progression and transitions within the system, and thereby to facilitate greater insight into the organisational capacity to manage these transitions, including a longitudinal perspective
- a set of working tools to assist in the unpacking of complex and fuzzy concepts, such as organisational alignments and polarities, paradox, non-linearity, cause and effect
- a graphical structure to examine the competing perspectives and diversity of views and a scaffolding to assist in the breaking down of entrenched patterns in relation to the research questions.

The perspectives articulated in both frameworks are complementary rather than competing, offering a comprehensive but not total understanding of how innovation can be embedded into organisational culture and practice. The limitation of the frameworks, as two-dimensional models, is in grappling with multi-faceted and multiple-tiered environments. A single framework cannot capture all the dimensions of organisational change and innovation. The two frameworks, therefore, were developed
to assist in the process of teasing out the complex issues associated with embedding e-learning in university environments. They can be augmented and enhanced by use of other models or frameworks of innovation and change (Kurtz & Snowden, 2003; Rogers, 1995) but it is argued that the IRF and ILF add new insight into understanding of the change process, insight not represented by these existing models.

The strength of the frameworks is to focus decision makers’ and researchers’ attention on the importance of a system-wide perspective to the problem, on the significance of relationships and cross-boundary issues, and to exemplify a new concept of embedding in a processual context (the ILF). The potential benefit of frameworks, models and other analytical tools is to enable individuals to make informed decisions with greater confidence and understanding, not to minimise the contribution of the individual’s judgement and experience. The increasing importance of individual judgement, collective knowledge and insight with respect to innovation in universities is argued in the next and final chapter.
Chapter 8: Conclusion – Implications, Limitations and Further Research

8.1 Overview of research findings

The broad aim of this research was to learn about the process of embedding innovation in an organisation. The innovation of interest was e-learning and the organisational context chosen was the Australian university. The purpose of the research was to address the problem that too often universities have failed to reap long-term benefits from educational innovation. The intent of the study, therefore, was to provide strategic insight as well as practical guidance for the key stakeholders of e-learning, including university executives, managers of the various e-learning services and elements, academic and professional staff, practitioners and contemporary researchers.

In addressing the overall research question, “How do organisations, specifically universities, successfully embed the innovation of e-learning?”, three secondary questions were posed:

- What is meant by the term embedding?
- What are the key influences that affect the ability of an organisation to effect the changes required to embed?
- Does the nature of the innovation affect the embedding process?

In the investigation of the issues associated with these questions, three propositions were posed. Each one shed important light on different aspects of the key question, the ability of a university to embed the e-learning innovation. The propositions were:

- The ability of a university to negotiate system intersections and transitions influences the degree to which e-learning can be embedded in that university.
- Complexity is an integral part of an innovation; therefore it cannot be ignored or eliminated without destroying the kernel of the innovation itself and its long-term viability.
- The efficacy of the innovation is related, in some measure, to the ability to sustain partnerships and collaborations.

The conclusions drawn from the analysis of the propositions, along with general findings from the two phases of data analysis, enabled the formulation of three theoretical statements.
The underlying problem was concerned with the notion of embedding, specifically how organisations such as universities embed innovation. Therefore, the first of the second order questions dealt with the meaning of the term embedding, as a change process in the context of this study.

8.2 The embedding process

The concept of embedding, as expounded in this study, enhances existing models of processual change (Greiner, 1972; Kotter, 1996; Lewin, 1951; Rogers, 1995; Tornatzky & Fleisher, 1990), extending timeframes beyond what has typically been construed as the final stage of implementation or stabilisation, and placing greater emphasis on sophisticated and holistic system relationships. Four key dimensions were mooted as comprising the embedding concept: innovation adoption, integration, legitimacy and sustainability. All four dimensions were examined with respect to the empirical data from the two inquiry phases, but the two critical dimensions, in terms of new knowledge and relevance to the overall question of the ability of universities to accrue benefit from the innovation, were legitimacy and sustainability.

As was argued in Chapters Five and Six, the empirical evidence demonstrated that the case universities had a reasonably sound grasp of the issues associated with adoption and with many of the integration dimensions. A number of organisational integration issues, for example, had been addressed in regard to institutional policies and procedures to facilitate the embedding of e-learning into organisational practice. In varying degrees at each of the case universities, these included the standardisation of e-learning development processes, routinisation of administrative and student support processes, and refinement of IP policies. There were significant limitations, however, on the part of institutional leaders to appreciating fully the importance of the legitimacy dimensions of the embedding concept, particularly at lower levels of the organisation, those involving work groups and individuals. This was a strong indication, therefore, that despite the e-learning innovation displaying signs of tenacity and survival, it had yet to be infused into organisational thought and culture, and as a consequence the sustainability dimension remained under-explicated in all the university environments.

There are noteworthy implications which flow from the limited appreciation of the latter two critical dimensions of the embedding construct by higher educational leaders and managers. For example, an over-reliance on structure and process elements to drive
e-learning (e.g. policies, adoption targets, incentives and other interventions) anchors the innovation discourse at a lower level of conceptual sophistication, so that from a pedagogical, learning and organisational efficiency perspective, its real potential remains elusive. Decision making, to date, has focused on the mechanics of the innovation (e.g. the capabilities of the technologies at Delta; network reach at Epsilon; the economies of scale of a delivery solution at Gamma) rather than on the higher order values of ensuring that e-learning can contribute to a qualitatively enhanced learning experience, delivering improved learning outcomes for all concerned (learners, employers, teachers, universities and governments).

8.3 Key influences that affect the ability of an organisation to effect the changes required to embed

Findings from the analysis of data relating to the three propositions were particularly useful in shedding light on the next of the secondary questions, concerning influences on the ability of a university to embed innovation. Some of the findings confirm or build on existing theory and literature, some offer a new perspective with respect to critical factors or influences, but taken as a set of theoretical statements or principles they contribute to a new level of understanding about how one can embed innovation and therefore accrue a maximum return to organisations.

It is the contention of this dissertation that to embed innovation successfully, an organisation must be able to progress an innovation through all the phases of change as set out in the ILF, from the Product-centric Domain, Innovation Phase through to the Complex Domain, Embedding Phase (see Figure 6.14). As argued previously, none of the case institutions had successfully negotiated the Complex Domain. Proposition 1, dealing with the management of organisational transitions and intersections, was found to influence the ability of an organisation to progress the innovation through all stages. Propositions 2 and 3 were relevant with respect to the management of the innovation within the Complex Domain of the ILF.

8.3.1 Proposition 1 — managing system intersections and transitions

The innovation environment (as represented in the both the IRF and the ILF) incorporates multiple pathways, transitions and clusters of activity affecting the e-
learning innovation’s overall direction or course (Pettigrew et al., 2001). The findings reported from the analysis of the first proposition raised significant issues with respect to how the innovation progressed from the periphery of the organisation towards the centre, crossing various domain and phase boundaries of the ILF. In particular, it was found that the innovation was under the greatest threat during major transitions and turbulent events in the system. So, for example, when the innovation moved from the Product-centric Domain (where the focus was on individual innovations, often with a strong discipline focus) to the Business Domain (where organisational processes dominated) there were periods of great unrest and uncertainty and it was unclear which pathway or outcome might prevail. The innovation might shoot rapidly forward on a radical adoption path, it might oscillate back and forward at the boundary, or regress back from the boundary (Kurtz & Snowden, 2003). At Lambda and Delta, for example, it was found that the major transition phase which centred on the Product-centric — Business Domain boundary had prompted quite different organisational response patterns, despite the fact that both cases had implemented a similar strategy to encourage more widespread adoption of the innovation through generous grant funding. At Lambda the e-learning innovation moved forward quite discernibly, but at Delta there was indecision, detachment, even regression in some areas, as typified in this comment about the effectiveness of grant scheme: “If you get a grant you win a prize, put it in your CV, move on and everybody else gets on with what they’re doing. There is no sense... that they’re trying to involve – to move it [innovation] through to anyone else” (Senior Lecturer, Delta, Interviewee 12).

The boundary issues occurring at the edge of each of the change phases or domains of the ILF often proved confronting and challenging for the institution, and the ensuing diverse organisational behaviours and responses were difficult to predict. Failure to manage these transitions could thus effect a stalemate or a slow entropy for the innovation as a whole or for one of its key components (Luhmann, 1995; Tubbs, 1998). The Delta case, it has been demonstrated, had remained in the Innovation Phase for some time, and was only just beginning to tackle the issues that would enable it to move on to the Business Domain.

The other significant aspect of the findings related to this proposition was the ability to manage the intersecting pathways or trajectories of elements occurring within the system domains of the ILF. These colliding trajectories could be seen as competing forces, some of which emerged in the case studies: creativity versus uniformity; equitable universal access versus targeted, specialised access; unique specialised
features versus scalability; control versus freedom. The colliding elements or innovation streams (Tushman et al., 1997) co-existed within each contextual boundary, but certain types of activities or interaction clusters were more prominent during different ILF phases and domains (product, business, complex). So, for example, agent interactions that were focused on scalability versus customised solutions were more prevalent around the boundary from the Product-centric Domain to the Business Domain and within the Business Domain.

From an organisational perspective, therefore, once e-learning began to attract interest beyond the immediate innovators, institutional managers began to adopt definite strategies to move it in a direction consistent with institutional goals. For example, certain organisational interventions or actions were undertaken to precipitate the convergence of competing forces or activity streams into a focused point of resolution, which might then become a point of confluence (merging the competing streams into a single integrated solution) or a bifurcation point (creating two distinctly separate activity pathways).

In many of the cases, managers attempted to engineer this process, carefully trying to anticipate some of the potential eventualities. At Epsilon, it was seen that the e-learning trajectories of “educational design” versus “IT focus” driven models for e-learning were deliberately planned by the executive to collide or intersect, through structural interventions (e.g. joint committees) and processes (redefining areas of responsibility). In some respects, this brought about resolution, a point of confluence, facilitating an integrated approach to some e-learning policies that reflected a broader and more informed perspective, but in other ways the strategy proved less successful, as attitudinal and cultural tensions persisted. So at times, the interactions occurring at the system intersections prompted a merging, a confluence of previously separate forces in a more cohesive single formation (e.g. policy), but at other times it produced new bifurcations (e.g. diverging staff attitudes about later innovations).

The interactions which take place during these transitions and turning points however often entail complex, self-organising processes (Stacey, 2000) and thus cannot be tightly controlled. However, the organisational outcomes emerging from these critical engagement points are not the product of entirely random behaviour; the interactions appear to have an internal pattern which, although not immediately apparent, produce their own internal order (Wheatley, 1992). Further, the surrounding environmental context can, and does, influence the nature of the transactions (even though it is
unlikely to signify a direct causal relationship), and as such the organisation is not entirely isolated from these transactions, nor need it be unprepared. At Lambda, as was argued in Chapter Six, a few departments adopted a somewhat local interpretation of the general faculty policy with respect to quality processes for developing online content. This allowed quite unique interactions and behavioural patterns to continue with respect to the development of e-learning resources (such as defining who was involved and given IP recognition, sources of funding, or the online delivery platform) and yet the influence of each department was seen to be generalised and loose, rather than having a specific and predictable impact on the outcomes.

Yet a more common institutional response across the case studies was for managers to attempt to introduce tight controls or interventions (e.g. policy, procedures, usage targets, funding schemes) to manage the transitions and intersections of system elements. These interventions did not always produce the expected organisational outcomes with respect to the growth of the innovation. For example, in the innovative stages the unexpected became the norm: projects spawned unanticipated results (but the full outcomes were not shared widely as there were no incentives for innovators to do so); and positive initiatives (e.g. Delta’s grant scheme) produced negative outcomes (e.g. resentment about the competitive nature of the scheme). The relationship between the environment and the e-learning innovation was proving to be too complicated and unpredictable to pursue an across-the-board, tightly controlled strategy.

8.3.1.1 Organisational implications

An implication of these findings, from a management perspective, is that organisations require a suite of responses. Rather than focusing exclusively on process controls, managers should also explore more flexible and open organisational approaches to monitor and guide the interactions that, in any case, cannot be controlled. One such strategy would be to minimise the immediate tendency for dichotomous organisational behaviour to the new or unknown, what has been referred to as “a constant tug of war, an either/or” (Wheatley, 1992, p. 90). The polarisation of issues that emerged from the case study data included: simplicity versus complexity (e.g. Gamma); centralised quality control versus devolved individual academic conceptions of quality (e.g. Gamma and Epsilon); and distance education versus traditional on-campus learning (Lambda and Delta). In each case transitional environments, for example at Gamma dealing with the situation of moving from a multiple platform to a single institutional
online learning environment, frequently ended up being presented as a choice between efficiency, scalability, consistency and uniformity versus individuality, local control, personalisation, adaptability and responsiveness.

Each case university had adopted a particular approach to managing the intersections of these spontaneously occurring (and top-down contrived) opposing forces, at times adopting a deterministic, compliant management approach, at others a more low-key “soft interventionist” approach. Neither mandated nor laissez-faire approaches were found to be intrinsically good or bad, but it is the contention of this dissertation that a more sustainable approach to embedding e-learning is one which over time facilitates an overall balance within the system. Seeking overall balance, however, does not constitute an argument in favour of a “middle of the road”, safe or “balanced” outcome with respect to each issue at hand, nor a case to support institutional lack of tolerance for any aberration or fuzziness in the system.

Strategies to manage polarised and intersecting issues should aim to effect an overall system balance which incorporates a broad tolerance for difference, a process which is backed up by an understanding throughout the entire organisation that the innovation climate naturally supports imbalances, contrasts, apparent contradictions, even conflict periodically, as ways of moving the whole system forward. Thus strict alignment between all the system elements is not always beneficial to the health of the innovation, as the tensions and conflicts that can surface at these critical system intersections can have an energising effect on creativity and innovative processes. The capacity to effect an overall system balance with a contextually appropriate level of tolerance is guided by the knowledge that if system mismatches or if non-alignments become too intense or destructive, leadership may be required to intervene, to diffuse, to reassert order, goals or principles, to reaffirm or revise mission. This situation appears to be particularly pertinent in the latter stages of the embedding process as the e-learning innovation moves towards the Complex Domain of the ILF.

The following theoretical statement is premised on the evidence from the first proposition:

The ability to manage flexibly the transactions which occur at the intersections of the system elements and during the phases of system transitions is critical to the successful embedding of the e-learning innovation.
In addition to the progression of the innovation through all phases of the embedding process, it is argued in this dissertation that a second key influence affects the ability of the university to embed e-learning. This influence is the university’s capacity to manage the innovation environment of the Complex Domain. The environment of the Complex Domain is central to the entire research problem, in that it is the ultimate organisational home for innovations, and thus is instrumental in whether the innovation will continue to grow or perish. Propositions 2 and 3 were particularly useful here, as the insights drawn from examining them had special relevance to the notion of sustainability.

8.3.2 Proposition 2 — embracing complexity

The complexity of the embedding process within a university context and of the e-learning innovation itself has been advocated throughout this dissertation. It has been argued, for example, that a new, more sophisticated wave of e-learning is emerging, and furthermore that this is unfolding in increasingly complex and rich environmental layers. Complexity is therefore integral to the nature of the e-learning innovation itself and to the innovation process. For this reason, the most appropriate organisational response is to learn more about it in order to navigate this space, rather than to marginalise or try to eliminate complexity from the environment.

Hence the ability to embed e-learning demands a greater in-depth understanding of, and further insight into, not only the complicated nature of the next generation of e-learning, but also the complexity of the ensuing relationships and processes (for example with respect to the disaggregation of teaching and management of IP, as argued in Chapter Six). These processes and relationships are an integral part of the problem construct. Embracing the nascent aspects of the next generation of e-learning therefore entails discerning, tolerating, nurturing and managing the new localised innovations germinating in the peripheral areas of the organisation. Furthermore, it is posited that the interactions and activities associated with new “next generation” e-learning innovations naturally belong in the Complex Domain of the ILF.

The capacity to embrace and harness complexity (Axelrod & Cohen, 1999) distinguishes adaptive and innovative organisations from the inflexible and routine bound. For ultimately it is the infusion of complexities, nuances or even idiosyncrasies into the innovation that gives it a dynamic context, that enables individuals to derive personal meaning and to forge a link between the abstract capacity of an innovation
and their own unique value system and world view (L-change, 2004). The institution’s ability to facilitate a “complexity absorption” process (Boisot & Child, 1999) promotes legitimisation of the innovation from a personal perspective and, as a result, engenders individuals’ long term commitment to the innovation. This in turn contributes to the e-learning innovation’s sustainability and delivers lasting benefits to both the individual and the wider organisation.

One cannot mandate, guarantee or even design for true excellence in teaching and learning. The kernel of exceptional accomplishment involves creativity, individuality, commitment and, from time to time, serendipity. This point was strongly argued at Lambda during the second investigative phase of this study. If it is to realise its potential, e-learning should spawn more examples of brilliant and captivating learning than the contemporary model has delivered to date. The new generational scenario, however, demands considerable trust on the part of decision makers to allow individuals to run with imaginative but potentially messy ideas in the midst of what is often mooted as the preferred, ordered environment. The phenomenon of “emergent order” (Holland, 1998; Kauffmann, 1995; Prigogine & Stengers, 1984; Wheatley, 1992) runs counter to trying to design or plan for all aspects of quality and excellence.

Managerial acceptance of emergent order is contingent on a better understanding of this concept and on a climate of trust, which in turn is dependent on the alignment of personal values and individuals’ internalised commitment to an initiative. Such an organisational approach, however, need not operate in, nor does it advocate, a strategy, policy or resources vacuum – the laissez-faire environment which sometimes characterises the Innovative Phase. As has been argued, there are various management methods to monitor, appraise and guide stakeholder actions if organisations adopt a philosophy of complexity tolerance.

A key issue which emerged from this research was the tension that can be identified at critical points along a continuum of innovation complexity and simplicity. Many university managers and higher education critics, keen to foster the adoption of the innovation by the mainstream constituency of learners and teachers, have proposed a simplification of e-learning strategy, based on standardisation, uniformity, relatively basic functionality and routine processes (Kilmurray, 2003; Twigg, 2001; Zemsky & Massy, 2004). Twigg, for example, argues for greater consistency and uniformity in academic practice to build on accumulated knowledge of quality improvement and cost efficiencies. This approach was evident at Gamma and Epsilon with respect to the
adoption of an institutional LMS, at also at Lambda and Epsilon in relation to the somewhat controversial topic of re-use of learning objects.

Zemsky and Massy (2004, pp. 7-8) exemplify the “simplify” versus “complexify” dichotomy with respect to e-learning, arguing that what is required to promote it to the next stage is a single dominant design or methodology that would eliminate the inefficiency of multiple formats and approaches. The object of the simplification strategy is to increase efficiency and take-up of the innovation, and as such in some areas (e.g. economic accountability) it contributes to the sustainability of the innovation. It fails, however, to address the other intangible dimensions of embedding related to either legitimisation or the other nebulous or non-quantifiable facets of sustainability (which resonate more widely with mainstream and later adopter stakeholders).

Online learning presents a paradox in that the uniform and seemingly straightforward interfaces, policies and processes developed to facilitate learner take-up belie the level of complexity (e.g. technical, administrative, conceptual) at the “back end” of the e-learning context in relation to issues such as systems integration, “single sign-on”, security and online assessment policies. A maxim (itself an exemplification of a contradiction) could be argued: the easier and more intuitive the system from the user perspective, the more complex and sophisticated the issues, processes, requirements and concepts which underpin the front-end user layer of the system. It can also be argued that simplicity masks complexity, and that therefore to make systems more user-friendly in the future, we must grapple with increasing levels of administrative, technical and especially pedagogical complexity. The latter, an area which would benefit from future research, has yet to be adequately explored as a complementary, rather than a competing concept with technological complexity.

Many of the creative and nascent activities in the Complex Domain can appear both baffling and chaotic, but the desire to maintain or re-establish order at all costs, to avoid the complex and difficult, threatens the innovation and creates sub-optimal conditions with respect to its long-term health and sustainability. An indiscriminately applied “order and control” strategy fails to appreciate that lack of order is not necessarily a bad thing, nor is it related to poor management, lack of understanding or inadequate resources. The danger lies in presenting it as a choice between control and no control, since in the Complex Domain both the orderly and the unknown must be dealt with concomitantly. Reliance solely on controlling strategies is highly risky in
the changing and unpredictable environments of the Complex Domain, as it is underpinned by a belief that all interactions and events can be explained and all are subject to direct cause-and-effect principles, an assumption which cannot be supported in complex adaptive systems.

The way individuals in higher education have managed innovation, particularly as it relates to the quality issue, illustrates the above problem. More recently, the emphasis has been on assurance processes to ensure that universities achieve minimum quality standards for students. But quality assurance methods, it is argued, act as a quality safety net rather than as a motivator for achieving excellent quality. Managing the issue of quality as it relates to individual creativity and complexity has been somewhat neglected to date, but, as it is posited there will be greater incidence of these characteristics in the Complex Domain, it is likely to present managers with far more challenges and demands.

At the institutional level of embedding e-learning, Tierney (1999) links innovation and creativity to quality outcomes and high performance, a position which resonates with those who promote values of “excellence through diversity” rather than standardised models of quality assurance or best practice as drivers of the next generation of e-learning. (The latter are the models of the ILF’s Business Domain.) However, a commitment to incorporate the creative and complex components back into the system is contingent on executives’ confidence that the organisation has the capacity to operate as a high performance organisation, and, in particular, on executives’ belief that all stakeholders have internalised the higher order strategies, principles and goals associated with e-learning. Tierney and McInnis (2001, online) posit:

High-performance systems encourage innovation and creativity. Such organisations differ from others that are structured around repetitive series of activities that, in a stable environment, enable the system to function effectively. Australian universities need to become more innovative because their environment is no longer stable…. A system that encourages creative activity is not one that rewards all institutions similarly and sets mandates and targets… . In a high performance system a governing body focuses less on preventing bad things from happening and more on making good things happen. Rather than a punitive model, one develops an incentive based model. Currently, Australian tertiary education is in danger of being mired in a system of checks and balances that depresses entrepreneurial spirit.
8.3.2.1 Organisational implications

The attributes of a high performance organisation in a number of respects align with those of the ILF’s Complex Domain, particularly with the latter’s identification with creativity, innovation and uncertainty. It is therefore one of the prime roles of university leaders to develop the desirable attributes of a high performance environment for innovation within their institutions, as a key requirement which influences the ability of the organisation to operate in the Complex Domain and to embed innovation.

Although recognition of complexity in university environments is promoted in this dissertation, it is not implied that everything is complex and unordered, nor that we should try to make things complicated when they are relatively straightforward. Rather it is argued that to progress e-learning, the diverse and multiple facets of innovation and its context need to be accommodated. Embracing creativity and innovation in the Embedding Phase of the change process is quite different from the unmitigated support for the “thousand flowers bloom” approach articulated by Interviewee A1 at Gamma, and evident in the early Innovation Phase of the ILF. In the Complex Domain, decision makers need to be well informed and seeking to target or exploit specific areas of the e-learning innovation which may have serendipitously arisen, but which must still conform with the university’s overall strategic intent. Such a strategy aligns in some ways with the call of Whittington, Pettigrew and Thomas (2001, p. 486) for “practical complexity”, and has implications for university managers and for future research.

One practical approach which enables complexity to co-exist with the more managed and routine elements and processes has been put forward by Duderstadt and colleagues:

Build layered organization and management structures. At the highest centralized level one should seek a clear institutional vision, driven by broadly accepted values, guided by common heuristics, and co-ordinated through standard protocols. Below this at the level of execution, one should encourage diversity, flexibility and innovation… decentralizing the decision process and activities that determine “how” to achieve these institutional goals. Put another way, universities should seek to synchronise, rather than homogenize, their activities (Duderstadt et al., 2003, pp. 54-55).

An important goal for university executive and management is to explore new, contextually relevant ways to handle emergent complexity, to develop more flexible
strategies to deal with the inevitable uncertainties and disruptions of the Complex Domain within a broad and visionary e-learning framework that aligns with the overall strategic direction of the organisation. In devising a suite of flexible strategies, managers should be wary of internal or imported blueprints or generic formulae which purport to provide fast-track solutions to the embedding of e-learning into educational institutions. They should place more importance on deciding which are the appropriate creative and potentially complex projects to support.

The theoretical statement which applies to the findings of the second proposition is:

Complexity is an integral dimension of e-learning, and therefore the sustainability of the innovation depends on the ability of the organisation to incorporate the complex nuances, ideas and concepts as part of the embedding process.

An appreciation of and appropriate management response to the implications of the above theoretical statement, such as resourcing, risk management and HR issues, are major influences on the ability to embed e-learning. Such issues may well be considered as ideal candidates for future research and collaborative initiatives. Collaboration is discussed in the following section.

8.3.3 Proposition 3 — collaborations

Collaboration was found to be particularly significant with respect to the sustainability dimension of embedding. The ability to manage collaborative activities within the Complex Domain can be seen as another influential criterion with respect to the research question, as there is ample evidence to suggest that the next generation of e-learning, if it is to realise its potential, will be beyond the resources, skills and capabilities of any one institution:

The current economic situation may well push those in higher education to be more creative in how they develop new electronically mediated learning materials. Colleges and universities may be reaching a point where not everyone can afford to do everything (Johnstone, 2002, p. 16).

There is therefore a cogent argument supporting the final theoretical statement:
Collaboration is essential to sustain the e-learning innovation in universities and a vital ingredient of the embedding process.

Collaboration was found to be relevant at all levels of system granularity (see Figure 6.12), from the actions of a single agent upwards, because e-learning is at once a personal, group and global construct. E-learning collaborations must provide personal meaning and benefit to the individual, but they also rely on and operate within an institutional and international framework. It is clear that as an educational innovation, e-learning has yet to be widely perceived as a legitimate mainstream activity across the broad education and training sector. Furthermore, despite the fact that e-learning is currently managed primarily at a local institutional or program level, it can be argued that the quality of a particular institution’s e-learning programs and services ultimately contributes to its generic value and has a bearing on the innovation’s overall acceptance in a world wide market. The global interrelatedness of the concept provides a strong rationale for the need to collaborate, but at the same time is a difficult concept to grasp. As Dunkin argues with respect to universities:

> Once we recognize that we are part of an interdependent network, then the form of our relationships can begin to take on the nature of partnerships and collaborations… There must be value created; there must be mutual benefit and mutual respect (Dunkin, 2001, online).

Moran and Mugridge (1993) highlighted the problems universities experience with respect to inter-institutional collaboration, in many respects raising the same issues which undermine collaborations today – institutional culture, trust, and ability to derive mutual benefits (Grigg, 2001). In contemporary contexts, however, as was illustrated in Stage Two of the inquiry at both Lambda and Gamma, collaborations involving e-learning often progress beyond inter-university boundaries, involving industry, government, and public and private institutions in the information and education field. From a university perspective, the complexity of the collaborative environment has increased exponentially, mirroring the increasing sophistication associated with the e-learning innovation itself.

Lambda and Epsilon, for example, were both keen to introduce initiatives which encouraged sharing and re-use of content, in particular of learning objects made available through learning or digital objects repositories. Such initiatives cannot be conceived as a solitary enterprise; they require at least in-house expertise from
technical, library and subject specialists, educational designers, and so on. In addition, external partners are involved, from vendors and potentially from other universities and publishers. A recent example of a collaboration of this type and reach was the announcement of GLOBE, the Global Learning Objects Brokered Exchange with the ambitious goal “to connect the world and unlock the ‘deep web’ of quality online educational resources through brokering relationships with content providers” (Putland, 2004, online). The collaboration, comprising five international organisations, emphasises the need for a strong business case, but flags the risk common to a collaboration of this size, that “the burden of managing relationships between the institutions, organizations, and corporations in the digital library world does not overwhelm the benefits of collaboration” (Putland, 2004, online).

As a generalisation, e-learning collaborations within the case universities had yet to demonstrate the resilience, maturity or scale to progress or sustain the embedding of initiatives of this nature, although there were indications that particular collaborations were being pursued seriously. Lambda, for example, was putting in place a number of institutional processes to build an ongoing collaborative multimedia development program with another university.

Collaboration contributes significantly to the “contextual complexity” (Kurtz & Snowden, 2003, p. 464) of educational environments, as each institution and individual participant of the collaboration brings a diverse set of expectations and attributes to the arrangement. Humans, as has been previously argued, are not limited to one persona (L Change, 2004), and these multiple identities and perspectives come into play at any point of time. As Kurtz and Snowden (2003, p. 464) argue: “In a human complex system, an agent is anything that has identity, and we constantly flex our identities both individually and collectively”.

From an organisational perspective, it is not always possible to know which social unit of analysis we are working with in collaborations, and thus what level (individual, group or institutional) of motivations, cultural norms or expectations come into play at any one time. As posited in the L Change project (2004) and exemplified in the case studies, people rarely act on one locally situated pattern, rather they have a great capacity for awareness of larger scale patterns. Therefore to simulate human interaction and co-operation, all scales of awareness must be considered concomitantly. At Lambda, strategies “to encourage people who are developing modules to form liaisons with people in the same discipline area” (Senior Professional
Support Staff, Lambda, Interviewee 9) were promoted and supported by many individuals: “I think that kind of organic, person-to-person cross-fertilisation is really very important” (Associate Professor, Lambda, Interviewee 8). However, individuals were also acutely aware of operating in a wider organisational context, one where competition between institutions was increasing and where other educational considerations counteracted existing principles: “I think it’s a pity actually, if you make it too discipline specific, people need to think outside their discipline” (Senior Academic Professional Support Manager, Lambda, Interviewee 10). Coming to grips with this aspect of contextual complexity, it is proposed, is a prerequisite to sustainable collaboration and to the ability of university executives and leaders to manage innovation in the Complex Domain.

Collaborations pose particularly challenging issues for leaders in universities, since multiple organisational contexts (as illustrated in Figure 6.12) have to be considered. This is highlighted in the Lambda and Delta cases where early collaborative initiatives had stumbled on issues such as IP and inter- and intra-institution team membership and recognition. It is perhaps with this level of complexity in mind that Pollard (2004) refers to collaboration as an art, rather than a skill or competence, and in so doing highlights the instinctive and intuitive nature of collaboration, attributes he suggests have been lost in the drive for individual achievement and competitiveness. Again, this drive to individuality emerged at Delta with respect to some of the later large scale collaborative projects, and it was a contributing factor to the lack of a more widespread take-up of e-learning.

It is therefore the underlying intent to work together and to succeed which is the vital ingredient in initiating and sustaining collaboration, more than (or at least in association with) a mandated set of rules. Hence to sustain collaboration, it is a key leadership responsibility to articulate the importance of intention and resolution to work together and to put in place processes that align with this understanding. Accountability processes, for example, should reflect the need for benefits to accrue to all the entities and agents of the collaboration. Effective collaborative environments are characterised by diversity and variety of skill sets, experiences and expectations of the team members, and it is these ingredients which are at once the essence and the potential downfall of the collaboration. Pollard (2004, online) suggests that effective collaboration is “a form of magic, creating and accomplishing what no individual could ever do”, and for leaders, this is a critical understanding.
8.3.3.1 Implications for operating within the Complex Domain

A number of implications for managing innovation in the Complex Domain have already been articulated. As was demonstrated in relation to collaboration, another implication is the importance of understanding context. It is important to have an appreciation of context to know where an organisation is placed along the embedding continuum of change. The characteristics of the organisational context of contemporary universities are that it embraces both common and uniquely distinctive features, that in today’s reality it is dynamic and constantly changing although there is natural tendency towards the stable and constant, and that it requires insight and management to juggle multiple roles and identities (research, education for the public good, social responsibility and outreach, and commercial interests).

Weick (2001, p. 447) highlights the importance of context to “synthesize and give meaning to scattered details” and points to the relationship between multiple contexts:

To consolidate bits and pieces into a compact, sensible pattern frequently requires one moves beyond those bits and pieces to understand what they might mean. The pieces themselves generate only a limited context, frequently inadequate to understanding what is happening in the system, what its limitations are, or how to change it… It is often the ability to move outside an information system, and see it as a self contained but limited context, that makes it difficult to diagnose, improve, and supplement what is happening inside that system (Weick, 2001, p. 447).

Complex environments generate conditions which require continuous monitoring and resourceful resolution of issues throughout all levels of the organisation. The need for more attentive and astute decision making becomes even more critical to the embedding process in the Complex Domain. It is argued in this thesis that effective decision making in the Complex Domain, incorporating increasingly radical e-learning innovation, extends beyond reliance on traditional management practices such as application of precedence, institutional policies, or decision making tools, important as these are. Leifer et al. (2000, p. 55) argue that management of radical and complex projects, like collaboration, is “more of an art than a science”. It is the qualities about the ability to embed successful complex e-learning partnerships within the Complex Domain.
associated with leadership, in particular human attributes such as personal judgement, intuition, prior experience and trust, which play an increasingly important role in environments where dynamically changing and unpredictable events occur. The need to be able to manage the unexpected by drawing on leadership qualities and judgement, rather than “standing orders” (Weick & Sutcliffe, 2001, p. 87) is evident in the following distinction made between mindful and mindless actions:

Mindful moments are important if the contexts in which you operate are dynamic, ill structured, ambiguous and unpredictable. In less dynamic contexts, mindfulness is less necessary and the economics of mindlessness are more appropriate. Mindfulness takes effort and cost: mindlessness in the form of routine can be cost-efficient. The trouble is that this is not nearly as neat and tidy as it sounds. All of us like to have our expectations confirmed, which means we are likely to overestimate the degree to which what we face is well structured, clear and predictable. Hence we are mindless more often than we should be. That is why the unexpected so often makes such deep inroads before it is detected. Since the unexpected develops to an advanced stage before we notice it, it produces greater disruption (pp. 87-88).

The paradox, therefore, is that if decision makers rely extensively on routine systems and highly structured approaches in a constantly changing environment, the likelihood increases of even more radical disruption or chaotic change. The ability to negotiate successfully this dynamic and complex world therefore includes being more inclusive of differences and complexity. As argued above, embracing complexity minimises the potential for unexpected or unannounced eventualities, because one is in a constant state of awareness, monitoring and vigilant to multiple eventualities. Weick and Sutcliffe (2001) in fact pose another challenge to orthodox management: to be cautious of the word “focus” in an organisational environment, because focus narrows ones perspective, reduces boundaries and excludes differences, providing the ideal environment for the unexpected to take hold.

It is important to reiterate that the Complex Domain comprises both ordered and non-ordered interactions and events, but the likelihood and frequency of the complex, at times chaotic, increases in the latter from the earlier phases of change. Thus sound management skills must still be employed in the Complex Domain to ensure that timely decisions, an appropriate level of order and stability, and the alignment of organisational strategies with operational elements and so on are maintained. Again, it becomes a question of balance and judgement as to when to draw on the more
intuitive and creative leadership attributes that support both individual and institutional renewal and commitment to e-learning.

The ability to effect an overall long-term balance within the system, which tolerates simultaneously both ordered and unordered elements, consensus and contradiction, the known and the undiscovered, is therefore a strong influence on the ability of an organisation to embed e-learning. One of the key balancing issues for managers is to ameliorate tendencies to polarise efficiency and creativity strategies – to find the appropriate contextual position along this continuum which aligns with the overall e-learning vision and strategy of the institution.

Efficiency strategies too often focus on scalable, stripped-down solutions, on uniform or standardised procedures and policies to drive organisational objectives, such as usage or budget targets. Efficiency processes and activities, with their focus on prescriptive rules and quantitative metrics as indicators of success, are dominant in the Business Domain of the ILF. As revealed in the empirical inquiry stages of the four university cases, all had relied in varying degrees on efficiency processes as part of the e-learning adoption and integration process. Organisational interventions aimed at improving efficiency, such as policies on student online interactions (Epsilon), and common technology such as the email system and LMS (Gamma), were necessary to move e-learning from the Product-centric Domain of the ILF towards the Business Domain. This was part of a wider trend in the higher education sector, to adopt more business-like, accountability and efficiency approaches to e-learning (Baron, 2002; Cutler, 2001; Gallagher, 2000; Lambda, Interviewee A2), and was apparent in the institutional responses to the Australian Government quality assurance audits. For example, the institutional responses from Gamma to the audit process (e.g. Performance Portfolio, 2003) aptly demonstrate the importance placed on efficiency processes and measures.

Astute judgement and inspired leadership were found to be the differentiating factors in the organisational decisions which influenced the degree to which the innovation had been embedded in the case studies. At two institutions (Gamma and Lambda) strong, positive leadership was identified in the earlier phases of the change process as a critical factor with respect both to shaping the nature of e-learning and to the adoption strategies employed. Effective leadership, complemented by sound management processes, it is argued, will be even more important in the later stages of the Embedding Phase, to enhance the sense of personal ownership of and commitment to
the e-learning innovation, which ultimately manifests as collective action and agency at the organisational level. Innovation legitimisation at all levels of the organisation contributes to its sustainability, and is a useful test of the level of embedding achieved across a university.

8.4 Relationship between innovation and the embedding process

The third question posed as part of the overall research problem was whether the nature of the innovation affects the embedding process. The findings from the data relating to this question were less conclusive, leaving room for further research, but nevertheless some useful preliminary conclusions can be drawn. There appears to be a relationship between the nature of the innovation and the actual change process, but it is not straightforward and, furthermore, it appears to become increasingly complex over time. In the early stages, when the nature of the innovation was embryonic, a clearer relationship was observed between the innovation and the nature of organisational change; for example, in the case studies the embedding processes were slower, more open and tentative, and in specific circumstances it was possible to identify a direct cause and effect between the two dimensions.

At Lambda, at the beginning, the e-learning innovation had been very localised, its progress had been measured, in some ways tentative, and therefore the nature of the change was largely seen as evolutionary. At Epsilon, however, during Stage One the innovation had already been more clearly defined by the organisation: it was directed towards achieving a particular institution-wide approach to online learning within a pre-determined timeframe. The nature of the change process, still evolutionary but with a more deterministic, top-down and rapid pace, also aligned to the somewhat different innovation characteristics, and, measured against specific institutional goals, the desired organisational outcome was reached. Although there was still some dissension about particular aspects of the e-learning innovation at Epsilon, the embedding process had progressed fairly well from the individually focused Product-centric Domain to the institutionally-oriented Business Domain.

As a general finding, the overall radicalness of the e-learning innovation, which was discussed in some depth theoretically in Chapters Two and Three and again empirically in Chapters Five and Six, influenced the nature of the embedding process
adopted by the institutions. The popular claim that the nature of e-learning model in Australian universities has been revolutionary and radical is not supported as a generalisation by this study. It is acknowledged that there were individual projects or programs within institutions where the e-learning approach represented a radical departure from conventional teaching and learning modes (e.g. a few examples of fully online courses or quite innovative use of sophisticated high-end conferencing technologies). In these instances, the e-learning elements were seen to be discontinuous and competency-destroying (Anderson & Tushman, 1997; Powell & Brantley, 1992), rendering existing skills obsolete (as was the case at Gamma with the editor positions). There was also evidence that the radical and disruptive dimensions of the e-learning innovation, such as online distance education methods at Lambda or the development of the new LMS at Gamma, fast tracked new skills and understandings, and thus were competency-enhancing (Anderson & Tushman, 1997; Powell & Brantley, 1992). The co-existence of these two contradictory streams of activity has significant implications for management and leadership strategy, and it is suggested, becomes increasingly significant as the e-learning innovation becomes more radical in the Complex Domain.

The other important acknowledgement with respect to the radicalness of the innovation in the cases is that many of the activities associated with e-learning represented a very different organisational approach, initiating new structures or processes (Nord & Tucker, 1987). Alternatively, e-learning was construed as a radical change because it was unfamiliar to the individual or workgroup, requiring the development of new pedagogical approaches or personal conceptions of academic or professional roles. As such, the e-learning innovation was labelled “radical”, even though in an industry context some of the changes were perhaps minor or already widely practised. This was evident at Delta with respect to online components and use of computer-based learning, and again at Lambda with respect to off-campus approaches. Notwithstanding these instances, overall the evidence presented in this research paints a more conservative picture of the current status of e-learning in Australian universities, more akin to appraisals made by Laurillard (2002b), Alexander, S. (2004) and Ayres and Grisham (2003).

There is, however, a gathering wave of evidence to suggest that the nature of the next generation of e-learning will induce a radical shift (Duderstadt & Womak, 2003; Johnstone, 2002; Norris et al., 2003(a); Twigg, 2001). Radical developments are already apparent with respect to technological advancement, degree of adoption, level
of participant engagement, scale of enterprise and pace of uptake. But the claim to overall radicalness will be based on the existence of a qualitatively different teaching and learning experience, brought about not by enrichment of one single dimension of the innovation of e-learning, such as technology, quality resources, interactive environments or increased accessibility – compelling as these may be – but by the fusion of these multiple and diverse elements into a radically different educational paradigm.

Several aspects of the next generation of the e-learning innovation are of interest to this study. It is likely to be populated with many instances of intersecting forces or trajectories (such as competency-enhancing and competency-destroying activities, business versus pedagogical models, collaborative versus independent activity, content driven versus learner interaction models). Another attribute of next generation e-learning is the complexity of issues such as integration of major technical and social systems. The technical complexity associated with the integration of learner management, content management, library and student administration systems positions the e-learning innovation in the ILF’s Complex Domain.

Issues which will present even greater challenges are those associated with the interface of human and social expectations of an educational innovation such as e-learning to fuse formal, work-based and informal learning dimensions into a cohesive, personally and socially relevant experience. E-learning’s relevance will derive less from its capacity merely to “deliver” at any place or any time, and more from creating learning opportunities and experiences that reaffirm the humanistic and socially contextual dimension of learning, although the latter will be concomitant with the former. The nature of the organisational responses and the change processes which underpin this type of innovation will be radically different from the strategies and processes employed to date, if this concept of e-learning is to be appreciated and sustained.

Analysis of the second phase case data revealed, over time, that both the nature of the e-learning innovation and the nature of the embedding process itself became more complicated, but it was less clear how this had affected the nature of the relationship between these two elements. While the innovation was slowly becoming richer in some respects and integrating more enhanced features, it was also becoming more institutionally controlled, orderly and better understood universally across organisations. The change processes associated with the adoption of e-learning were
also seen to vary considerably. At times they were very directed, managed and controlled; at other times impromptu, rapid and somewhat erratic. The whole environment appeared to display both order and ambiguity. It was not possible from the analysis to discern a clear causal relationship between the two dimensions (even if such a relationship existed), of one influencing the other in the way particular incidents had presented in the early stages. When and how these patterns influenced each other was unpredictable, and the nature of the relationship between the innovation and the change process dimensions was far from orderly or causal; rather, it could be described as iterative, cyclic or even confused.

It was found that when some of the conditions associated with a more complex concept of e-learning were present in the cases, such as when competing innovations were present at Gamma and Delta, or when opposing values about distance education or on-campus pedagogies intersected at Lambda, a more turbulent and chaotic set of change processes evolved, even in the more tightly managed environments such as Gamma. The subsequent change responses at the institutions varied. Even within one organisation, such as Lambda, there was considerable diversity of response: change became more directed and controlled from the top (e.g. the introduction of more centralised evaluation processes); or a more conciliatory and compromising approach resulted (some departments were allowed to put learning resources on the institutional LMS); in some cases the issue appeared to be ignored altogether (the initial institutional response to a departmental head who discouraged the use of e-learning).

It is the contention of this dissertation that these behaviours and patterns are symptomatic of the Complex Domain, which is where the embedded innovation will be situated, and furthermore that such interactions will become more prevalent than in earlier change phases. The implication of this proposition is that greater importance should be paid to the relationship between the innovation and the change processes which are intentionally adopted or spontaneously emerge. However, it is not easy to understand these relationships, let alone predict outcomes, therefore again management must remain open and flexible. Managers charged with the embedding of e-learning need to draw on a raft of multi-faceted change strategies: top-down, bottom-up and across; directive and autonomous; rapid and cautious; decisive and patient. Methods used to sustain innovation also need to be flexible and creative, and include guiding, think tanks, collaborating, strategic thinking (as well as strategic planning), doing nothing (in other words, observe and “wait and see”), mentoring, innovations hubs and “skunkworks” (Leifer et al., 2000). Such methods would be used in
conjunction with, rather than replacing, more traditional management tools and processes, which this study has demonstrated already have delivered increased reliability and robustness, accountability, and scalable and efficient solutions.

The key responsibility for managers and decision makers will be to choose the change strategies or processes most likely to be successful in an unusual and complex environment, where the innovation of e-learning now promises to span organisational boundaries through a nexus of collaborative, social and technological interfaces. This implication challenges Zemsky and Massy’s (2004) preferred approach of a dominant design for e-learning, favouring instead contextually relevant and flexible designs, but designs which have the capacity to link together, to integrate and to meld a larger design across non-traditional boundaries which serve new markets/cohorts of learners more appropriately.

For the institutions which have not yet moved as decisively into the Business Domain of the change process, there does not appear to be a fast-track change pathway. In other words, the Business Domain cannot be ignored, nor can an organisation leapfrog from the Innovation to the Complex Domain, because it would appear that many of the elements of the Complex Domain draw on the knowledge and processes gained during the Business Phase. These include human relationships as well as administrative, technical processes and infrastructure.

8.5 Summary of the findings and implications

The findings from the analysis of data collected in Stages One and Two indicate that there are a number of key influences which affect the embedding process and the ability of an organisation to manage the processes associated with the e-learning innovation. The key system influences which affect embedding include:

- the nature of the interactions and transactions occurring at the system boundaries, during transition phases and at the intersection of colliding system elements or activity streams
- the organisational context (cultural, technological, strategic, geographic)
- the pervasive impact of complexity on all dimensions of the research problem (the e-learning innovation, the change process and the university environment)
- the necessity for collaboration.
The implications for all stakeholders of e-learning are both wide and deep, but a particular onus on university executive and managers is the ability to progress the innovation beyond the relatively mechanical, process-oriented Business Domain of the ILF to the more inclusive and engaging Complex Domain. It is argued that managing the multiple constituencies and dimensions of the Complex Domain is the prime charge of university leaders in enhancing organisational ability to embed the innovation. The strategies and methods which might be employed in the Complex Domain include:

- maximise creative energy flowing from organisational tension
- minimise polarisation of issues
- employ flexible and participatory decision making which places less emphasis on controlling and routine mechanisms and more on motivational incentives
- ascribe more weight in decision making to the human attributes of personal judgement, creativity, trust and experience, while still drawing on existing processes and tools
- nurture organisational tolerance for system complexity and fuzziness
- aim for an overall system balance over time, for example between order and disruption, but do not necessarily strive for system equilibrium at all times
- actively seek ways of promoting and sustaining organisational collaboration, sharing and knowledge management
- incorporate and build on the essential business processes established in earlier phases, to achieve scalable and efficient e-learning processes and systems.

The ability of an organisation to *embed*, as opposed to *implement* e-learning, requires a refocusing on the interactions and relationships between the various elements or dimensions of the organisational system, careful monitoring, appraisal, alignment or re-alignment of critical organisational elements (as identified in the IRF, e.g. strategy and culture, aspects of the e-learning innovation with structure or process), and the successful engagement of the whole organisation and a consideration of the university community.

### 8.5.1 Limitations and further research

This study has indicated the strengths, limitations and potential of the e-learning innovation operating in a complex new environment. There have been some useful pointers to the key elements, strategies and conditions which might facilitate embedding of the innovation in universities, but clearly, more research is required
about the complex nature of the next iteration or generation of e-learning and how it might operate within the complex domain of organisations.

This thesis has contributed to ongoing research into the efficacy of e-learning by exploring some of the fundamental concepts of complexity within the socially and technologically constructed e-learning environment in Australian universities. A fascinating interplay between human (biological) and technological (machine) systems has emerged in the exploration of the innovative process. In examining the question of the ability to embed an enhanced e-learning construct, we have witnessed trends towards convergence, even integration, of both human and technological (machine) systems. In other words, there has been research into making machines more capable of human-like interactions and intellectual processes, displaying for example sensory capture, intuitive behaviour and personalised human-like communications. At the same time, considerable effort has been expended trying to make human systems and environments more machine-like (efficient, scalable, robust and predictable). The ethics, economics, efficacy and viability of these efforts still require considerable research.

New strategies for decision makers, managers and leaders of the e-learning innovation have been posited, which both build on and challenge some existing management practices within universities. However, a key new research opportunity flows from the findings of this research and the application of the analytical systems-based frameworks developed and utilised in this research. That is the melding of what we know from the more established organisational and management theories with the newer research emerging from complexity sciences. This research has made a beginning, but there is much more to be done to be able to develop theory to generalise to other organisational and social environments. Maguire makes this point:

> We cannot take complexity theory as it is developed by the physicists and biologists and plonk it into organizational science. It remains an empirical question as to whether human systems – organizations composed of human agents – are different and unique in certain ways (Maguire, 2002, p. 205).

Interest in the complexity sciences has been gaining momentum rapidly. If complexity science is to make a real contribution to the way we engage in teaching, learning and associated research in these fields (including the vital management processes which support and guide these activities), there must be resolute attempts to explore its
particular application within universities. In particular, a number of the key constructs of complexity theories have been revealed when examining the current issues in higher education. These include the tensions between autonomous traditions underpinning teaching and research activities on the one hand, and the business processes associated with scalable solutions and delivering efficiency and accountability to multiple constituents on the other. These tensions align with the fundamental elements of complexity sciences, such as contradiction, paradox and uncertainty. They centre on issues of the co-existence within a system of polarities: control versus self-organisation; simplification versus complexity; and standardisation versus diversity. Tensions also characterise the unpacking of the individually construed conception of quality versus organisationally managed and constructed quality management processes.

Especially topical with respect to e-learning are issues related to adoption and integration strategies which rely on closely managed processes theoretically underpinned by notions of causality and predictability. Yet time and again, the unexpected thwarts well-intentioned planning processes, at times unreasonably leading to claims of mismanagement rather than an understanding that such fluctuations and “mess” are part of the expected cycle of innovation. As Allen (1994, p. 17) contends, “knowing what we cannot know is an important step on the road to wisdom”. As universities increasingly are immersed in unknown and unstructured environments, a timely subject for further research is identification of the situations where disciplined institutional responses (based on cause and effect principles) may be usefully applied in e-learning contexts, and thus where it is reasonable to predict outcomes.

The intersection of commercial and traditional academic conceptions of learning with respect to electronically mediated environments is another timely topic for further research. An example is the current focus of interest of educational institutions, industry (vendors, publishers and creators) and governments on learning objects and their re-use and shared databases. A specific issue relates to the contradictory reward systems operating in commercial and academic worlds. To buy an off-the-shelf product, thus saving high development costs, is rewarded in a business environment, whereas in an academic context, developing one’s own product brings individuals more recognition, as it represents a work one can claim on one’s academic portfolio to count towards promotion. Such opposing forces need further research in the
collaborative environments mooted in this research and elsewhere (Leonie, 2005), as they present a significant barrier to e-learning adoption and embedding.

This research problem was originally envisaged from the perspective of a broad inquiry canvas and thus a whole-of-organisation approach was taken, drawing on the general principles of systems theories, that all elements, entities or parts of the system are connected and that an event or interaction in one area of the system will impact on everything else. Pragmatic restrictions, however, meant that some aspects of the university e-learning system received scant, if any attention. A significant exclusion, highlighted earlier, and one which clearly calls out for further research, is the learner perspective with respect to embedding e-learning. For example, how do student perceptions of their identity and role, as independent or reliant learners, customers of the university or members of the university learning community, novice scholars or working professionals seeking additional qualification/certifications, impact on the complex domain of e-learning? How do these multiple roles and expectations influence the future development and direction of e-learning?

Other areas related to the increasingly complex nature of the e-learning innovation, such as the increasing sophistication of the technologies, the opposing pedagogical versus business models or the disaggregation of the role of the teacher, are ripe for a more in-depth investigation, particularly with respect to the relationships and interactions with other system elements and the subsequent implications for university communities. Research in these areas, it is hoped, will be assisted by the higher order findings and the analytical tools developed as a result of this study. The theoretical statements also make useful starting points for those who may wish to explore similar questions in areas beyond the higher education sector, and therefore enable the findings of this study to have wider application and generalisability to the broader education sector or within an international demographic context.

8.6 Conclusion

The overarching question posed in this dissertation, “How do organisations, specifically universities, successfully embed the innovation of e-learning?”, has been investigated from theoretical and empirical perspectives. The key finding lies in the genesis of a conception of embedding as a new dimension of change, which extends current models and perceptions of change processes beyond the established
organisational milestones of implementation and stabilisation. Revelations about the process of embedding centred on the concepts of innovation legitimisation at all levels of the organisation, and sustainability in complex and unpredictable environments.

Taken as a single integrated construct, “the ability to embed an innovation” is a comprehensive and holistic notion. It includes the ongoing development and infusion of particular skills, understandings, knowledge, predispositions and commitment to an innovation such as e-learning throughout all levels of an organisation. For universities, it also demands of executive and senior management a sound understanding of the entire change process, and the leadership to engage the whole organisation in the process of growing and developing e-learning to fit the particular context of each institution.

It is the contention of this dissertation that the ability to embed an innovation is both a complex and an intuitive process, and paradoxically also a strategically conceived, planned and managed undertaking. The majority of the case universities had made reasonable progress with respect to the early envisioning, planning and management tasks, as evidenced by meeting adoption targets and introducing new organisational processes and policy, but all had yet to comprehend fully the complex and intuitive dimensions of change and to take on board these innate elements of the embedding process.

The nature of the e-learning innovation itself is both complex and far reaching, and it continues to harbour much unrealised potential. Its current status within Australian universities is situated largely in the domain of business processes, where the emphasis is on productivity, efficiencies, assurances, technological integration and scalability, factors which meet the necessary economic, accountability and commercial demands of multiple stakeholders. Its future and long-term efficacy, however, lies in the Complex Domain, where the sustainability of innovation is inextricably linked with the infusion of the creative, engaging and humanistic dimensions which enable the crucial social dimension of learning. Only when e-learning can enhance current teaching and learning practice and make a qualitative difference to the experience and the outcomes, can it lay claim to being a radical innovation.

The concept of embedding, as conceived in this thesis, requires a much greater appreciation and knowledge of the value of complex and creative solutions than has been demonstrated in the higher education sector to date. The ability to embed e-
learning in a university context assumes a relational and holistic knowledge of the
diverse but interconnected elements of the university as a system, and a deeper
understanding of the dimension of radicalness with respect to innovation. The higher
education sector has certainly witnessed radical structural, technological and process
change, but as yet it has not engaged adequately with the innovation of e-learning at
the epistemological level, as cogently expressed by Laurillard (2003, p iii): “When the
knowledge technologies change so radically, they change not just what we know, but
how we come to know it”.

This dissertation, acknowledging the significance of the task ahead, has proposed two
frameworks and several theoretical statements to complement existing tools, methods
and knowledge about the change processes associated with e-learning innovation. It is
hoped that this study’s findings relating to the embedding of innovation in
organisations will encourage progress to “next generation e-learning”, in a way which
will enable lasting benefits to flow to all constituents: learners, teachers, universities,
industry and governments.
References


263


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### Appendix 1

#### Table 4.1 Interviewee Questions – Phase 1, Stage 1.

The following semi-structured questions were asked at Gamma, Lambda, Delta and Epsilon.

<table>
<thead>
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<th>Questions to determine organisational context; in particular, prompts used to elicit details of the organisational structure, mission, strategies, infrastructure, relevant teaching and learning policies and processes.</th>
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<td>2.</td>
<td>What type of computer-facilitated learning (CFL) or technology-mediated teaching and learning activities are currently undertaken by the university/faculty/department? Prompts included: stand-alone computer-based learning, online or web-based learning (e.g. web-supported, fully online), student use of electronic resources (e.g. databases), student learning support services, electronic presentation methods in FTF or distance learning, video, audio or computer-based conferencing.</td>
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<td>3.</td>
<td>How long have these activities/programmes/projects been in place?</td>
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<td>How widespread is this type of programme across the university/faculty/department? (e.g. number of staff, projects, programmes involved)</td>
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<td>5.</td>
<td>What has been the main purpose or driver for introducing the use of CFL or e-learning in the university/faculty/department? (i.e. What is the strategy for e-learning?)</td>
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<td>6.</td>
<td>Have there been any particular events or incidents which you believe have influenced the uptake of CFL or e-learning?</td>
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<td>7.</td>
<td>Describe any specific interventions or actions that have been introduced to encourage the uptake of CFL or e-learning. (e.g. special funding, grants, adoption targets)</td>
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<td>8.</td>
<td>What motivated you to get involved with CFL or e-learning?</td>
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<td>9.</td>
<td>What is or would be important for you to continue using or developing CFL or e-learning programmes?</td>
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<td>10.</td>
<td>Has your role (e.g. academic/teacher/administrator) changed since introduction of CFL or e-learning? In what way?</td>
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<td>What are some of the relevant issues associated with the development and use of CFL or e-learning in your university/faculty/department? Prompts included:</td>
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<td>- Funding or other resources</td>
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<td>- Training and professional development</td>
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<td>- Organisational culture</td>
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<td>Have these issues/factors acted as a facilitator or barrier to adoption or continued use of CFL or e-learning? In what way?</td>
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<td>13.</td>
<td>Do the CFL/e-learning approaches in place align with the current strategic direction of the university/faculty/department?</td>
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<td>14.</td>
<td>Have any specific institutional changes (e.g. policies, new structures or processes) been introduced with respect to the use of CFL or e-learning?</td>
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<td>Has policy played an important part in the adoption of CFL/e-learning approaches? In what way?</td>
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<td>16.</td>
<td>Have collaborative initiatives been important. In what way?</td>
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<td>17.</td>
<td>How would you describe the nature of the change process with respect to the development and use of CFL/e-learning? Prompts included: (pace – rapid, slow; direction – top-down, bottom-up)</td>
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<td>18.</td>
<td>Do you believe that CFL is well embedded into the organisation? Why?.</td>
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<td>19.</td>
<td>What do you think are the greatest challenges or opportunities with respect to future use of CFL/e-learning in your organisation?</td>
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<td>Delta University</td>
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<td>Delta University</td>
<td>16</td>
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</tbody>
</table>

297
## Appendix 2

### Table 5.1 Organisational elements – strategy

<table>
<thead>
<tr>
<th>Gamma</th>
<th>Lambda</th>
<th>Comparative Comments/Insights</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Create distinctive position for the university within a changing environment</td>
<td>• Maintain and enhance the reputation as a leading university</td>
<td>Gamma saw e-learning as an opportunity to carve out a distinctive position in a changing global market, building on existing capabilities with respect to off-campus education.</td>
</tr>
<tr>
<td>• Equity, social responsibility &amp; professional focus</td>
<td>• Strong research tradition</td>
<td>Lambda took a quite different approach in that e-learning approaches were to enhance, not replace, the quality of the on-campus learning experience, shoring up the University’s premier position in the market place.</td>
</tr>
<tr>
<td>• Teaching &amp; learning of strategic importance: set of graduate “qualities” to equip graduates as knowledgeable &amp; socially responsible professionals; student-centred learning, flexible learning with emphasis on online technologies</td>
<td>• Teaching &amp; learning focus on excellence &amp; quality</td>
<td></td>
</tr>
<tr>
<td>• Seeking new markets internationally (online technologies to support this strategy)</td>
<td>• Aim to attract &amp; retain the best students</td>
<td></td>
</tr>
<tr>
<td>• Strategy very important with respect to online teaching &amp; learning – previously described as a “non-strategy” (PVC, Academic Division, Interviewee A1)</td>
<td>• Campus-based teaching &amp; learning programs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• E-learning to enhance the quality of learning</td>
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<tr>
<td></td>
<td>• Strategic collaborations sought with other premier tertiary institutions</td>
<td></td>
</tr>
</tbody>
</table>

### Table 5.2 Organisational elements – structure

<table>
<thead>
<tr>
<th>Gamma</th>
<th>Lambda</th>
<th>Comparative Comments/Insights</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Significant institutional restructure of academic areas – eight faculties re-organised into four divisions each headed by a Pro-Vice-Chancellor</td>
<td>• Traditional university organisational structure – central executive, faculties, schools, centres &amp; units</td>
<td>Organisational structural changes were deliberate interventions at both universities to further their goals &amp; strategies. Gamma’s structural changes dominated the institutional environment and, although they generally aligned with new strategic directions of university, had produced organisational tensions.</td>
</tr>
<tr>
<td>• Creation of centralised staff development &amp; student support unit. Gamma Learning Centre (GLC) had about 90 staff (from former distance education centre, study advisors and professional counsellors)</td>
<td>• Major university-wide initiative to create Information Division, incorporating library, IT, educational technology &amp; professional staff/student support services</td>
<td>Targeted structural interventions at Lambda were introduced for maximum impact. These included creation of executive positions in key areas and introduction of teaching and learning</td>
</tr>
<tr>
<td>• IT infrastructure an institutional responsibility recently given high priority, but it was coming from a poor base.</td>
<td>• Nested system of institutional and faculty based support units provided extensive professional advice and service to staff. It consisted of centralised IT infrastructure, educational multimedia development and library services, offering both generic and highly specialist services and infrastructure university wide. The model relied on an integrated matrix</td>
<td></td>
</tr>
<tr>
<td>• Competing demands for networking capacity: servicing multi-campus sites and supporting off-campus, including international, delivery.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Three year university IT</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gamma</strong></td>
<td><strong>Lambda</strong></td>
<td><strong>Comparative</strong></td>
</tr>
<tr>
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</tr>
</tbody>
</table>
| upgraded plan to increase network & computing capacity & student computer access (Gamma Annual Report, 1997, p. 15)  
- IT Plan based on principles of standards, scalability & universality, e.g. all staff and students migrated to common email environment (Microsoft Exchange).  
- Internal teaching and learning grant scheme in place, but relatively low key  
- Informal communication networks played important role with professional, work & project groups, with added considerations of distributed project teams and international program development and delivery  
- Disaggregation of teaching role commenced | structure which, in turn, was dependent on strong co-operative links and communication flows.  
- Case Faculty comprised five schools. It had extensive structures to support e-learning (e.g. organisational units, staff positions & resources).  
- A number of in-house professional support units provided services covering educational evaluation and curriculum development, multimedia development and IT support.  
- For example, the LMU, a key Faculty Multimedia Unit, had 15 staff and was experiencing rapid growth. It focused on specific faculty curriculum goals, and avoided experimental technology-driven projects. It was established in 1994, disbanded a few years later, and re-established in 1998 after a considerable “rethink” on the part of the Faculty.  
- Key roles established within the University and the case Faculty to provide leadership and advance e-learning. E.g. the position of Assistant Dean was a senior academic position responsible for the development & integration of any type of IT service, multimedia or computer learning application within the Faculty.  
- Institutional IT infrastructure extensive, especially on-campus environment (less focus on off-campus or external IT network requirements and needs)  
- Centralised institutional IT network provision (standards, service etc.), but decentralised at access points (within buildings, software and hardware - servers, user computers to support educational programs, Faculty research & administration)  
- Case Faculty provided computer student high-end multimedia labs.  
- Significant institutional teaching & learning grant scheme introduced 1997. It provided approximately $10 million over three years from central funds for multimedia teaching and learning. | grant scheme. Some of these interventions, e.g. Assistant Dean position, had assumed the status of a critical incident. |
Gamma  | Lambda  | Comparative Comments/Insights
---|---|---
Learning projects. Faculty case had won approximately 30% of these institutional grants.  
• Establishment of an inter-institutional collaborative grant (university wide) scheme.  
• Informal communication networks played important role with professional, work and project groups (within traditional notion of collegial & professional organisation).  
• Disaggregation of teaching role commenced. Professional support staff provided skills in instructional design, graphic design, programming, multimedia development, educational evaluation.

Table 5.3 Organisational elements – process

<table>
<thead>
<tr>
<th>Gamma</th>
<th>Lambda</th>
<th>Comparative Comments/Insights</th>
</tr>
</thead>
</table>
| • Significant process changes under way involving policy formulation and implementation in area of online learning and transnational education programs  
• Policy and procedures framework particularly strong with respect to teaching and learning. Existing policies and procedures in place with respect to distance education provision and IP.  
• Focus of e-learning policy framework on delivery of online courses, rather than development of course content (Interviewee A2). Delivery included: standardisation of student access; course content maintenance; protection of university interests.  
• Policy & procedures gaps & tensions included: managing control of plagiarism in online and transnational contexts; equity & access; student & staff support services, e.g. information literacy, management and protection of institutional asset in collaborations.  
• Resources and funding tight, therefore processes at institutional level to capitalise | • Institutional policy and procedures generally lower key, underpinned by principle of maximum academic freedom. Assistant Dean reported that it was his intention "not to interfere with what individuals Schools and Departments do." (Lambda, Interviewee A2)  
• Minimal processes (e.g. rules, standards) required as staff given high degree of autonomy, but encouraged to set new benchmarks, to promote or publish outcomes.  
• A limited number of critical factors identified which could act as barriers or facilitators to the integration of multimedia and IT into teaching and learning programs (e.g. IP, staff training). University managing & monitoring these critical success factors closely with policy and procedures.  
• Intellectual property (see Table 5.5) an exception to low key approach to policy.  
• Comparatively well funded and resourced institution, so many processes devolved to Faculty level where focus was on quality, excellence, efficacy of programmes.  
• Emphasis on staff development | Policy and procedural areas can act as a litmus test for organisational health with respect to change and strategy, highlighting the organisational gaps and tensions. This was particularly evident at Gamma.  
Planning processes were important in both cases, but Gamma appeared more reliant on these to drive change than Lambda, which had adopted a more guiding influence approach. |
<table>
<thead>
<tr>
<th>Gamma</th>
<th>Lambda</th>
<th>Comparative Comments/Insights</th>
</tr>
</thead>
<tbody>
<tr>
<td>on efficiency.</td>
<td></td>
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<tr>
<td>• Initial processes to vet innovative new teaching projects were underpinned by assumption that they needed to be profitable (and those that had, assumed a reasonable degree of autonomy from existing university procedures). Warning signals were sounded, however, with respect to putting in place processes based on the premise that online programs would result in cost savings.</td>
<td>• Rewards and recognition generally not sufficient for teaching and use of Communication and Information Technology.</td>
<td></td>
</tr>
<tr>
<td>• Emphasis on staff development (see Table 5.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• New administrative and planning processes under development for collaborative, online and offshore projects, including: handling information electronically rather than in paper-based form; currency of web-based information e.g. class timetables.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• New executive committees established – e.g. to approve criteria and priorities for online courses</td>
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</tbody>
</table>
### Table 5.4 Policy environment at Gamma University

<table>
<thead>
<tr>
<th>Issue</th>
<th>Evidence of positive view of policy and procedures</th>
<th>Evidence of negative view of policy and procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong policy environment versus unregulated (or absent) policy environment, driving university e-learning programs</td>
<td><strong>“The university is very strong on policy with respect to flexible learning as it has come from distance education. … there is an expectation that staff will become involved in online.”</strong> Executive Academic Director, Gamma, Interviewee A6.</td>
<td><strong>“I suppose it is almost the opposite. Where there hasn’t been any policies it has been quite good really because it means that you can just get on and do what you want to do. I have found so far that most policies just can be very limiting.”</strong> Academic Program Manager, Gamma, Interviewee 11.</td>
</tr>
</tbody>
</table>
| | **“The policy framework is very strong in this university.”** Executive Director, Gamma, Interviewee A3.  
“We don’t see it (online policy) as providing any greater problems than innovation in any other area.” Executive Director, Gamma, Interviewee A3 | **“We’ve been developing the computerised assisted learning from the basis of letting a thousand flowers bloom… but we’ve not really had what I would say is a very strategic approach.”** Pro Vice-Chancellor, Academic Division, Gamma, Interviewee A1. |
| Policy failure, gaps and tensions | **“University IP policy has not been limiting or restricting in any way.”** Academic Program Manager, Gamma, Interviewee 8 | **“We’ve had a number of programs where the University has effectively had its approval policy unable to be implemented, because a local academic or School or Faculty has taken things so far with an offshore agent, that the University has been forced to continue with it… to avoid losing face overseas.”** Senior Administrative Manager, Gamma, Interviewee A2. |
| | **“[aligning of] the University’s policy and the School’s policy of encouraging staff to move all of the School’s… subjects online.”** Executive Academic Director, Gamma, Interviewee A6. | **“Because our project is sort of, a little separate from University procedures, although we have to stick within the guidelines of the University, stick to their rules and regulations, it’s a little bit different – we’re sort of treading new waters I guess.”** Administrative Support Officer, Gamma, Interviewee 12. |
| | **“There’s got to be a set up of standards and how you tie that up with allowing innovation and without stymieing any innovation is one of the issues of policy.”** PVC, Academic Division Gamma, Interviewee A1. | **“We are pushing into new areas where policy hasn’t been made, although the other problem we’ve had is that because the University has been going through the state of turmoil and change, policies and procedures are changing all the time.”** Academic Program Manager, Gamma, Interviewee 8. |
### Table 5.5 Contrasting IP policy and processes – Gamma and Lambda Universities

<table>
<thead>
<tr>
<th>Issue – IP Overview</th>
<th>Gamma</th>
<th>Lambda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall non problematic. Clear guidelines established and generally accepted by staff.</td>
<td>• Overall non problematic. Clear guidelines established and generally accepted by staff.</td>
<td>• Ongoing problem for the University, which they were attempting to resolve, but particularly an issue within case Faculty.</td>
</tr>
<tr>
<td>“The intellectual property that’s involved in teaching is owned by the University regardless of where and when it occurs. So that’s not an issue.” Executive Director, Gamma, Interviewee A3</td>
<td>“The University approach has been very messy and complex – it has not been particularly well handled or worked through at the institutional level.” Faculty Dean, Lambda, Interviewee A1.</td>
<td></td>
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<table>
<thead>
<tr>
<th>Issue – Focus of teaching and learning IP policy and procedure</th>
<th>Gamma</th>
<th>Lambda</th>
</tr>
</thead>
<tbody>
<tr>
<td>The focus on access &amp; distribution, rather than producing sophisticated, media-rich product. This emphasis alleviated issues with respect to potential from commercial royalties or income.</td>
<td>• The focus on access &amp; distribution, rather than producing sophisticated, media-rich product. This emphasis alleviated issues with respect to potential from commercial royalties or income.</td>
<td>• The focus on balancing institutional &amp; individual rights, protecting value of asset and fostering development of IP.</td>
</tr>
<tr>
<td>“The only kind of copyright with online are issues to do with print – readings going onto CD ROM.” Academic Program Manager, Gamma, Interviewee 8.</td>
<td>• “The only kind of copyright with online are issues to do with print – readings going onto CD ROM.” Academic Program Manager, Gamma, Interviewee 8.</td>
<td>• A major revision of IP policy being conducted. Innovative approach in national context, based on principles of recognising relative contribution of all contributors to a work or multimedia product. Innovativeness of policy was in the processes established at the front end of a project to negotiate reward and recognition for all stakeholders.</td>
</tr>
<tr>
<td>• Policy had two classes of creators:</td>
<td>• Policy had two classes of creators:</td>
<td></td>
</tr>
<tr>
<td>o “originators”: members of academic staff, typically the instigator of the idea and the one responsible for the intellectual content</td>
<td>o “originators”: members of academic staff, typically the instigator of the idea and the one responsible for the intellectual content</td>
<td></td>
</tr>
<tr>
<td>o “contributors”: the professional staff with the skills and expertise “to make the program happen”, e.g. graphic designers, programmers, project managers</td>
<td>o “contributors”: the professional staff with the skills and expertise “to make the program happen”, e.g. graphic designers, programmers, project managers</td>
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### Gamma

**Issue – Managing the complex and conflicts situations**

**Ownership and entrepreneurialism**
Dissenting voices from the innovators and entrepreneurial elements, but these were generally managed successfully within the context of the Gamma environment. “And there still would be some within the institution who don’t actually understand what the formal arrangements are, but they tend to be people who teach within a fairly blinkered existence and they are increasingly a smaller number of our total staff. There is no question that there will always be some people who would wish to take the University into battle over the issue of intellectual property, but they simply don’t understand what the law is.” Executive Director, Gamma, Interviewee A3.

“So we do get the staff trying to say ‘no they belong to me, I wrote them’… Other lecturers will say ‘I refuse to put my lecture notes and PowerPoint slides online, I won’t do that because that is my property’… And I have that within my group… and I guess it is an issue that hasn’t caused major problems. But I still keep the line ‘it’s the University’s material’. And I just keep pushing that line.” Academic Program Manager, Gamma, Interviewee 8.

### Lambda

**Commercial and collaborative projects**
New IP policy had two options for individuals to commercialise:
- license the product out (University retains IP)
- negotiate with university to have IP deeded back to individual through sale or license Agreement that new policy had assisted the “in-house” development environment, but complex issues still stymieing people from taking on collaboration & commercialisation projects, “Unbelievable. We still haven’t addressed it. It’s just ghastly. The University still hasn’t got its act together… I’ve not been able to get any clear guidance on IP.” Professor and Head of Department, Lambda, Interview A6.

“IP does cause problems with collaboration projects – for example it becomes very difficult to separate the content they’ve put in.” Multimedia developer, Lambda, Interviewee 15.

New policy had provision for asking individuals to recompense university for previous outlays or contributions (e.g. grant monies), if product was later on to be commercialised by individuals.
Table 5.6 Staff development – Gamma University

<table>
<thead>
<tr>
<th>Issue</th>
<th>Gamma</th>
<th>Supporting Evidence</th>
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</thead>
<tbody>
<tr>
<td><strong>Professional development and training approach</strong></td>
<td>Staff development high priority to skill staff with respect to online teaching (removing pressure on central resources). Academic staff develop programs to assist staff to make the transition to the online environment.</td>
<td>“One of the things we’ve absolutely attempted to do is to be absolutely proactive about the provision of support for academic staff who want to move online. … And our intent is… that our academics become intelligent online practitioners through their own efforts.” Professional Support Manager, Gamma, Interviewee 4.</td>
</tr>
<tr>
<td></td>
<td>Fairly basic training emphasis initially.</td>
<td>“I think at this University they’re more still at the mechanics level, just getting something online… I haven’t seen too much about the other side of it [online chat] and that’s what interests me… so I find it a bit frustrating.” Lecturer, Gamma, Interviewee 9.</td>
</tr>
<tr>
<td><strong>Awareness of programs</strong></td>
<td>There was a reported lack of knowledge about what sort of support or training was available (though this was not a consistent response).</td>
<td>Comment made about awareness of training programs – “[I have] no idea, no idea at all.” Lecturer, Gamma, Interviewee 9.</td>
</tr>
<tr>
<td><strong>Efficacy of programs</strong></td>
<td>Mixed response – some individuals praised IT skills training and valued specific programs such as the graduate certificate program, BUT the more competent users criticised central programs which gave little assistance with pedagogical efficacy of online methods.</td>
<td>“I was disappointed as to what they could do… I think I told them [Professional Training Staff] more than they told me. I’m not a computer boffin at all. So after that I didn’t bother talking to them.” Lecturer, Gamma, Interviewee 10.</td>
</tr>
<tr>
<td><strong>Preferred approach</strong></td>
<td>Staff had preference for informal in-School training, but many recognised additional cost involved.</td>
<td>“To be honest, given the workloads of various people around here, my guess is that one of the better ways is to probably occasionally get together and to throw ideas around, rather than necessarily having something highly structured.” Lecturer, Gamma, Interviewee 10.</td>
</tr>
</tbody>
</table>
### Table 5.7 Organisational elements – culture

<table>
<thead>
<tr>
<th>Gamma</th>
<th>Lambda</th>
<th>Comparative Comments/Insights</th>
</tr>
</thead>
</table>
| • Strong innovative and entrepreneurial culture, which at times clashed with the social equity culture  
• Teaching recognised as important, particularly off-campus modes  
• Changing institutional priorities and landscapes leading to tensions of cultural “identity”  
• e-learning entrenched “cottage industry” culture held by independent innovators, versus systematic institutional vision promoted by management.  
• Within project groups, new team cultures building characterised by cross discipline/School team spirit, creativity, support for team  
  “There’s a team spirit that’s developed among the staff – they can’t keep up with the full time workload here while they’re overseas, so they have started to share and to help each other out.”  Academic Program Manager,'. Gamma, Interviewee 8.  
  “You need backup from people. So that when you fall apart… colleagues can help you. It’s probably good to work in a collegial atmosphere, which is one of the pluses that I think will accrue as this project works through.”  Lecturer, Gamma, Interviewee 9.  
• New coalitions forming between former “lone rangers”, in opposition to mainstream e-learning approaches,  
• Traditional collegiate academic culture strong  | • Excellence and quality, strive to be the best  
• Traditional collegiate academic culture strong  
• Teaching important, but research dominant. View that teaching would somehow look after itself. “The University is working to overcome a rather difficult culture that existed, probably going back 20 years, where the culture was that teaching really didn’t matter very much.”  Head, University Centre, Lambda, Interviewee 10.  
• Teaching part of a wider external culture which holds back development, referred to as an anti-intellectual stance, “Education is not regarded highly enough in this country… the climate in which people do this or not, take up IT or not, it comes down to everyone’s priority.”  Senior Academic Administrator, Lambda, interviewee A2.  
• Culture that only recognises success. “I think people are very reluctant to stand up and admit their failings in a professional community. And especially in an industry that in my mind is relatively young, and has a lot of growing to do. Something to be encouraged is for people to learn from mistakes that are being made.”  Professional academic support staff, Lambda , Interviewee 9.  
  “Best practice” culture worked against sharing mistakes  
• Collaborative culture underdeveloped, but valued in principle “Collaborative efforts will play a much greater role.”  Dean, Lambda, Interviewee A1.  
• Within case Faculty, ethos building about value of multimedia  
  “A very strong culture, [where] there’s direct recognition from the Head of Department down, that the range of teaching strategies should be broadened significantly. And I think that this has just been accepted by the academics.”  Senior Lecturer, Lambda, Interviewee 16.  | Gamma’s culture could be summed up as pragmatic but innovative, driven by the will to succeed and survive, and influenced by strong leadership and a sense of urgency. Tensions and uncertainties surfaced in this climate.  
Lambda was working from a more stable base, with a strong cultural identity, sense of confidence and purpose about its mission. Lambda’s biggest challenge was the inertia brought about by stability and reliance on existing norms (e.g. traditional role of academic staff) which could close off new opportunities. |
Table 5.8 Innovation dimension – e-learning profile

<table>
<thead>
<tr>
<th>Gamma</th>
<th>Lambda</th>
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</thead>
<tbody>
<tr>
<td>• e-learning innovation in transition phase – moving from a diverse</td>
<td>• e-learning innovation in transition phase – moving from economic practical rationale to</td>
</tr>
<tr>
<td>a universal online learning management system (GammaNet).</td>
<td>quality enhancement to complement existing on-campus classes.</td>
</tr>
<tr>
<td>• Evolutionary merging of on- and off-campus student categories</td>
<td>• The early rationale to adopt computer based approaches within the Faculty was pragmatic</td>
</tr>
<tr>
<td>• “One of things we are absolutely clear about is that the</td>
<td>• “Given the staff cutbacks and problems in providing small group tutorials to large numbers</td>
</tr>
<tr>
<td>distinctions between teaching methodologies for on campus students,</td>
<td>of students, computer aided instruction offers a solution to that problem.” Senior Academic,</td>
</tr>
<tr>
<td>distance students and international students will progressively</td>
<td>Lambda, Interviewee 11.</td>
</tr>
<tr>
<td>disappear.” Executive Director, Gamma, Interviewee A3.</td>
<td>• The aim was to enhance the quality of on-campus learning and was not at all about external</td>
</tr>
<tr>
<td>• Online learning closely tied to university strategy which was</td>
<td>studies or “lifelong learning” practices (Interviewee 8).</td>
</tr>
<tr>
<td>student-centred (interpreted as universal access irrespective of</td>
<td>• Targeted use of IT methods in teaching within the Faculty, however, was taking place within</td>
</tr>
<tr>
<td>location of student, consistent interface, look and feel to user</td>
<td>a broader University context of innovative and cutting edge development of multimedia programs.</td>
</tr>
<tr>
<td>interface, easy to use).</td>
<td>This led to a greater emphasis on use of IT to enhance or improve the quality of teaching and</td>
</tr>
<tr>
<td>• e-learning solution through GammaNet – low cost, scalable and</td>
<td>learning.</td>
</tr>
<tr>
<td>sustainable.</td>
<td>• Focus on student access to high quality on-campus programs, via relatively high-end student</td>
</tr>
<tr>
<td>• GammaNet immediate goals: to gain support from academic and</td>
<td>computer laboratories.</td>
</tr>
<tr>
<td>support units, ramp up general awareness and dissemination activities,</td>
<td>• Exception to the campus based programs were a small number of professional continuing</td>
</tr>
<tr>
<td>manage issues arising from the University requirement to use approved</td>
<td>education programs being developed to cater for practising professionals in the workplace.</td>
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<tr>
<td>authoring tools; and provide technical support to maintain hardware</td>
<td>Academics involved felt somewhat frustrated about the lack of support for off-campus program</td>
</tr>
<tr>
<td>within the schools and divisions.</td>
<td>courses.</td>
</tr>
<tr>
<td>• Course quality the responsibility of academic staff – therefore</td>
<td>• Course quality the responsibility of academic staff – therefore e-learning systems and tools</td>
</tr>
<tr>
<td>e-learning systems and tools provided only generic quality</td>
<td>provided only generic quality frameworks but primarily designed for staff to manage of quality</td>
</tr>
<tr>
<td>frameworks but primarily designed for staff to manage of quality of</td>
<td>and interactions, “(We have) built in pedagogical templates a structure which lead staff</td>
</tr>
<tr>
<td>content and interactions, “(We have) built in pedagogical templates</td>
<td>through educational design principles in a fairly well defined and rigid structure.” Senior</td>
</tr>
<tr>
<td>a structure which lead staff through educational design principles</td>
<td>Academic Manager, Gamma, Interviewee 5.</td>
</tr>
<tr>
<td>in a fairly well defined and rigid structure.” Senior Academic</td>
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<tr>
<td>Manager, Gamma, Interviewee 5.</td>
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</tbody>
</table>
Table 5.9 Comparative table of e-learning technology, pedagogy, methodology and curriculum

<table>
<thead>
<tr>
<th>Technology</th>
<th>Gamma</th>
<th>Lambda</th>
</tr>
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<tbody>
<tr>
<td>- e-learning focus on online scalable technologies, rather than alternative technologies, multimedia, videoconferencing, webcasting.</td>
<td>- e-learning utilised number of digital technologies, but particular emphasis on use of rich media, including graphics, photographs, audio and video.</td>
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<tr>
<td>- Aim to minimise dependency on print technologies which had dominated distance education model.</td>
<td>- Exploratory development of interactive web objects as a way of incorporating more sophisticated elements, such as animations, into learning resources.</td>
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<tr>
<td>- Current situation: Two parallel coexisting online technologies: “independent” course websites and recently released generic online platform (GammaNet).</td>
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<tr>
<td>- GammaNet an integrated environment comprising an electronic student administrative information, library and support services, with a common homepage, subject outline, email, listserv and discussion forum.</td>
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<tr>
<td>- Existing online courses developed as individual websites run by Division, Schools or external providers: “We’ve had a fairly multiple approach to this and I think this was fairly inevitable when you’ve not had a university-wide approach. There was no prescription for the University and that was because in the development stage there’s no agreement about the standard that should be implemented.” Executive Academic Manager, Gamma, Interviewee A1.</td>
<td>- Focus on provision of adequate IT environments &amp; access for students to sophisticated computer laboratories on-campus, intranets and IT infrastructure: “We are hoping for the student it becomes a very relaxed and seamless way of dealing with IT.” Senior Professional, Lambda, Interviewee 13.</td>
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<tr>
<td>- Websites developed “in-house”, in collaboration with other partners (e.g. universities from UK &amp; Sweden), off-the-shelf commercial product, or outside provider.</td>
<td>- Use of rich media limited off-campus online delivery.</td>
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<tr>
<td>- Structure of websites determined by subject co-ordinator based on specific requirements of students and subject: “We can certainly provide quality on-line education that’s customised to the particular situation, be it student, staff, content.” External Online provider, Interviewee 7.</td>
<td>- Technology not the driver of e-learning, as realisation that pedagogy underpinning the using multimedia based approaches was recognised as being integral. Cautious about being seduced by the technologies, “It’s easy to be caught up in the rush of excitement to get things off the computers. And there is a tendency to be besotted with the colour and the movement, as opposed to what a computer offers in an academic/educational sense. I think the evaluation has to look at what advantages are being gained through delivering educational concepts and changing the learning environment to include multimedia type programs. And determining in whether it does it better or worse than traditional.”</td>
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<tr>
<td>- Individual sites exhibited range of sophistication and quality (some relatively advanced with interactivity &amp; communication tools: chat, web-based forums). Others very basic with only a “home page”.</td>
<td>- Head of Department, Lambda, Interviewee A4.</td>
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</tbody>
</table>
- GammaNet – institutionally developed proprietary course management platform involving non-committed technology.
- Easily scalable & modular structure to facilitate the addition of new components.
- Generic low cost system, basic functionality initially, reliance on templates and wizards as a means to enable staff to import and manage subject content.
- Exception to basic functionality was innovative IT features linking of web pages to databases providing staff with the capacity for direct input, and provision for future automatic technology upgrade paths (e.g. for communication tools).
- Computer based programs, delivered across hybrid technologies, the Faculty intranet, departmental servers and student laboratories, via a commercial LMS (Top Class) or CD-ROM from stand-alone computers.

**Pedagogy and methodology**

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<tr>
<th>Gamma</th>
<th>Lambda</th>
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<tbody>
<tr>
<td>• Sound knowledge of distance learning methodologies, e.g. asynchronous learning so transition to asynchronous online seen as evolutionary. But the distance education materials production methods were not transferred to new universal online environment. The distance education production process Fordist model was based on Taylorist principles of central quality control and a teams of specialists working in a conveyor line schedule process on one learning package.</td>
<td>• In 1998, use of multimedia and computer based programs was seen as complementary or in some cases supplementary to the traditional teaching and learning experiences.</td>
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<tr>
<td>• Senior managers driving the online development environment saw the distance education central expert teams model as “flawed”, “unworkable” &amp; mechanical, in that it produced “bottlenecks … in the production cycle which actually slowed down delivery &amp; teaching.” Executive Director, Gamma, Interviewee A3.</td>
<td>• The pedagogical focus was still face-to-face interactions within the established tutorial or laboratory class sessions, enhanced by small group computer based laboratory work. The educational design of students’ interactions was based on using both the computer and the tutor as educational resources, but it was still seen by some as an experimental or practical solution.</td>
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<tr>
<td>• Responsibility for the quality of the learning experience thus rested with the member of academic staff, assisted by technology and design components that involved linking of web pages to databases containing course learning materials authored by academic staff. The academic staff member, with no specific web authoring skills, was thus able to directly create and manage the course content.</td>
<td>• Evaluation given a high priority and integrated into the development cycle of each product,</td>
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<td>• “That’s why evaluation is so important I think… to find out what the dumb things are as well as the good things, because you don’t want to make the same mistake too many times.” Senior Academic and Professional Support Manager, Lambda, Interviewee 10.</td>
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<td></td>
<td>• Comprehensive network of professional support units to develop the computer based and multimedia resources.</td>
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**e-learning Courses / Curriculum**

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<tr>
<th>Gamma</th>
<th>Lambda</th>
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<tr>
<td>• In 1998-99 only a few subjects available entirely online (mostly business or those primarily serving international students).</td>
<td>• All courses in the targeted schools with the new curriculum were required to have a significant component of computer based learning.</td>
</tr>
</tbody>
</table>
| • However, by 2005, new online initiative had set university-wide targets for all courses to have online component. | • The introduction of a new problem based curriculum included a strong educational argument supporting the use of multimedia based computer programs. For example, it was tied into the curriculum development &
the instructional design process, “building on the unique ability of interaction between the computer and the person to build concepts.” Head of Department, Lambda, Interviewee A4.

<table>
<thead>
<tr>
<th>Related systems: IT, Administrative</th>
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<tbody>
<tr>
<td><strong>Gamma</strong></td>
<td><strong>Lambda</strong></td>
</tr>
<tr>
<td>• Institutional IT and administrative systems, basically set up to support on-campus and distance-education programs.</td>
<td>• Minimal emphasis on online learning environments for administrative student support or services within the Faculty. These services continued to be managed within the existing structures of the institution.</td>
</tr>
<tr>
<td>• A hybrid of online and traditional manual administrative processes to support student online learning, for example with respect to enrolment, library services and submission and marking of student assignments.</td>
<td>• However, significant advances being made to access and develop online information literacy resources within the library environment, initiatives that were being done in close co-operation with the Faculty planning and development initiatives.</td>
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<tr>
<td>• New teaching &amp; learning related requirements of online learning generally, and GammaNet specifically, were only just surfacing.</td>
<td>• Faculty worked closely with Lambda IT services division with respect to networking infrastructure.</td>
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<tr>
<td>• Strong commitment by GammaNet developers to university IT standards and interoperability principles (email and library systems).</td>
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</table>
Table 5.10 Comparative table of scale, location and “radicalness”

<table>
<thead>
<tr>
<th>Scope or scale of Innovation</th>
<th>Gamma</th>
<th>Lambda</th>
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<tbody>
<tr>
<td>• The intended scope of the change was both broad and deep to align with the strategic intent. The current status was relatively narrow in so far as the numbers of both staff and students involved across the university, but the long term goal was for all staff, all programs, and all courses to be available to all students, regardless of whether they were on-campus or distance education, local, national or transnational students.</td>
<td></td>
<td>• Within the Lambda case the scope was relatively targeted initially – specific projects or programs, typically supported by grant monies. Particular schools targeted for more comprehensive use, because of curriculum change.</td>
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<td>• The depth or extent of the impact of e-learning was quite patchy. In some areas it had been integrated well throughout a program or school; in others it had hardly been used.</td>
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<td>• One school in particular had almost 100% use, but others had none. Within the wider university context there was a goal for comprehensive use of e-learning, but this was not a priority within the Faculty case.</td>
</tr>
<tr>
<td>Location within System/Organisation</td>
<td>Gamma</td>
<td>Lambda</td>
</tr>
<tr>
<td>• e-learning moving from pockets of peripheral energy, individual websites and online projects, towards the centre of the organisation, represented by central services, policy and executive oversight.</td>
<td></td>
<td>• e-learning recently assumed far more central position within the Faculty case and the wider institution, but not yet considered to be core business within all departments.</td>
</tr>
<tr>
<td>Radicalness</td>
<td>Gamma</td>
<td>Lambda</td>
</tr>
<tr>
<td>• e-Learning seen as evolutionary, rather than a radical or revolutionary pedagogical innovation, building on the tradition and principles of distance education,</td>
<td></td>
<td>e-Learning model can be summed up as both evolutionary and radical: evolutionary from the perspective of building on strength in IT applications, CBT and multimedia, but radical in the change of direction and anticipated impact that the use of computer based approaches, in conjunction with the new curriculum, would have on a traditional teaching and learning environment.</td>
</tr>
<tr>
<td>• “If in fact we are starting from anything, it is in drawing upon the experience of being a very successful distance education provider, which was essentially a student focused, resource based learning experience,” Centre Director, Gamma, Interviewee A3</td>
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<tr>
<td>• The development of GammaNet was both evolutionary and revolutionary: evolutionary in that it incorporated much learning from what others had done elsewhere, “We’ve been able to emulate … the best part of the innovative things very quickly.” Online Learning Manager, Gamma, Interviewee 4.</td>
<td></td>
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<td>• But it was also conceived as radical in breaking from existing university practice and norms with respect to the concept, scale &amp; processes.</td>
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Table 5.11 Gamma University – diverse conceptions of the e-learning environment

<table>
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<tr>
<th>Positive</th>
<th>Negative</th>
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<tr>
<td>• Select number of individual online sites were “cutting edge” developments (winning industry awards, e.g. ASCILITE, Internet &amp; WWW Usage Award &amp; nomination for Australian Excellence in Teaching). Academic Program Director (Interviewee 11) reported comment from Bill Gates, Microsoft CEO in site visitors' book, “I'd like to purchase this site for my private collection.”</td>
<td>• Unfettered number of websites unsustainable.</td>
</tr>
<tr>
<td>• Sophisticated individual sites incorporated high levels of interactivity, video, sound, etc. which added value and were “easily integrated into the learning experience.” Gamma, Bachors Program Information Handbook, 1998.</td>
<td>• Students and “mainstream” staff wanted easy to use system with consistent interface for all subjects. This not possible with multiple websites approach.</td>
</tr>
<tr>
<td>• GammaNet relatively low cost &amp; met strategic needs of university to provide flexible electronic course delivery into new markets.</td>
<td>• Criticism of the efficacy of GammaNet: “I think what universities are looking for... is some sort of magic bullet that they can fire that would then be applied across the board to all degrees, all courses. So I guess they are needing to look at an approach that is systematised throughout the university.” External Online provider, Gamma, Interviewee 7.</td>
</tr>
<tr>
<td>• GammaNet easy to use (e.g. web page development, templates &amp; wizards) facilitating rapid uptake by staff &amp; students with only basic IT skills (no html knowledge), “I think the first thing is that they should have a degree of success without having to have altered their skill profile, or felt that they’ve been pushed to the margins of their competence”. Executive Director, Gamma, Interviewee A3.</td>
<td>• GammaNet had basic functionality only, inhibiting and frustrating those already using highly interactive communication tools, “They haven’t actually come up with anything smart at the user end. It doesn’t impress me, what I’ve seen so far... hasn’t been at the leading edge.” Lecturer, Gamma, Interviewee 10.</td>
</tr>
<tr>
<td>• “Cutting edge” innovation perceived as an advantage by one group of stakeholders (innovators).</td>
<td>• “Cutting edge” innovation was seen as a problem or limitation by the other groups (e.g. managers).</td>
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</table>
Table 5.12 Comparison of change elements

<table>
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<tr>
<th>Gamma</th>
<th>Lambda</th>
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<tbody>
<tr>
<td>• Evolutionary or incremental, with pockets of innovative and radical activity, but these had occurred at largely the margins or edges of the system.</td>
<td>• Until 1998–99, relatively steady and incremental change but gaining momentum, “It’s been slow, but in the process we’ve learnt a lot along the way and now its beginning to filter through. The diffusion has taken place.” Senior Academic Manager, Lambda, Interviewee A4.</td>
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<tr>
<td>• Relatively slow in getting into online component of e-learning but the university had built on previous experience of others and had mapped out a much steeper adoption curve for the next few years. “One of the interesting things about being a little slower off the mark than some other institutions is that we have been able to learn from their experience and to learn from their mistakes.” Senior Academic Manager, Gamma, Interviewee 5.</td>
<td>• Success in obtaining internal grant monies and the start-up of new problem based curriculum was driving a much faster change rate from 1999 onwards.</td>
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<td>• Contradictory views about how rapidly change might occur in the future. The optimistic perspective which followed the introduction of new e-learning policies was that the pace of change was quickening, “In the space of a relatively short few months, (we) have been able to take the university rapidly forward.” Senior Academic Manager Gamma, Interviewee 5.</td>
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<td>• A more cautious position, however, was also sounded: “I want to stress… that we are not encouraging everyone to rush into this particular mode.” Executive Director, Gamma, Interviewee A3.</td>
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Direction of Change

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<tr>
<th>Gamma</th>
<th>Lambda</th>
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<tr>
<td>• Initially, the direction of change was from the bottom-up, where the innovative online developments had grown at periphery of the organisation: “A lot of independence has been given to academic units who want to engage in project activity… And most of the things [online resources] they’ve developed… have been treated as local projects.” Academic Program Manager, Gamma, Interviewee A2.</td>
<td>• Direction of the change was coming from the top-down [(from University Executive)] and the bottom-up [(individual innovators)], described as “an hierarchy of interest”. Senior Professional Support Manager, Lambda, Interviewee 10.</td>
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<tr>
<td>• At time of Stage 1 data collection there was a strong impetus for new e-learning initiative coming from the top: “The VC really pushes online delivery across the whole university… they are very pro anything online. Very – like I mean ‘why aren’t you?’, ‘your course has to be up and running by… it has to be’.” Academic Program Manager, Gamma, Interviewee 8.</td>
<td>• Considerable emphasis on put on individuals’ autonomy within departments to drive change: “I think the impetus comes from… within the department, which then comes back to the lecturers. They say ‘yes’, we’ve picked it up and then they come back with other ideas – so it drives both ways.” Senior Academic, Lambda, Interviewee 16.</td>
</tr>
<tr>
<td>• The strategy was that the direction of change was to be more multi-directional, top-down and bottom-up, and across the university.</td>
<td>• There were loci of change within specific departments (e.g. new units and projects groups), which radiated change outwards “Things are really going to happen at the departmental level. So I think units like this [LMU]… will only survive if they continue to relate directly to the needs of the departments, which is where the academic action is.” Senior Academic Manager, Lambda, Interviewee 10.</td>
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</table>
### Gamma

**Manner/Type of Change**

- The methods or strategies that the University was exploring to encourage uptake of the new online learning system were beginning to take shape. On the one hand, even though explicit institutional policies relating to online learning platforms or modes had yet to be implemented, there was considerable evidence of diffusion.

- Initially there was an informal diffusion model of innovation: "The pilot project [named] just evolved within the school and then migrated into existing structures of the School." (Academic Program Manager, Gamma, Interviewee 11), but the later emphasis on a universal model suggested there would be far less reliance on low key, ad hoc type change in the future.

- Targeted implementation of e-learning programs, would replace the informal modes but new approach did not include innovators: "We weren't actually concerned in the first instance with what the innovators were doing." Executive Director, Gamma, Interviewee A3.

- An institutional and systematic approach was the goal but it was felt that it was "historically difficult to do. You had a self-contained project and then OK… a small cohort gets the benefit from it. But the ability to draw them [technical innovators] into the mainstream is a crucial thing to do." Online Learning Manager, Gamma, Interviewee 4.

- Change strategies included reliance on policy and procedure, creating tensions and issues (e.g. with entrepreneurs). "I wouldn’t deny that this is not a problem for us, because we have some academics who have been highly innovative and developed top quality material on platforms which will not be supported by the University in the longer term, because they are too expensive or we can’t provide the range of resources to support every particular environment." Executive Director, Gamma, Interviewee A3.

### Lambda

- An uneven take-up rate of e-learning programs was evident. Some staff had been involved for 10 years or more, while others were just beginning in a minor way. External factors had introduced a “let’s wait see” feeling. “The University position is not quite settled yet… my impression is that its partly the shifting sands of the whole of the information technology area, operating systems change, computers change, people administering it and the structures that support the shift change almost on a yearly basis.” Senior Academic Manager, Lambda, Interviewee A4.

- There was a genuine attempt to manage the nature of the change process in a harmonious fashion, with an appreciation for the fact that the Faculty itself was an integrated system. “Everything that they did was related to everything else.” Professional Academic Support Manager, Lambda, Interviewee 7.

- Change was not mandated – rather it occurred in an autonomous & non-threatening way, “because we believe it (e-learning) has a useful role as a complementary method of education.” Dean, Lambda, Interviewee A1.

### Stakeholders

- Still strong involvement from innovators, but also very clear commitment from university executive.

- Increasing involvement of mainstream staff as more subject co-ordinators were expected to put their courses online; it was the intent that all academic staff would be involved. Executive Director, Gamma, Interviewee A3.

- LMU and other Faculty support units were seen as having instrumental role in e-learning initiative.

- Innovators, academic managers and leaders, professional IT and educational support staff were other key stakeholders.

- Involvement of mainstream staff at this stage minimal, but expected to have greater involvement in near future.
Table 5.13 Interventions (high to low organisational significance)

<table>
<thead>
<tr>
<th><strong>Gamma</strong></th>
<th><strong>Lambda</strong></th>
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<tbody>
<tr>
<td>New organisational units, e.g. GLC central teaching and learning support unit</td>
<td>New organisational units, e.g. LMU; new Committees, e.g. Faculty IT Advisory Committee</td>
</tr>
<tr>
<td>Comprehensive set of institutional policies and procedures</td>
<td>New strategic senior positions, Assistant Dean</td>
</tr>
<tr>
<td>Institutional e-learning adoption targets</td>
<td>Teaching and learning grant schemes very important strategically &amp; covered a wide gamut of institutional aims</td>
</tr>
<tr>
<td>Staff development – important intervention</td>
<td>IP policy</td>
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<tr>
<td>Teaching and learning grant scheme, low key but targeted to cross-institutional projects to support “the mainstream”.</td>
<td>Usage goals – low key</td>
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Table 5.14 Organisational non-alignments – Gamma and Lambda

<table>
<thead>
<tr>
<th>Non-aligning issue</th>
<th>Case Evidence</th>
<th>Barrier or Facilitator</th>
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</thead>
<tbody>
<tr>
<td>Promotion based on teaching</td>
<td>At Lambda the view persisted through all organisational levels that promotion based on teaching was both “high risk” and “labour intensive” (Interviewee 8), despite statements to contrary made by the University Executive. This had the effect of discouraging staff from becoming involved in e-learning, and set up tensions between teaching and research activities. “It’s definitely an issue for younger staff with respect to promotion and career paths. If they have the ability in research, they are going to be less inclined to go into this area.” Senior Academic, Lambda, Interviewee 11.</td>
<td>Barrier – this was seen as destructive force because the majority of academic staff felt they would disadvantage their career prospects by devoting time to IT and teaching innovation. Given this scenario the Faculty would continue to rely on enthusiasts and organisational interventions to sustain the innovative work.</td>
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</table>
| Management of IP and copyright issues and university goal to promote multi-media product | At Lambda, IP issues were problematic on several levels of activity: development, use and organisation of resources, collaboration and commercialisation. The view from the seasoned developers was that there was only a small window of opportunity to resolve outstanding issues before a negative impact set in. Strong emotional reactions from some of the University community, however, suggested that copyright and IP had reached a finely balanced position and consequently the university needed to evaluate the outcome of the new policies to determine if the issue, as a barrier to change, was going to increase or diminish. (Appendix 5, Table 5.5 provides further observations.) | Barrier – the following observation covered the range of issues having a negative impact: “My impression is that it [IP] has acted as a barrier, simply because of lack of decisions sometimes… Uncertainties as to who might own it and how some incentive might be derived from sharing in intellectual property. Copyright issues. Student versus staff development issues. That makes it a little bit difficult to be certain that if you develop a program and it’s internationally successful, are you doing it and never...
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<tr>
<th>Non-aligning issue</th>
<th>Case Evidence</th>
<th>Barrier or Facilitator</th>
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<tbody>
<tr>
<td><strong>Non-aligning issue</strong></td>
<td>evidence of the problematic nature of copyright/IP issues.</td>
<td>seeing anything for it?&quot; Senior Academic Manager, Lambda, Interviewee A4.</td>
</tr>
<tr>
<td><strong>E-learning - vision of innovators versus vision of University management</strong></td>
<td>While tensions between innovators and leadership existed at both institutions, at Gamma there was a sense that this issue was rapidly escalating rather than being contained. There was a serious discrepancy between the vision of the innovators and that of university senior strategists: “You’ve got two forces acting. You’ve got a top-down force from the institution and you’ve got a bottom-up swelling of the masses who want to do this thing and the two don’t seem to be well aligned. I suppose it tends to be the top-down approach that had put a lot of restrictions on the way things should be done, whereas maybe they should be providing lots of opportunities and that. Someone else said they should be providing the “sound” for the “sound kit”. I think really, despite them, this is the way we’ll end up teaching like this, and it will because the students and the teaching staff want to do it this way.” Academic Program Manager, Gamma, Interviewee 11.</td>
<td><strong>Barrier</strong> – it appeared that this issue would require resolution before the innovation could be comfortably bedded down across the institution, as feelings were running high between the two groups.</td>
</tr>
<tr>
<td><strong>Equity policy non-alignment and online system capabilities</strong></td>
<td>High-order strategic and policy incongruencies manifested at Gamma as tensions between the University’s equity agenda and the direction, functionality and capacity of online system: “The biggest philosophical issue that I think the university is going to have to address as it goes down the route of online delivery,…. is how does it support students who don’t have the same IT infrastructure. And particularly when we go overseas. How does our equity mission apply outside Australia? Do we have a commitment to increasing the equity of access to higher education which we can see very clearly in Australia, but how do we frame that… should we be operating in Hong Kong, or should we be operating in the People’s Republic of China? Should we be operating in India where we won’t get any money back? And should the Australian government be resourcing that? Executive Administrative Manager, Gamma, Interviewee A2.</td>
<td>Perceived barrier, but, in reality, only temporary. The longer term opportunity was that the university had mechanisms to ensure that online technologies could facilitate access and address equity issues for many disadvantaged or disabled users.</td>
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<td><strong>Need for supportive collaborative environment versus lack of leadership, institutional policy and process</strong></td>
<td>Gamma and Lambda lacked mechanisms to support collaboration. Despite the fact that there was great potential and willingness by many to exchange new ideas and to share development costs, the competitive environment was seen to work against this: “There is seen to be some friction between the competition between universities or departments on the one hand, and the need to make collaborative research and to make sure</td>
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<tr>
<td>Non-aligning issue</td>
<td>Case Evidence</td>
<td>Barrier or Facilitator</td>
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<td>that information is being disseminated, and that we’re not re-inventing the wheel, and we’re not producing 3,000 modules on the same content area.”</td>
<td>Senior Professional Support, Lambda, Interviewee 9.</td>
<td><strong>Barrier</strong> to engaging many of the mainstream staff at the outset, but in longer term, efficiency processes had the potential to raise overall standards and introduce models for sustaining the e-learning innovation, thus providing consistency of quality to learners. Thus introduction of business and economic principles acted as a <strong>facilitator</strong> to the embedding process.</td>
</tr>
<tr>
<td>Economic and efficiency models of e-learning versus pedagogical and quality models</td>
<td>The efficiency and scalability principles underpinning the e-learning initiative at <strong>Gamma</strong> did not align with the views of some senior officers who argued that this position “needs to be challenged purely on the basis of the technological capability – at one level online will achieve economies, but they are not necessarily economies that achieve the outcomes that were originally seen.” (Executive Administrative Manager, Gamma, Interviewee A2). Tension relating to an economic rationale for e-learning was also apparent at <strong>Lambda</strong>, where the stated goal, to accrue maximum return on the investments from the development of multimedia product, was undermined by the lack of funds available to maintain these products (therefore they lost their currency and usefulness).</td>
<td></td>
</tr>
<tr>
<td>Anomalies between capabilities of online technologies and the institutional restrictions placed on their use</td>
<td>At <strong>Gamma</strong>, despite the fact that the majority of staff were familiar with distance education principles, there was not an easy fit between the promises and expectations of what online technologies could offer for teaching at a distance – immediacy, flexibility and individual control – and the university-wide approach of uniformity and a centralised institutional online system. This highlighted an underlying disparity between the nature of the e-learning innovation and the culture and expectations of teaching staff. Additional issues such as plagiarism and online student assessment had emerged which were bringing to the fore the need for refinement or creation of new institutional policies and procedures.</td>
<td><strong>Barrier</strong> for some, underpinning the frustration expressed by innovators. In the long term, the tension could act as a facilitator, leading to improvements and enhancements in the system for all, as managers responded to demands for increased functionality.</td>
</tr>
<tr>
<td>Organisational academic and entrepreneurial culture versus management strategy and process</td>
<td>There were more subtle areas of non-alignment at <strong>Gamma</strong>, between cultures of academic autonomy, teaching excellence and entrepreneurship versus executive rationale for effectiveness, accountability and sustainable solutions. One of the underlying issues was about control, e.g. who might have the final decision with respect to which online platform was used in a particular academic program. The innovators clearly felt a high level of ownership of their existing online systems, a belief in academic autonomy (supported by the financial and educational success accruing from their programs), and a valuing of a rediscovered sense of camaraderie or collegiality forming within these entrepreneurial projects.</td>
<td><strong>Barrier</strong> – this is a deep seated issue which requires ongoing negotiation and discussion, and at times can be resolved only through some staff leaving the organisation or new leadership.</td>
</tr>
</tbody>
</table>
### Table 5.15 Barriers and facilitators to change – Gamma and Lambda Universities

<table>
<thead>
<tr>
<th>Issue</th>
<th>Gamma</th>
<th>Lambda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff rewards and recognition</td>
<td><strong>Barrier</strong> Concern about salary and recognition for being involved with teaching innovation: “There’s been a lot of controversy about the way academics are paid.” Academic Program Manager, Gamma, Interviewee 8.</td>
<td><strong>Barrier</strong> Belief pervasive that promotion based on teaching was both “high risk” and “labour intensive”. Interviewee 8. “I think a much greater inhibition is recognition of the activity. I don’t think its got to do with money.” Senior Academic, Lambda, Interviewee 14.</td>
</tr>
<tr>
<td>Time for innovative teaching</td>
<td><strong>Barrier</strong> Staff lacked time for this activity and had to add on to other duties.</td>
<td><strong>Barrier</strong> – with major exception that staff with grant monies had time in lieu.</td>
</tr>
<tr>
<td>Grant schemes</td>
<td>Too small to really impact on uptake.</td>
<td><strong>Facilitator</strong> - very important.</td>
</tr>
<tr>
<td>Student support</td>
<td><strong>Barrier</strong> – inadequate for needs of diverse student body. For example, needs of offshore students prompted the comment: “I don’t think we have actually, to be honest. I don’t think that they are issues that we have dealt with seriously. We probably should have.” Senior Academic Manager, Gamma, Interviewee 5.</td>
<td>Not really problematic as lot of staff support in class.</td>
</tr>
<tr>
<td>IP and copyright</td>
<td>Not problematic at institutional level.</td>
<td><strong>Barrier</strong> at institutional level.</td>
</tr>
</tbody>
</table>

### Table 5.16 Structural changes – Epsilon University

<table>
<thead>
<tr>
<th>Epsilon</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-divisional committees</td>
<td>A web management committee</td>
</tr>
<tr>
<td>A media lab</td>
<td>An executive (comprising the heads of the library, the IT services and the teaching and learning group and chaired by the PVC) to provide leadership and policy direction with respect. To assist the pilot and innovation projects, which now fell outside the normal operating systems, but were seen by the university as likely to lead to towards mainstream outcomes. The unit might mitigate against some of the organisational rivalries/tensions between two key divisions, especially in relation to the boundary issues between educational design and technology. “It’s a fuzzy border which has caused a lot of the dilemmas.” Interviewee 7.</td>
</tr>
<tr>
<td>Key e-learning related positions</td>
<td>Five senior academic advisory/liaison positions were created for five years, with the responsibility for assessing academic needs and for providing mentorship and advice regarding online teaching and learning. Online support officers, located in the schools, to work with academic staff at the coalface, had an advisory and support role with respect to use of IT and educational design, as well as some responsibility for bridging the services and the culture between the two professional support organisational groupings.</td>
</tr>
</tbody>
</table>
### Table 5.17 e-learning innovation dimensions – Epsilon University

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Detail</th>
<th>Comments and Supporting Quotations</th>
</tr>
</thead>
</table>
| Technical online learning system | • Minimum basic standards for all subjects included: subject outlines (links to other online resources and to Internet sites), listservs, discussion groups or web forums.  
• System did **not** support integrated provision of subject content (lecture notes, readings, diagrams etc).  
• Technology limitations related to subject: e.g. could not incorporate maths formulas, scientific equations and statistics. | Staff wanted to be able to put up lecture notes for external students and for revision by on-campus students (Interviewee 12). They got around technical limitations by using attachments in the listservs or links to School home pages, inviting students to download the materials. |
| Administrative and related student services | • System incorporated related administrative and support services for students: email, library and bookshop services, student administrative services such as enrolment information, transcripts & examination results, and help services. | These services regarded as integral to the learning system.  
Additional functionalities being piloted included electronic assignment submission & online assessment tools. |
| Future developments | • A current development was enhancement of forum software.  
• Future priority was expanded use of databases and R & D into reusable learning objects (see discussion below). | “Online databases are important in a small regionally dispersed university with limited resources. If there is any resource out there which I can look up, if I find it useful I’ll apply it.” Lecturer, Epsilon, Interviewee 6. |
| Pedagogy and methodology | • Limitations of online environment to support full range of pedagogy – e.g. some staff wanted more of the human element in the technology.  
• Methodologies for preparation of course materials remained closely aligned to the distance education production model. Quality assurance, for example, provided through centralised process checks.  
• Many staff valued the collaborative potential of the technologies, using it to harness students’ energies around a particular project & to help students with management of their own learning by keeping track of assignments, course outline updates, etc.  
• Staff seeking maximum flexibility from the online system. Customisable approaches enabled according to needs of different student cohorts. | Despite university emphasis on communication tools some staff wanted to emulate more closely human interaction, “to have a touch that is a human touch... that sort of touch takes more resources, but I just think there is a place for preserving the human in this technology.” Lecturer, Epsilon, Interviewee 5.  
“The biggest, the single most important advantage of the technology that this approach has brought to us is that we can now sensibly tailor courses to cohorts of students.” Senior IT Manager, Epsilon, Interviewee A2. |
Table 5.18 Barriers and facilitators – Epsilon University

<table>
<thead>
<tr>
<th>Issue</th>
<th>Detail</th>
<th>Comments and Supporting Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time for innovative teaching and development</td>
<td><strong>Barrier</strong> Departmental estimate was 20% of teaching time for online supported activities, but this was not recognised formally in teaching load.</td>
<td>“I think the university is underestimating how much time lecturers will have to devote to online support for students – especially in subjects where there are large numbers of students 300, 400 or more.” Lecturer, Epsilon, Interviewee 10. “I think it’s (online) a wonderful innovation for students and a wonderful resource for teaching excellence. However, I think the time required to do a proper job needs to be acknowledged in teaching loads. If academics are going to take it on seriously, then I think it has to be factored into their workloads, not just put on top as an additional extra. And I think that’s what a lot of the reluctance is about. And I think that until that’s sorted out, there’s going to be a huge resistance.” Senior Lecturer, Epsilon University, Interviewee12.</td>
</tr>
<tr>
<td>Lack of funds and resources</td>
<td><strong>Barrier</strong> Insufficient to realise university e-learning goals</td>
<td>“So having the resources to match the rhetoric, rather than all this glowing ‘we’re doing this or we’ve doing that!’ then on the ground it’s a very different story. Because I think that only sets up a dynamic that’s to do with frustration rather than progression.” Lecturer, Epsilon University, Interviewee 5.</td>
</tr>
<tr>
<td>Distance education policies limiting potential of e-learning</td>
<td>Institutional policy highlighted this tension, e.g. the ruling about standardisation of the online environment which meant that all students must have access to the same functionality and services. Thus, if certain features (such as multimedia or streamed content) could not be made available to all, they would not be available to any students through the university online environment. Such policies had the effect of marginalising many of the early adopters and enthusiasts, which was acknowledged by senior managers. “I know a number of staff want to do things at the very highest level and they are being limited to a certain a degree by what we can offer and the directions of our policies – yes there is a bit of frustration.” Professional Support Manager, Epsilon, Interviewee A2.</td>
<td></td>
</tr>
<tr>
<td>Staff training</td>
<td><strong>Facilitator</strong> A lot of effort put into staff support at all levels: IT training, in-house instructional design, higher order mentoring &amp; discipline-specific advice.</td>
<td>Nevertheless, the view persisted that there is insufficient training, “I think there’s a problem with how to get the lecturers up to speed with what’s happening… how we can train our lecturers to use our online supported subjects.” Lecturer, Epsilon University, Interviewee 8.</td>
</tr>
</tbody>
</table>
## Table 5.19 Dimensions of the e-learning innovation – Delta University

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Detail</th>
<th>Comments and Supporting Quotations</th>
</tr>
</thead>
</table>
| Technology                         | • Diversified concept of e-learning. Primarily focused on stand-alone, computer based multimedia product or individual websites to support course access.  
  • One postgraduate program using a commercially available online collaboration platform, Lotus Notes. | • Teaching and learning plan had broad goals to implement curriculum review & introduce more flexible teaching methods by specific target dates (Strategy 1.3, Five Year Strategic Plan for Faculty, Delta, 1999-2003). |
| Pedagogy and methodology           | • Focus on on-campus delivery. Off-campus online courses low priority.  
  • Emphasis on flexibility of study options  
  • Web-based activities self-contained within the Faculty case. Websites provided and disseminated information and supporting materials such as unit outlines, rather than serving as communication spaces.  
  • Computer based products developed as templates, with the intention that they would be used by different subjects across the Faculty, the wider University and beyond. |                                                                                                   |
| Administrative, IT and related student services | • Mid-term goal was to move towards an integrated web learning environment for undergraduate courses, which included library resources (Strategy 1.3, Five Year Strategic Plan for Faculty, Delta, 1999-2003)  
  • Emphasis on development of the library e-resources, especially databases.  
  • Upgrading IT infrastructure, but concern over the inadequacy of student computer laboratories. | • This objective tied to getting an institutional central grant for strategic initiatives.  
  • Focus on databases similar to Epsilon. |
| Future developments                | • Widespread use of Lotus Notes across the Faculty (Target 1.3d, Five Year Strategic Plan for Faculty, Delta University, 1999-2003).            |                                                                                                   |
Table 5. 20 Barriers and facilitators – Delta University

<table>
<thead>
<tr>
<th>Issue</th>
<th>Detail</th>
<th>Comments and Supporting Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copyright and IP</td>
<td>Barrier</td>
<td>Strongly held views about these issues, but identified more as a potential barrier</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Copyright is certainly a future barrier… but a lot of people don’t see use of copyrighted material as a barrier – they just go ahead and do it.” Senior Lecturer, Delta, Interviewee 14.</td>
</tr>
<tr>
<td>Funds and resources</td>
<td>Barrier</td>
<td>User pays system for services acted as a barrier to adoption.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of funds to maintain &amp; update existing computer based programs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“It’s like one hand paying the other hand and it just becomes a bureaucratic sort of nightmare… it’s like paying your mother to cook breakfast for you.” Lecturer, Delta, Interviewee 17.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lambda raised similar concern about maintenance funds.</td>
</tr>
<tr>
<td>Teaching and learning grant schemes</td>
<td>Facilitator &amp; Barrier</td>
<td>The grant scheme had supported a lot of innovative activity. But the scheme had become divisive: into camps of winners and losers, engendering feelings of “exclusion” in the losers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“If you get a grant you win a prize, put it in your CV, move on and everybody else goes away and gets on with what they were doing. There is no sense, and I have not even had a sense from the teams who have been given time off, that they are trying to involve – to move it through to anyone else.” Senior Lecturer, Delta, Interviewee 12.</td>
</tr>
<tr>
<td>Staff time</td>
<td>Barrier</td>
<td>Lack of staff time an impediment to staff engagement in e-learning projects.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exception, as with all the other cases, was when grant monies included time-off arrangements.</td>
</tr>
<tr>
<td>Staff training</td>
<td>Barrier</td>
<td>Training seen as vital within the Faculty, but the institutional programs were thought to miss the mark.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The degree of change was recognised by management, so a university objective was to provide better support for all staff by introducing change management training for senior managers &amp; supervisors (Strategy 4.3, Five Year Strategic Plan for Faculty, Delta, 1999-2003).</td>
</tr>
</tbody>
</table>
Appendix 3

Table 6.1 Structural changes – Lambda University

<table>
<thead>
<tr>
<th>Structural Element</th>
<th>Unit or Position</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty professional support units</td>
<td>LMU – more staff: five academic staff (four full time) and six general staff</td>
<td>Services had been extended to cover additional departments within the Faculty</td>
</tr>
<tr>
<td></td>
<td>Online Learning Unit</td>
<td>New support unit</td>
</tr>
<tr>
<td>New or changed positions</td>
<td>Head of Faculty Online Learning Unit (FOL)</td>
<td>New</td>
</tr>
<tr>
<td></td>
<td>Faculty Development Manager</td>
<td>New; e-learning related</td>
</tr>
<tr>
<td></td>
<td>Education IT Co-ordinator position</td>
<td>New integrating role to liaise between the various central Faculty professional support groups (e.g. the IT units, education unit and the clinical schools)</td>
</tr>
<tr>
<td></td>
<td>Assistant Dean, responsible for IT, online and multimedia development</td>
<td>Expansion of role, centrally funded by Faculty, moved from part time to full time</td>
</tr>
<tr>
<td>Funding structures</td>
<td>Faculty Budgets Committee oversaw areas of e-learning funding</td>
<td>Funding responsibility shift from central University to Faculty, especially for technological infrastructure, support services and specialist staff</td>
</tr>
</tbody>
</table>
Table 6.2 Lambda, Nature of Innovation – Comparative Technology Overview

<table>
<thead>
<tr>
<th>Stage 1 1998-99</th>
<th>Stage 2 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>• e-learning utilised a range of digital technologies and media.</td>
<td>• Continued use diversified technologies and rich media (evolutionary pattern) to progress computer-based and online materials.</td>
</tr>
<tr>
<td>• Emphasis on computer based applications using rich media, including graphics, images, audio and video.</td>
<td>• On-campus IT environments (student laboratories) still high priority but there was an increased capacity to deliver beyond the Faculty to off-campus sites, using the Internet and complementary communications infrastructure.</td>
</tr>
<tr>
<td>• Focus on good campus-based IT environments.</td>
<td>• A high quality videoconferencing system had been installed in 20 clinical sites.</td>
</tr>
<tr>
<td>• Educational technology environment comprised of hybrid technologies: Faculty intranet, departmental servers, student laboratories (networked or stand-alone computers utilising CD ROM, commercial off-the-shelf LMS (Top Class), presentation technologies.</td>
<td>• Greater emphasis on online technologies. TopClass still the Faculty supported LMS, but departments also used other university platforms. A decision on whether the Faculty would adopt the new institutional LMS platform was imminent.</td>
</tr>
<tr>
<td>• Off-campus online delivery very limited.</td>
<td>• Bandwidth limitations still presented problems with respect to use of rich resources, such as video, synchronous communications, computer animations or interactives.</td>
</tr>
<tr>
<td>• Exploratory development of interactive web objects as a way of incorporating more sophisticated elements, such as animations, into learning resources.</td>
<td>• Investigation included (but not limited to), authentic 3D immersive environments, video over IP conferencing network to nine different sites, with a fairly high level of functional capability such as whiteboard sharing features.</td>
</tr>
<tr>
<td></td>
<td>• Development and re-use of learning objects.</td>
</tr>
</tbody>
</table>
### Table 6.3 Gamma – Structure

<table>
<thead>
<tr>
<th>Level of Governance</th>
<th>Group/Unit/Service</th>
<th>Function Example</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive</td>
<td>University Strategic Planning Group</td>
<td>Assessed all developments and directions for online learning – teaching and learning, marketing, administration, etc.</td>
<td>Institution wide</td>
</tr>
<tr>
<td>Executive</td>
<td>Policy and program review committee</td>
<td>Jointly oversee development of an institutional quality framework for teaching and learning, which included e-learning</td>
<td>Institution wide</td>
</tr>
<tr>
<td>Executive</td>
<td>Teaching and learning committee</td>
<td></td>
<td>Institution wide</td>
</tr>
<tr>
<td>Senior</td>
<td>Gamma Learning Centre (GLC)</td>
<td>Central academic service &amp; support services</td>
<td>Institution wide 85 staff (22 academic and 63 general staff)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Key role in the development and support of e-learning (staff &amp; students)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Growth in academic, scholarship, research, evaluation functions</td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td>Student Academic Services</td>
<td></td>
<td>Institution wide</td>
</tr>
<tr>
<td>Senior</td>
<td>Library</td>
<td></td>
<td>Institution wide</td>
</tr>
<tr>
<td>Senior</td>
<td>Information Strategy and Technology Services</td>
<td>IT services</td>
<td>Institution wide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased emphasis from 2002 with establishment of a $1.5 million per year fund for IT infrastructure.</td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td>International Centre (Gamma International)</td>
<td>International services</td>
<td>Institution wide</td>
</tr>
<tr>
<td>Middle</td>
<td>Gamma Assist</td>
<td>Innovative physical and virtual services and resources for staff &amp; students designed to promote control of, &amp; responsibility for, individuals’ own learning, Assistance included workshops, online resources &amp; advice</td>
<td>Institution wide Located on every campus</td>
</tr>
<tr>
<td>Middle</td>
<td>Gamma Central</td>
<td>Student IT and administrative service and support (24 x 7 x 52). Online access to all administrative services, including the student information management system, powered by Peoplesoft</td>
<td>Institution wide Located on every campus</td>
</tr>
</tbody>
</table>
Table 6.4 Structural Changes – Gamma University

<table>
<thead>
<tr>
<th>e-Learning Positions or Scheme</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online Learning Manager</td>
<td>Role was now focused on strategy, research and liaison across the university rather than operational issues.</td>
</tr>
<tr>
<td>Support Officers</td>
<td>Located in each Division, with a strategic liaison role with the Dean and senior academics.</td>
</tr>
<tr>
<td>On-Line Advisors</td>
<td>New role located on each of the campuses to provide what was referred to as “at-elbow help”, where as much as possible they provided one-on-one technical and instructional design assistance. These positions created from positions formerly responsible for the production of learning resources, editors, instructional designers and web builders.</td>
</tr>
<tr>
<td>Supported Teachers Scheme</td>
<td>The initiative emulated the University’s researchers scheme, awarding points and funding for doing things online and for peer reviewing others online work. Significantly, if an academic member of staff was awarded “supported teacher” status, this would then count towards that person’s academic portfolio for promotional purposes.</td>
</tr>
</tbody>
</table>

Table 6.5 Gamma Nature of Innovation – Technology

<table>
<thead>
<tr>
<th>Stage 1 1998-99</th>
<th>Stage 2 2002-03</th>
</tr>
</thead>
<tbody>
<tr>
<td>• e-learning focus on online technologies. Two parallel online technologies, “independent” course websites and recently released generic online platform (GammaNet).</td>
<td>• GammaNet now universal institutional LMS, providing the online learning environment for over 1,200 courses as well as powering course, program and staff home pages.</td>
</tr>
<tr>
<td>• GammaNet – internally developed proprietary course management platform involving non-committed technology.</td>
<td>• Online environment now provided a broader range of student services functionality: access to courses, learning resources, collaborative environments, electronic student services and information, e.g. electronic mailbox and calendar, internet access quota to view 5,000 online pages, and a printing quota equivalent to 1500 pages.</td>
</tr>
<tr>
<td>• Generic low cost system, basic functionality initially, reliance on templates and wizards as a means to enable staff to import and manage subject content.</td>
<td>• IT environment, including LMS, now relatively stable. “We’ve got the plumbing pretty well right and now we’re able to build things with that plumbing and so the features are coming on top of that.” Interviewee 4.</td>
</tr>
<tr>
<td>• Easily scalable &amp; modular structure to allow the addition of new components.</td>
<td>• A limited number, but significant new technologies added into GammaNet.</td>
</tr>
<tr>
<td>• Exception to basic functionality was innovative IT feature linking web pages to data bases providing staff with the capacity for direct input, and allowing future automatic technology upgrade paths (e.g. for communication tools).</td>
<td>• The newest and arguably most cutting edge development was integration of interaction and communication tools – in particular CENTRA.</td>
</tr>
<tr>
<td>• IT infrastructure in multi-campus environment under resourced.</td>
<td>• Other significant additions, audio/video streaming which built on some existing institutional capabilities – e.g. an audio and video studio facility. Content developed for streaming was described as “next generation, virtual classroom type of thing” (Online Learning Manager, Gamma, Interviewee 4), with more emphasis on interactions than on content.</td>
</tr>
<tr>
<td>• Aim to minimise dependency on print technologies which had dominated distance education model and to avoid use of technologies such as multimedia, videoconferencing, webcasting.</td>
<td></td>
</tr>
<tr>
<td>Innovation “Type”</td>
<td>Product-centric Domain</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td><strong>Innovation Characteristics</strong></td>
<td>Phase 1</td>
</tr>
<tr>
<td>Small in size &amp; scale.</td>
<td>If innovation has survived early extinction threat &amp; grown in scope, the extent of growth depends on whether radical or evolutionary process.</td>
</tr>
<tr>
<td>Confined within its own system boundary, developing in relative isolation within the organisation. Minimal interactions with outside elements, including other innovations which are likely to occupy the same R &amp; D space.</td>
<td>Relationships with other innovations &amp; organisational elements &amp; systems still developing - may be a combination of tight and loose coupling.</td>
</tr>
<tr>
<td>Nature of innovation often grounded in (or influenced by) the professional discipline arena of the innovation owners.</td>
<td>Interdependencies very important. May have progressed to formal collaboration &amp; combined with one or more other innovations.</td>
</tr>
<tr>
<td>Innovation very new to the organisation – likely to have been imported (in some form) from outside organisation, but may also leverage off some existing organisational knowledge, skills, competencies.</td>
<td>Some self-organising processes apparent in these interactions.</td>
</tr>
<tr>
<td>Lack of clarity or shared understanding about the innovation across the organisation – open to numerous interpretations</td>
<td>Moving towards “critical mass” adoption.</td>
</tr>
<tr>
<td>Driven primarily by an individual/small group; high</td>
<td></td>
</tr>
<tr>
<td><strong>Innovation “Type”</strong></td>
<td><strong>Product-centric Domain</strong></td>
</tr>
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<td>----------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td><strong>Phase 1</strong></td>
<td><strong>Phase 2</strong></td>
</tr>
<tr>
<td>degree of personal ownership.</td>
<td>ALTERNATIVE SCENARIO Innovation cannot remain static - as a mainstream “product” it could be successfully challenged and replaced by new competing innovations.</td>
</tr>
<tr>
<td>“Quality” usually individually determined &amp; assessed.</td>
<td>Innovation dies.</td>
</tr>
<tr>
<td>Unravelled by enthusiasm, commitment and creativity of the “owners”. Owners may also demonstrate ingenious solutions outside organisational norms, to keep innovation alive.</td>
<td>ALTERNATIVE SCENARIO Innovation does not progress and is abandoned.</td>
</tr>
<tr>
<td>Organisational location/Position</td>
<td>Merging away from the periphery towards the centre of the organisation, but still operating in outer circle of organisation.</td>
</tr>
<tr>
<td>Located at the periphery or boundary of the organisation.</td>
<td></td>
</tr>
<tr>
<td>Organisational Responses</td>
<td>Laissez-faire (few organisational interventions). Few organisational policies &amp; processes in place to oversee innovation, but those which do exist may hinder rather than facilitate. Some interventions e.g. policy, procedures, funding schemes.</td>
</tr>
<tr>
<td>Organisational response defined by the nature of the organisation – its organisational configuration.</td>
<td>Structural elements more important – new structures needed (e.g. units, positions).</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation “Type”</td>
<td><strong>Product-centric Domain</strong></td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td></td>
<td><strong>Phase 1</strong></td>
</tr>
<tr>
<td></td>
<td>its development</td>
</tr>
<tr>
<td></td>
<td>Innovation may have an organisational champion, but majority sceptical, fearful, threatened.</td>
</tr>
<tr>
<td></td>
<td><strong>ALTERNATIVELY</strong> innovation’s death passes almost unnoticed. Little attempt to capture organisational knowledge about initiative.</td>
</tr>
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