Factors influencing academics’ development of interactive multimodal technology-mediated distance higher education courses

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ABSTRACT

Advances in technology and the continued emergence of the Web as a major source of global information have encouraged tertiary educators to take advantage of this growing array of resources and move beyond traditional face-to-face and distance education correspondence modes toward a rich technology-mediated learning environment. Moreover, ready access to multimedia at the desk-top has provided an opportunity for educators to develop flexible, engaging and interactive learning resources, incorporating multimedia and hypermedia. This study investigates pedagogical, individual and institutional factors influencing the adoption and integration of educational technology by academics at a regional Australian university, for the purpose of developing interactive multimodal technology-mediated distance education courses. These courses include a range of multimodal learning objects and multiple representations of content in order to cater for different learning styles and modal preferences. The findings of this study revealed that a range of pedagogical, individual and institutional factors influence academics’ development of interactive multimodal technology-mediated distance education courses. Implications for distance education providers and individual academics arising from these factors and subsequent recommendations are presented.
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<th>Description</th>
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<tr>
<td>ABC</td>
<td>activity based costing</td>
</tr>
<tr>
<td>ARCS</td>
<td>attention – relevance - confidence - satisfaction</td>
</tr>
<tr>
<td>DeC</td>
<td>Distance and e-Learning Centre</td>
</tr>
<tr>
<td>EPIC</td>
<td>editor for programmable integrated circuit</td>
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<tr>
<td>ESL</td>
<td>English second language</td>
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<tr>
<td>GOOD</td>
<td>generic offline/online delivery</td>
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<tr>
<td>ICE</td>
<td>integrated content environment</td>
</tr>
<tr>
<td>LFII</td>
<td>Learning Futures Innovation Institute</td>
</tr>
<tr>
<td>LTEC</td>
<td>Learning and Teaching Enhancement Committee</td>
</tr>
<tr>
<td>LTSU</td>
<td>Learning and Teaching Support Unit</td>
</tr>
<tr>
<td>ICT</td>
<td>information and communication technology</td>
</tr>
<tr>
<td>VARK</td>
<td>visual, aural, read/write and kinaesthetic</td>
</tr>
<tr>
<td>RIPPLES</td>
<td>resources, infrastructure, people, policies, learning, evaluation and support</td>
</tr>
<tr>
<td>USQ</td>
<td>University of Southern Queensland</td>
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STATEMENT OF ORIGINAL AUTHORSHIP

The work contained in this thesis has not been previously submitted for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously submitted or written by another person except where due reference is made. The referencing and citing system used in this thesis follows the American Psychological Association (APA) style. I undertake to retain the original interview transcripts on which this thesis is based for a minimum of five years, in accordance with University ethics guidelines.

Signed: ........................................... Dated: ............................
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Chapter One

INTRODUCTION

The purpose of this study was to investigate pedagogical, individual and institutional factors that influence academics’ development of interactive multimodal technology-mediated distance education courses. The study focuses on both driving (motivators and enablers) and restraining (inhibitors and barriers) forces (Lewin, 1951). In this first chapter, key terms are defined and an overview of the research is provided including a background and context to the research, a discussion of its significance, the research question and issues, the research methods and the structure of the dissertation.

This study draws upon the interrelated fields of educational technology, multimodal learning and distance education at the tertiary level. For the purpose of this study, educational technology is defined as “recent developments in computer-based technologies used to facilitate teaching” (Ebersole & Vorndam, 2003, p. 4). The term “interactive multimodal technology-mediated course” adopted for the purpose of this study, refers to a course that involves the use of multimedia and information and communication technology (ICT) to develop engaging and interactive course resources and uses multiple presentation modes to represent the content knowledge, and appeal to different learning styles and modal preferences (Birch & Sankey, 2008; Chen & Fu, 2003; Moreno & Mayer, 2007; Sankey & St Hill, 2005). Interactive learning environments “enable multidirectional communication” and “what happens, depends on the actions of the learner” (Moreno & Mayer, 2007, p. 310). The term “technology-mediated” is used rather than “technology-based” to indicate that the technology supports the pedagogy, and not vice versa (D’Andrea & Gosling, 2005). Distance education refers to “the acquisition of knowledge and skills through mediated information and instruction, encompassing all technologies and other forms of learning at a distance” (United States Distance Learning Association, 1998, p. 1).
1.1 Background and context of the study

Advances in technology and the continued emergence of the Web as a major source of global information have encouraged tertiary educators to take advantage of this growing array of resources and move beyond traditional face-to-face and distance education correspondence modes toward a rich technology-mediated learning environment (Bates, 2006; O'Donoghue, Singh & Dorward, 2001). Moreover, ready access to multimedia at the desk-top has provided an opportunity for educators to develop flexible, engaging and interactive learning resources incorporating multimedia and hypermedia (Gill, 2004; Moreno & Mayer, 2007; Sheard, Postema & Markham, 2001). In the tertiary sector, advances in technology have had a major impact upon the way that distance education courses are now designed and delivered.

1.1.1 The impact of technology on distance education

Distance education courses have been traditionally delivered via print-based packages (the correspondence model) (Taylor, 2004). In recent years, there has been a shift away from print-based packages with a number of distance education courses now being delivered fully online or via other electronic means including CD ROM (McDonald & Mayes, 2005). Digital technologies have facilitated the development of interactive multimodal technology-mediated distance education courses. Interactive multimodal technology-mediated distance education courses involve the use of multimedia and information and communication technology (ICT) to develop engaging and interactive course resources and use multiple presentation modes to represent the content knowledge and appeal to different learning styles and modal preferences (Chen & Fu, 2003; Moreno & Mayer, 2007; Sankey & St Hill, 2005).

Material presented in multiple presentation modes may lead learners to perceive that it is easier to learn and thus may improve attention rates, leading to improved learning performance (Chen & Fu, 2003; Moreno & Mayer, 2007). Limited access to the Web and slow download for some students inhibits fully online delivery of interactive multimodal technology-mediated courses. Hence, CD or DVD format (supplemented with an online course homepage) may be a more viable,
equitable and accessible option. Moreover, a CD or DVD-based course provides students with a tangible learning resource that can be retained and accessed once the course has been completed.

1.1.2 The institutional context for the study

This study specifically focuses on the factors influencing academics’ development of interactive multimodal technology-mediated distance education courses at USQ. USQ in Australia is a major provider of distance education courses. Enrolments exceed 26,000 students each year from over 120 nationalities and approximately 20 percent of enrolments are international students (USQ, 2007a). In 2007, USQ offered more than 300 accredited programs (comprising about 1000 courses) across five faculties. A typical undergraduate degree program at USQ comprises 24 courses and, as a rule, each course involves 15 weeks of study.

USQ has established an international reputation for excellence in the use of educational technology and the delivery of online education. In 2005, USQ was accredited as a quality distance education learning institution by the Distance Education Training Council (DETC) of America. In 2004, the university received the Commonwealth of Learning Award of Excellence for Institutional Achievement. The University was a joint winner of the Good University Guide’s “University of the Year Award” in 2001 in recognition of its excellence as an e-learning university.

Students studying with the USQ can choose to study in one of three modes: on-campus, external or web (online). Approximately two-thirds of the university’s students study in distance education mode, either as an external or web student (USQ, 2007a). External students receive hard copies of study materials either in print or CD format and each course has an online homepage. Web students access all of their course materials and resources online. Traditionally, distance education courses at USQ have been delivered via static, print-based packages, typically comprising an introductory book, a study guide and a book of selected readings. This print-based package may be supplemented by audio or video cassettes, an optional one-week residential school and telephone tutorials. Some courses have involved more advanced technology such as video-conferencing and broadcasted lectures. Since
2000, each USQ course has been supplemented by a course homepage, known as USQStudyDesk, where teaching team members can post announcements, upload course content, facilitate discussion forums, provide hyperlinks to external learning resources and develop online assessment items.

### 1.1.3 The emergence of the interactive multimodal technology-mediated course at USQ

In 2003, the management of the Distance and e-Learning Centre (DeC) at USQ identified an opportunity to convert print-based packages to CD and thus reduce the considerable costs of printing and distribution of print-based packages for distance education students. At that time, this was known as “hybrid delivery”. Since 2006, the term “hybrid” has been replaced with the term “transmodal” (USQ, 2007b). This change in the nomenclature reflected USQ’s mission to be Australia’s leading educator (USQ, 2007c).

Transmodal delivery is defined by USQ as “the provision of course content through a resource-based learning package, supplemented by selected interactive teaching support activities using communication technologies or face-to-face sessions” (USQ, 2007b, para 1). Transmodal delivery enables all students, studying across all modes (on-campus, external or web) and across three geographically-dispersed campuses “to access core content in a variety of formats consolidated onto a single CD and supplemented with teaching support activities, specifically designed for the particular course, program or discipline, and delivery context” (USQ, 2007b, para 3). Most recently, (late 2007, and after the interviews for this study had been conducted) the term “flexi-mode” was introduced in USQ communications to explain a concept, whereby all students, regardless of mode of study or campus, will receive an identical set of course materials. In order to achieve this cost-effectively, all USQ course materials will be delivered via CD ROM and/or online.

The changing nomenclature, used at the University since 2003, to describe technology-enabled course delivery viz., hybrid, transmodal, flexi-mode, reflects one of USQ management’s primary goals which is to achieve cost-effective delivery of distance education courses across three modes of delivery (on-campus, external or
web), more so than the pedagogical perspective of greater concern to individual academics which is, what presentation modes of the course content itself will appeal to different learning styles and modal preferences and thus aid student learning. Goal Four of USQ’s Learning and Teaching Plan states that one of USQ’s strategies for providing a flexible and responsive learning environment for students is to “develop a hybrid delivery mechanism, as a core educational resource for all courses as practicable, that accommodates different learning styles and opportunities” (USQ, 2006a, para 3). Hence, for the purpose of this research, an interactive multimodal technology-mediated distance education course is defined as a course that involves the use of multimedia and ICT to develop engaging and interactive course resources and uses multiple presentation modes to represent the content knowledge and appeal to different learning styles and modal preferences (Birch & Sankey, 2008).

Interactive multimodal technology-mediated courses for distance education students at USQ typically comprise a printed introductory book and an interactive CD, and are supplemented, to varying degrees, by an online course homepage. The interactive CD houses most of the course resources and includes introductory information, study modules, assessment items, readings and other useful resources. The multimedia enhancements on the CD may include video and audio introductions, recorded lecture presentations, interactive audio-enhanced diagrams and simulations, interactive quizzes and crosswords, video and audio materials, and graphics. Technology-mediated delivery allows the embedding of links to useful websites as well as hyperlinked examples and activities, including links to the course textbook website, educational websites that have been specifically developed to assist students with assessment, generic USQ resources (e.g. library, handbook, student services) and the online course homepage.

Examples of the range of multimedia elements that may be housed on the interactive multimodal CD are provided in Appendix A. The online course homepage can be used to supplement the course CD and provide “real-time” and updated content including announcements, discussion topics, updated content and recordings of on-campus lectures. An example of how a course homepage may be used to supplement a course CD is provided in Appendix B. A range of approaches have
been used by academics involved in the early stages of interactive multimodal technology-mediated distance education course development at USQ and a single universal approach has not yet been adopted or prescribed.

### 1.2 Significance of the research

This study contributes to conceptual understanding in terms of providing a categorised framework for explaining key factors that influence academics’ adoption and integration of educational technology and, in the context of this study, for the development of interactive multimodal technology-mediated distance education courses. These factors may be pedagogical, individual or institutional. Pedagogical factors represent the individual academic’s educational goals as well as the broader educational aims of the institution. Individual factors are within the control of the individual academic and for the purpose of this study have been categorised as being primarily pragmatic, opportunistic or personal in nature. Institutional factors are deemed to be within the control of the institution to change. While this study sought to develop a categorised framework of factors for investigation purposes, it is important to recognise the complexity of these factors as well as their interrelatedness.

Before embarking on a full-scale conversion of traditional print-based distance education materials to interactive multimodal technology-mediated course resources, USQ may benefit from an understanding of the factors that drive or constrain development by academics and learn from the experiences of pioneers and early adopters. This study seeks to provide that understanding. Moreover, individual academics may consider the findings of this research informative when making their decisions regarding their own course resource development activity. Hence, this study has both theoretical and practical implications.

Research into academics’ development of interactive multimodal technology-mediated distance education courses was necessary, because the conversion from print to technology-mediated format requires a significant shift in the ways that distance education courses are designed and delivered and has significant resource...
implications. This initiative represents a major undertaking for USQ and conversion has been slow, with many academics resisting change for a variety of reasons. For example, the first course (Introduction to Law) was converted to CD format in 2003 and, by the end of 2006, only about 50 of the 1000 courses on offer at USQ had been converted. This slow transition process has followed a pattern similar to the diffusion of other educational innovations which is often characterised by a significant lag between early and late adopters of technology (Geoghegan, 1994; Moser, 2007; Rogers, 1995; Zemsky & Massy, 2004). With respect to the adoption of educational technology, Salter and Hansen (2000) point out that “typically, usage rates tend to plateau when most of the innovators and early adopters, those keen to implement innovations, have been brought on board” (p. 55).

Multimodal learning environments may be categorised by varying levels of interactivity from highly interactive to non-interactive (Moreno & Mayer, 2007). For example, when commenting on the adoption of educational technology for distance education to date, Butler and Blashki (2003) lament that the extent of the use of contemporary technology has been “limited to simple replication of existing distance education processes” (p. 636). Moreover, Kavanagh (2001) argues that potential technological affordances have not been realised with some attempts simply being “an unreflective rebadging or repackaging of the more traditional modes of learning” (p. 511). Mishra and Koehler (2006) propose that while “advocates of technology in education often envisage dramatic changes in the process of teaching; the reality has lagged far behind the vision” (p. 1017). In line with these comments, the extent to which academics at USQ have adopted and integrated educational technology for the purpose of designing and delivering interactive multimodal technology-mediated courses has ranged from primarily “dumping” print-based materials onto a CD, to the development of a highly interactive set of resources comprising a range of multimedia and interactive elements. The extent to which educational technology is integrated into a multimodal course is important, as technology-mediated courses must represent a superior learning resource that provides added value, otherwise distance education students will resent having the cost of printing the study materials (previously provided free of charge) shifted onto them. Further, failure to embrace the full potential or “novel” affordances of available technologies represents a wasted opportunity for USQ (Salomon, 1998, p. 6).
Due to the high cost of technology and vast investments of time, university management is keen to achieve successful adoption of educational technology by academics (Bates, 2003; Moser, 2007; Salter & Hansen, 2000). However, initial adoption of educational technology may not result in sustained and meaningful use or integration over a period of time (Cuban, Kirkpatrick & Peck, 2001; Gulbahar, 2007; Weston, 2005). Providing access to technology is not enough; academics must recognise the opportunity and be sufficiently motivated to use it, and then the provision of appropriate infrastructure support for adopters is essential (Mishra & Koehler, 2006; Perkins, 1985; Surry, 2000). Hence, an understanding of the range of factors that drive or restrain academics from adopting and integrating educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses was necessary and thus the focus of this research. While this study focused specifically on USQ, the findings of the study have implications for all distance education providers developing interactive multimodal technology-mediated distance education courses. In the next section (Section 1.3), the central research question and key issues addressed in this study are presented.

### 1.3 Research question and issues

To address the research problem, the central question of this study was:

What are the pedagogical, individual and institutional factors that influence academics’ adoption and integration of educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses?
Three key issues and three sub-issues were explored to address the central research question, as follows:

1. What *pedagogical* factors influence academics to adopt and integrate educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses?
   a. What lessons have been learnt by academics who have developed interactive multimodal technology-mediated distance education courses?

2. What *individual* factors influence academics to adopt and integrate educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses?

3. What *institutional* factors influence academics to adopt and integrate educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses?
   a. What are the current attitudes of academics towards interactive multimodal technology-mediated distance education courses and what are the perceptions of students?
   b. What direction should USQ take with respect to the development of interactive multimodal technology-mediated distance education courses in the future?

1.4 Research methods

In this section, a brief overview of the research methods used for this study is provided. The research methodology for this study is addressed, in detail, in Chapter Three.

A qualitative research methodology was used for the study and involved undertaking a single case study of USQ which was exploratory, intrinsic and embedded in nature. Permission was granted by USQ management to conduct the research and ethical clearance was gained. The main purpose of this study was to determine and understand what and how pedagogical, individual and institutional
factors have influenced academics’ decisions regarding the design and delivery of interactive multimodal technology-mediated distance education courses. Questions of “what” and “how” lend themselves to an exploratory case study (Yin, 2003). Moreover, an exploratory case study was selected as the phenomenon being studied was complex and contextual factors were highly pertinent.

To improve the reliability of the findings, an exploratory case study requires gathering data from multiple sources (Creswell, 2003; Yin, 2003). The multiple sources of evidence used for this case study included:

- interviews: in-depth, semi-structured interviews with
  - a purposive sample of fourteen academic staff from three faculties across three adopter categories, viz., pioneers, early adopters and non-adopters (Rogers, 1995)
  - three instructional designers who have assisted the pioneers and early adopters with the development of interactive multimodal technology-mediated distance education courses
- informal interviews with two managers from DeC
- document analysis: analysis of USQ documents related to the design and delivery of interactive multimodal technology-mediated distance education courses
- artefact analysis: analysis of examples of interactive multimodal technology-mediated distance education courses developed by the pioneers and early adopters interviewed for this study
- self-reflective personal narrative: the researcher’s perspective on some of the issues raised in the interviews, based on her personal experience with the development of interactive multimodal technology-mediated distance education courses.

The in-depth, semi-structured interviews conducted with academic staff and instructional designers were flexible enough to allow for new issues to emerge. The interviewees were fourteen academics, purposively sampled from USQ across three faculties (viz., Arts, Education and Business) and a range of disciplines, and three
instructional designers. To capture perspectives and motivations which may vary across various adopter categories (Rogers, 1005), the interviewees included:

- four academics who converted their courses prior to 2005 (pioneers)
- six academics who converted their courses after 2005 (early adopters)
- four academics who had not converted their courses at the time of the interviews in 2006 (non-adopters).

The interview questions were drawn from issues identified in the literature, reviewed in Chapter Two, and from the researcher’s own personal experiences and reflections of the course conversion process. The questions were tailored to the various groups included in the case study. Analysis of the interview data involved identifying key factors and related issues, and was driven by the key factors within a provisional research framework, as presented in Figure 2.1 (viz., pedagogical, individual and institutional factors, lessons learnt and future directions). The responses from the interviews were examined for these key factors and related issues. NVivo 7 software was used to assist with the organisation, coding and categorisation of the transcribed interview data.

1.5 The role of the researcher

The researcher has been actively involved in the development of interactive multimodal technology-mediated distance education courses since 2003, has been researching the topic since 2004 and thus far, has converted four undergraduate marketing courses in the Bachelor of Business program and one post-graduate marketing course in the Master of Business Administration program from print to interactive multimodal technology-mediated format (Appendix C). The researcher was specifically interested in identifying the pedagogical, individual and institutional factors that impact on academics at USQ and sought to uncover strategic implications and make recommendations for USQ management. The impact of the role of the researcher on the study and the findings is addressed in further detail in Section 3.2.4.
1.6 Contributions of the research

This study contributes to the body of knowledge on academics’ adoption and integration of educational technology, specifically in the context of the development of interactive multimodal technology-mediated distance higher education courses. Academics’ adoption and integration of educational technology, across a variety of educational contexts, has been found to be influenced by driving and restraining forces including pedagogical, individual and institutional factors. The purpose of this study was to determine the extent to which these factors also influence academics’ adoption and integration of educational technology for the purpose of developing interactive multimodal technology-mediated distance higher education courses, and whether other factors, not previously identified in this field, are evident in this particular context. While this study focussed specifically on the case of USQ, many of the contextual factors are relevant to other distance education providers in the tertiary sector. Moreover, the researcher identified various categories of individual factors from the literature including pragmatic, opportunistic and personal dimensions.

Much has been written about the use of educational and instructional technology for learning and teaching (Clyde & Delohery, 2005; Mayer, 2005; Moreno & Mayer, 2007; Naidu, 2003; Newby, Stepich, Lehman & Russell, 2000), however, limited studies had specifically addressed pedagogical motivations for the adoption and integration of educational technology in the distance education context and yet, pedagogical motivations appear to be paramount (Earle, 2002; Jafari, McGee & Carmean, 2006; Mishra & Koehler, 2006; Sankey & St Hill, 2005; Winn & Joughin, 1996). Moreover, most previous studies on academics’ participation in distance education and adoption and integration of educational technology have focussed primarily on institutional and individual factors (see, for example, Betts, 1998; Schifter, 2000). A major contribution of this study is an in-depth investigation of pedagogical factors influencing academics’ development of interactive multimodal technology-mediated distance education courses.
Previous research in this context concerned student perceptions, while this study investigated factors influencing academics’ development of interactive multimodal technology-mediated distance education courses and thus focussed on academics’ perspectives (Birch & Gardiner, 2005; Buchan, Black, Howard & Macklin, 2005; Gordon, 2005; Sankey, 2005). Further, much of the literature on the adoption and integration of educational technology has concerned the shift away from face-to-face, on-campus teaching to online teaching, or some combination of the two (“blended” or “hybrid” delivery) (Betts, 1998; Chizmar & Williams, 2001; Maguire, 2005; Schifter, 2000; Weston, 2005). However, this study focussed on distance education and the shift from a static “correspondence” (read/write) model to a more dynamic and interactive multimodal technology-mediated model.

This research has revealed managerial and educational implications for both tertiary education institutions and individual academics and thus will contribute to practice. Before embarking on a full-scale conversion of traditional print-based materials to interactive multimodal technology-mediated distance education courses, management and individual academics may benefit from being more informed of the key pedagogical, individual and institutional factors that influence the change process and learn from the experiences of the pioneers and early adopters. Moreover, an understanding of enabling and restraining factors, arising from this study, will inform universities regarding the infrastructure and resources required to support and enable academics and, where possible, remove or reduce any barriers to the development of interactive multimodal technology-mediated distance education courses. Further, given the resources and time involved in the development of interactive multimodal technology-mediated distance education courses, the findings of this study will inform individual academics as they critically consider their own motivations for undertaking conversion of their traditional print-based distance education courses.

1.7 Structure of the thesis

In this introductory chapter, a brief background and context to the study was provided, and the significance of the study including anticipated contributions to
theory and practice was discussed. The research question and key issues were presented, the research method was briefly addressed, and a brief outline of the structure of the thesis was provided.

Chapter Two investigates the pedagogical, individual and institutional factors that influence academics’ adoption and integration of educational technology across a variety of contexts. Based on the literature, the provisional framework used for investigating the research question is presented.

In Chapter Three, a discussion of the research design used to investigate the research problem is provided. The qualitative research methodology involving a single case study based on multiple sources of evidence is discussed including the selection of interviewees. The approach used to analyse the interview data and other sources of data used for the case study is addressed and then issues of validity, generalisability and reliability of the findings are discussed. Ethical considerations and limitations of the research methodology are also presented.

A discussion of the research findings are provided in Chapter Four (pedagogical factors), Chapter Five (individual factors) and Chapter Six (institutional factors). Implications and recommendations, theoretical and managerial contributions, limitations of the research and directions for further research are addressed and then finally, a postscript from the researcher is provided in Chapter Seven.
This chapter examines factors, including both driving and restraining forces that influence academics’ adoption and integration of educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses. These driving and restraining forces involve pedagogical, individual and institutional factors. Pedagogical factors arise from both the institution and the individual academic’s educational aims and thus have been analysed separately. Individual factors including both motivators and inhibitors have been categorised as being primarily pragmatic, opportunistic or personal in nature. Institutional factors are deemed to be within the control of the institution to change and include institutional motivations, enablers and barriers. While these factors (and issues related to each factor) have been identified from the literature, they are not deemed to be exhaustive and other factors and issues may be present in this context. Moreover, it is acknowledged that overlaps between these three major factors may exist and thus they are not necessarily mutually exclusive.

The purpose of this investigation of the literature is two-fold. The first aim is to identify pedagogical, individual and institutional factors that have been found to influence academics’ adoption and integration of technology across a range of educational contexts, with the primary focus on the distance education context. The second aim is to identify factors from these other educational contexts that may provide insight on factors that influence academics’ adoption and integration of educational technology, specifically for the development of interactive multimodal technology-mediated distance education courses, and to determine if other factors (and related issues) specific to this context are present.
The focus of this study is on the adoption and integration of educational technology for the development of interactive multimodal technology-mediated distance higher education courses. The term “educational technology” is broadly defined as “recent developments in computer-based technologies used to facilitate teaching” (Ebersole & Vorndam, 2003, p. 4). The term “interactive multimodal technology-mediated course”, adopted for the purpose of this study, refers to a course that involves the use of multimedia and ICT to develop engaging and interactive course resources and uses multiple presentation modes to represent the content knowledge and thus appeal to different learning styles and modal preferences (Birch & Sankey, 2008; Chen & Fu, 2003; Moreno & Mayer, 2007; Sankey & St Hill, 2005). Interactive learning environments “enable multidirectional communication” and “what happens, depends on the actions of the learner” (Moreno & Mayer, 2007, p. 310). The term “technology-mediated” is used rather than “technology-based” to indicate that the technology supports the pedagogy, and not vice versa (D’Andrea & Gosling, 2005). Multimedia involves the use of “images and text used in conjunction with sound, music, video and/or animation” (Karakaya, Ainscough & Chopoorian, 2001, p. 84).

The context of this inquiry is tertiary level distance education. Distance education refers to “all arrangements for providing instruction through print or electronic communications media to persons engaged in planned learning in a place or time different from that of an instructor or instructors” (Moore, 1990, p. 15). In 1998, The United States Distance Learning Association defined distance education as “the acquisition of knowledge and skills through mediated information and instruction, encompassing all technologies and other forms of learning at a distance” (United States Distance Learning Association, 1998, p. 1). This latter definition is used to define distance education in this study.

This study focuses on the experience of a major distance education provider in Australia, USQ, where traditional print-based “correspondence” packages, typically comprising an introductory book, study guide and a book of selected readings have been provided free of charge to students enrolled in distance (external) mode. In 2003, USQ commenced a process of converting these static print-based distance education courses to an interactive multimodal technology-mediated format.
typically comprising a printed introductory book, an interactive CD, accompanied by an online course homepage). These interactive multimodal technology-mediated distance education courses allow for the inclusion of a range of multimedia and hypermedia learning elements as well as asynchronous and synchronous interaction via the online course homepage.

Little research has focussed on factors that influence the development of interactive multimodal technology-mediated courses for distance education students, and those few studies have focussed on students’ perceptions rather than academics’ motivations (Buchan et al., 2005; Gordon, 2005; Sankey 2005; Sankey & St Hill, 2005). This study investigates pedagogical, individual and institutional factors that influence academics to convert traditional print-based distance education courses to an interactive multimodal technology-mediated format using a range of multimedia and hypermedia, and specifically focuses on the academics’ perspective.

In this chapter, the literature underpinning this research is presented, commencing with a discussion of the transformation of distance education resulting from technological and social change, the development of interactive multimodal technology-mediated distance education courses and the adoption and integration of educational technology. Next, institutional factors including motivations, enablers and barriers that influence academics’ adoption and integration of educational technology are identified from the literature. For the purpose of this study, individual factors including both motivators and inhibitors that influence academics’ adoption and integration of educational technology have been categorised and discussed as being primarily pragmatic, opportunistic or personal in nature. Finally, a provisional framework for investigating factors which influence academics’ adoption and integration of educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses is presented.

2.1 The transformation of distance education

Advances in technology and the emergence of the World Wide Web as major source of global information have placed pressure on higher education institutions to take
advantage of this growing array of resources and move beyond traditional face-to-face and distance education correspondence modes toward a rich technology-mediated learning environment and thus remain viable in an increasingly competitive global education market (Bates, 2006; O'Donoghue et al., 2001). In particular, the Web has provided the opportunity to develop engaging, “interesting and exciting interactive resources, incorporating multimedia” (Sheard et al., 2001, p. 1). Technology-mediated distance education courses have emerged in response to a number of changes in higher education including “globalisation, the advent of the ‘information age’ and a move to a knowledge society” (McDonald, McPhail, Maguire, & Millett, 2004, p. 287).

Technological and societal changes mean that traditional approaches to distance education will not meet the needs of distance learners in the future (Jochens, van Merrienboer & Koper, 2004; Jona, 2000; Taylor, 2004). For example, many of today’s younger students, having grown up in a highly visual electronic world, are visual/aural learners and “techno-savvy”, while older students, many of whom are working full-time while studying part-time, require more flexible and convenient learning options. Jafari, McGee and Carmean (2006) argue that today’s students want “interactivity, mobility, and synchronous communication” (p. 57). Hence, a blended approach to distance education that provides flexible options may be more appealing to today’s “digital generation” and distinct demographic age groups including “Baby Boomers” (born 1946 – 1964), “Generation X” (born 1965 – 1980), “Generation Y” (born 1981 – 1985) and “Net Geners” (born 1982 - 2001) (Buckingham & Willett, 2006; Hartman, Moskal, & Dzuiban, 2005; Oliver & Goerke, 2007).

The shift toward technology-enabled distance learning has resulted from advanced technology and desktop access to multimedia, and has created opportunities for instructors to enhance the learning environment (Gill, 2004). Educational technology has been adopted by many university instructors with the intention of enhancing the learning environment and course resources. Butler and Blashki (2003) argue that:
if the aim of our educative practice is to provide a rich and rewarding
learning experience for all students, regardless of mode of enrolment, the
investigation of diverse ways in which these technologies might be used is
imperative. (p. 635)

Various forms of educational technology have been widely adopted by
academics in the on-campus context, including the use of PowerPoint, video content
and access to the Web in technology-enabled classrooms. Many universities have
now developed online distance education courses and established learning
management systems as a means of extending enrolments and providing greater
flexibility for students studying in part-time mode (Benson & Palaskas, 2006;
Weston, 2005). To a lesser extent, some educators have developed interactive
multimedia or CD-based materials to supplement their on-campus or organisational
training programs (Evans & Gibbons, 2007; Young, 1998; Zywno, 2003a; Zywno &
Waalen, 2001). In more recent times, static, print-based distance education courses
are being transformed through the adoption and integration of educational
technology and the development of interactive “blended”, “hybrid” or “multimodal”
technology-mediated courses (McDonald & Mayes, 2005; Sankey & St Hill, 2005).
These courses involve a combination of delivery modes and may include traditional
face-to-face classes, online courses and/or delivery via CD or other electronic means
(Parsons & Ross, 2002). In the literature, the term “blended” or “hybrid” course
typically refers to the delivery of a conventional on-campus course that is
supplemented by an online mode of delivery (McDonald & Mayes, 2005; University
of Wisconsin Milwaukee, 2005).

The term “interactive multimodal technology-mediated distance education
course”, adopted for the purpose of this study, refers to a course that involves the use
of multimedia and ICT to develop engaging and interactive course resources and
uses multiple presentation modes to represent the content knowledge and appeal to
different learning styles and modal preferences (Birch & Sankey, 2008; Chen & Fu,
2003; Sankey & St Hill, 2005). Moreno and Mayer (2007) explain that multimodal
learning environments “use two different modes to represent content knowledge:
verbal and non-verbal,” where the verbal mode includes textual and aural
representations of content and the non-verbal mode is the pictorial mode including
both static and dynamic graphics (p. 310). These presentation modes (verbal and non-verbal) and representations of content are used to appeal to students’ different sensory modalities (visual versus auditory) (Penney, 1989). While the primary purpose for developing interactive multimodal technology-mediated courses is to provide a rich learning resource for distance education students, there is no reason why students studying on-campus cannot also benefit from accessing these interactive resources. In the next section, a discussion of interactive multimodal technology-mediated distance education courses is provided.

2.1.1 The development of interactive multimodal technology-mediated distance education courses

Interactive multimodal technology-mediated distance courses have been developed for a variety of reasons, with one key aim being to improve student learning. Material presented in a variety of presentation modes (multimodal presentation) may appeal to different sensory modes and lead learners to perceive that it is easier to learn and improve attention rates, thus leading to improved learning performance (Chen & Fu, 2003; Fletcher & Tobias, 2005; Moreno & Mayer, 2007). Multimodal courses use multimedia learning elements to appeal to a variety of sensory modes.

Studies concerning the use of multimedia and hypermedia for teaching and learning purposes have focussed primarily on the on-campus or face-to-face training context. For example, a study of on-campus engineering students conducted by Zywno (2003a) found that under hypermedia instruction (multimedia plus hypertext), students significantly improved their overall examination performance as compared to students under conventional instruction. Lower achieving students benefited more from hypermedia instruction than their higher achieving counterparts, especially at the lower levels of cognition including comprehending and application. Higher ability students gained more benefits from hypermedia instruction at higher cognitive levels such as complex problem solving (Zwyno, 2003a). In a face-to-face organisational training context, a qualitative case study of six female learners’ perceptions of a CD-based instructional program on interactive writing conducted by Young (1998), indicated that the CD was perceived to be a “very interesting, appropriate, useful, helpful and good supplementary medium to adapt heterogeneous learners’ learning styles, needs, situations, expectations, and previous computer
experiences” (p. 2). Hence, it appears that hypermedia presentations may be particularly beneficial for lower achieving students and multimedia presentations appeal to diverse student learning styles.

There are, however, very few studies that focus on interactive multimodal technology-mediated courses in the distance education context (Birch, 2006; Birch & Sankey, 2008; Buchan et al., 2005; Gordon, 2005; Sankey & St Hill, 2005). One study of on-campus and distance students’ \( n=146 \) perceptions of two undergraduate management courses delivered via an interactive multimodal technology-mediated course revealed that 73 percent of students found information presented using multiple representations (both visual and aural) was helpful for learning (Sankey & St Hill, 2005). Another study conducted by Gordon (2005) involved a qualitative investigation of the attitudes of distance education students \( n=23 \) toward a CD-based course and found that many students made positive comments about the CD and its format as well as other elements of the course, and stated that they would like to see the format duplicated in other courses. In another study, Birch and Gardiner (2005) investigated distance education students’ \( n=117 \) perceptions of two courses delivered via an interactive multimodal technology-mediated course in an undergraduate marketing program. They found that students enjoyed using the course CD, agreed that the CD assisted their performance and found the CD to be easy to use and navigate.

Hence, the potential pedagogical benefits of interactive multimodal technology-mediated distance education courses include student satisfaction with the course resources, enhancement of students’ learning experiences and students’ perceptions of improved performance. These benefits may encourage other academics to consider the adoption of educational technology for the purpose of designing and delivering interactive multimodal technology-mediated distance education courses. In the next section, the adoption and integration of educational technology is addressed.
2.2 The adoption and integration of educational technology

The high cost of technology and the vast investment of money and time that some universities have made emphasises the importance of the adoption of educational technology by academics (Bates, 2003; Salter & Hansen, 2000). However, initial adoption of educational technology may not result in sustained and meaningful use or integration over a period of time (Gulbahar, 2007; Weston, 2005). For example, an in-depth case study of “highly-wired” schools revealed that high investments in infrastructure and access to technology do not necessarily lead to increased integration of technology (Cuban, Kirkpatrick, & Peck, 2001). Hence, providing access to technology is not enough; users must be sufficiently motivated to use it and necessary infrastructure support is essential (Moser, 2007; Perkins, 1985; Surry, Ensminger, & Haab, 2005).

Moreover, Butler and Blashki (2003) pointed out that, disappointingly, the extent of the use of contemporary technology for distance education has been “limited to simple replication of existing distance education processes” (p. 636). For example, the simple “dumping” of print-based material onto a CD or online, cynically referred to as “shovelware” and “computer-supported page turning” (Lockwood, 2004, p. ix). Further, Kavanagh (2001) notes that the potential affordances of technology have not been realised with some attempts at adopting educational technology simply being “an unreflective rebadging or repackaging of the more traditional modes of learning” (p. 511).

The spread of educational technology in the university sector may be explained by Rogers’ (1995) theory of the diffusion of innovations. Rogers (1995) defined an innovation as “an idea, practice or object that is perceived as new by an individual or other unit of adoption” (p. 11). Diffusion is defined as “the process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 1995, p. 5).
Innovations that are more likely to be adopted are:

- perceived to represent a relative advantage over current methods;
- compatible with current practices/habits;
- not too complex to explain and use;
- able to be tried before full adoption; and
- easier to observe

(Rogers, 1995).

The first adopters of new innovations such as educational technology are the “innovators”, comprising about 2.5 percent of the members of a given social system (Rogers, 1995). The next group to adopt are the “early adopters”, comprising about 13.5 percent of the social system. The “early majority” are proposed to be the next group to adopt (34 percent), followed by the “late majority” (34 percent) and then finally, the so-called “laggards” (16 percent). Innovators of educational technology tend to be venturesome, cosmopolitan and have a predisposition toward technology as well as the patience to deal with student problems that arise (Jones & Kelley, 2003; Moser, 2007). Early adopters are respected opinion leaders with a positive attitude toward technology, while later adopters tend to be more sceptical and thus may only adopt as a “consequence of peer pressure or economic necessity” (Moser, 2007, p. 68).

Knowledge of the different personal characteristics of various adopter categories, with respect to educational technology, may assist educational institutions to understand that different groups of academics may be more or less likely to adopt and thus seek to encourage adoption with tailored programs and support rather than assuming that one approach will work for all (Jacobsen, 1998). Moreover, an understanding of how diffusion occurs among academics may lead to the development of strategies that bridge the gap between early adopters and mainstream faculty and thus encourage or facilitate the adoption of educational technology. For example, Jacobsen (1998) argues that “a different support infrastructure is clearly needed for mainstream faculty than that which sufficed for early adopters of technology” (p. 7).
Change processes such as the adoption and integration of educational technology are influenced by driving and restraining forces (Lewin, 1951). Lewin (1951) argues that human behaviour is a function of both the person and their environment and thus, for change to take place, the total situation has to be taken into account including driving (encouraging) and restraining (discouraging) forces. Given high academic workloads and the time and effort involved in embracing educational technology, it is important to determine what forces drive or restrain academics from adopting and integrating educational technology (Ebersole & Vorndam, 2003; Jacobsen, 1998; Maguire, 2005).

Factors influencing the adoption and integration of educational technology have been categorised and reported in a variety of ways. For example, Ertmer (1999) distinguished first-order (extrinsic) and second-order (intrinsic) barriers to technology adoption and integration. However, as this study includes enablers and motivators as well as barriers, Ertmer’s (1999) categorisation is too narrow for the scope of this study. Maguire (2005) identified three major categories of motivating and inhibiting factors including institutional, extrinsic, and intrinsic or personal. However, in the context of this study, it was difficult to distinguish institutional and extrinsic factors and hence, Maguire’s (2005) typology was not adopted for this study. Miller, Martineau and Clark (2000) simply differentiated what they called organisational and individual factors influencing the adoption and integration of educational technology. Likewise, for this study, factors influencing the adoption and integration of educational technology have been categorised as being institutional and individual. However, as pedagogical factors which are deemed to be very important to the context of this study pertain to both institutional and individual educational goals, they have been analysed and discussed separately.

Factors within the control of the institution to change have been categorised as institutional factors, while factors deemed to pertain to the characteristics, perceptions, beliefs or attitudes of individuals have been categorised as being individual factors. However, it is important to recognise that institutional factors may influence individual motivations, and vice versa, hence these categories may not be
mutually exclusive. In the next section, institutional factors that influence the adoption and integration of educational technology are discussed.

2.3 Institutional factors influencing academics’ adoption and integration of educational technology

This section addresses a number of institutional factors including motivations, enablers and barriers that influence academics’ adoption and integration of educational technology across a variety of educational contexts. The discussion commences with institutional motivations for adopting and integrating educational technology that, in turn, may influence academics’ motivations.

2.3.1 Institutional motivations

In an era of reduced government funding for education, the ability to access fee-paying global education markets and non-traditional students is a major incentive for Australian educational institutions to embrace educational technology (Bates, 2006; Laurillard, 2002; Maguire, 2005). Moreover, the degree and rapid rate of technological development as well as the growing importance of the Web as a major source of global information simply cannot be ignored (Dooley & Murphrey, 2000; O’Donoghue et al., 2001). Earle (2002) proposes that driving forces for the adoption and integration of educational technology include “the power and potential of new developments, rapid availability, creativity, Internet access, ease of communication, or the promise of impact on learning” (p. 10). Educational institutions that fail to adopt technology and redesign their programs to embrace these opportunities may not be able to compete in the increasingly aggressive competitive distance education sector (Dooley & Murphrey, 2000; Ebersole & Vorndam, 2003).

Moreover, educational institutions need to adopt and integrate educational technology in order to remain commercially viable by responding to student needs for greater access, flexibility and convenience (Ebersole & Vorndam, 2003; Jafari et al., 2006; Weston, 2005). Indeed, technology has provided an opportunity for educational institutions to provide flexible course delivery for people who are studying at a distance, many of whom are full-time employed and/or raising a family.
Technology such as learning management systems has also allowed educational institutions to communicate more effectively with distance students via electronic means, independent of time and place (Ebersole & Vorndam, 2003; McCorkle, Alexander, & Reardon, 2001; McGee & Diaz, 2007). Further, as discussed in Section 2.1, technological and societal changes have motivated institutions to adopt educational technology as a means of appealing to “new-age” and “techno-savvy” students (Hartman et al., 2005; Jafari et al., 2006; Oliver & Goerke, 2007). Many universities have recognised the opportunity to provide a richer learning environment and enhance the distance learning experience for their students by adopting and integrating educational technology (Bates, 2006; Buchan et al., 2005; O’Donoghue et al., 2001). For example, McDonald and Mayes (2005) note that hybrid courses have been introduced to respond to the changing educational environment and to meet both learner and institutional needs.

The shift away from traditional print-based “correspondence” packages for distance education students to courses delivered electronically may be more cost-effective for institutions, at least in the longer term (USQ, 2007b). While the upfront cost of development of interactive multimodal technology-mediated distance education courses may be high, the ongoing costs may be substantially reduced due to lower printing and distribution costs and thus technology-mediated courses could be more sustainable in the longer term. Moreover, due to the learning curve effect which occurs as an organisation gains experience with a process, some of the past barriers to the adoption and use of educational technology are falling, with adoption and integration of many educational technologies now becoming easier and more systematic (Jones & Kelley, 2003; Pachnowski & Jurczyk, 2003).

In summary, there are a number of motivations for tertiary institutions to adopt and integrate educational technology. However, while the institution may seek to adopt and integrate educational technology to achieve specific goals, the extent to which individual academics are willing or able to participate in the adoption and integration of educational technology may vary (Harrsch, 2000). Indeed, academics need to perceive equivalent opportunities and benefits for the institution, themselves and their students if they are to willingly participate in the adoption and integration
of educational technology (McLean, 2005). In the next section, institutional enablers to the adoption and integration of educational technology are addressed.

### 2.3.2 Institutional enablers

In proposing a model for enabling or facilitating the transition to online teaching, Covington, Petherbridge and Egan Warren (2005) identify three broad types of support: (1) organisational and administrative support; (2) professional development; and (3) peer support. These three factors appear to facilitate or enable the adoption and integration of educational technology across a range of educational contexts and thus form the basis of the discussion for the context of this study. Institutional enablers to academics’ adoption and integration of educational technology are those that are under the control of the institution to change and include:

- institutional support;
- training in the effective use of educational technology; and
- the presence of mentors, role models and technology champions.

Each of these factors is now addressed in turn, commencing with a discussion of the need for ongoing institutional support.

Institutional and administrative support is a key enabling factor for the adoption and integration of educational technology (Betts, 1998; Capobianco & Lehman, 2004; Daugherty & Funke, 1998; Dooley & Murphrey, 2000; Jones & Kelley, 2003; Rockwell, Schauer, Fritz, & Marx, 1999). A model for effective integration of educational technology into tertiary education, referred to by the acronym RIPPLES (resources, infrastructure, people, policies, learning, evaluation, support) was developed by Surry et al. (2005). In this model, support includes administrative leadership, technical support, pedagogical support and training.

Academic leadership and top management commitment have been found to be critical for the effective integration of education technology in higher education, and this high level of support is necessary from the beginning of the initiative (Covington et al., 2005; Ely, 1990; Moser, 2007; Surry et al., 2005). Moreover,
institutional support needs to extend beyond the tangible to reflect the culture, mission and vision of the organisation (Berge, 1998; Spodark, 2003). Further, ongoing support across the adoption cycle, from innovators to the late majority, is critical for widespread adoption of technology (Moser, 2007). Indeed, a lack of support for innovators may result in “too many setbacks” and subsequent “negative reporting may lead to scepticism” and thus deter other academics from adopting educational technology (Moser, 2007). Further, a necessary precondition to technology integration is a supportive and “enabling environment” that involves an “ethos which values experimentation” and one that “tolerates falters” (Spodark, 2003, p. 2).

A case study conducted by Waddoups and Howell (2002), which focussed on the development of hybrid courses in the tertiary sector, revealed that administrative support as well as a supportive organisational structure with a culture of collaboration, participative decision making and cooperation facilitated the hybridisation process. The essential role that people play in the integration of educational technology in terms of “the needs, hopes, values, skills and experiences of the people who will use an innovation” was also emphasised by Surry et al. (2005, p. 328). Indeed, the transition from a traditional print-based distance education course to an interactive multimodal technology-mediated course requires the cooperation of a team of academics, administrators, technical specialists and instructional designers (Chizmar & Williams, 2001).

The diffusion of educational technology also depends upon the university’s administration “properly framing top-down initiatives, establishing a favourable environment for use and making sure academics clearly understand how the benefits of technology outweigh the drawbacks” (Weston, 2005, p. 103). Hence, according to Surry (2000), the institution’s efforts to motivate academics to adopt and use educational technology could be based on Keller’s (1983) model of motivation. This model, known as the ARCS model, involves attention gaining, relevance, confidence building and satisfaction (Keller, 1983). The model proposes that if the academic (a) can be made aware of the technology and its uses; (b) can see the relevance of the technology to their personal needs; (c) is provided with the necessary training and
support to use the technology; and (d) is rewarded for using the technology, then they may be more likely to adopt the technology (Surry, 2000).

The adoption and effective integration of educational technology also relies upon specialised training in both the use of technology and an understanding of how to integrate the technology into the curriculum (Buchan et al., 2005; Mainka, 2007; Mishra & Koehler, 2006; Surry et al., 2005). However, developing the skills to use technology is not sufficient; academics also need training in appropriate instructional design (Davidovitch, 2007; Gulbahar, 2007; Moskal et al., 1997). For example, providing comprehensive training and support for academics to learn how to teach within the hybrid model was a key success factor for one university that successfully hybridised its courses (Waddoups & Howell, 2002). However, for academics to support technological initiatives, they must believe that the timing (“just-in-time”) and source of training is appropriate, relevant and specific to their needs and interests (Irani & Telg, 2002; McLean, 2005). Moreover, as academics may be at different levels of knowledge and capability, it is necessary to assess individual training needs and, where possible, tailor the training to the individual needs of the academic (Ali, 2003; Covington et al., 2005). Release time may also be required to undertake the necessary training (Capobianco & Lehman, 2004; Carroll-Barefield, Smith, Prince, & Campbell, 2005; Maguire, 2005).

However, due to academic autonomy, the optional status of staff development programs and the fact that many university instructors are not trained educators, there may be a great deal of variation in pedagogical approaches (Jacobsen, 1998). Hence, Bates (2000) proposes that educational institutions should emphasise innovative teaching and that professional development in the use of educational technology should be a required activity. Moreover, once training has been undertaken, ongoing support is still required (Bates, 2000).

Mentors, role models and technology champions who are prepared to collaborate and share their experiences, conduct workshops and coach colleagues in the use of technology, appear to facilitate the rapid diffusion of educational technology (Bates, 2000; Covington et al., 2005; Dooley & Murphrey, 2000; Ebersole & Vorndam, 2003). Educators who are not able to envisage the uses and
benefits of the educational technology may need to observe how others integrate the technology to enrich the learning environment (Franklin, Turner, Kariuki, & Duran, 2001). For example, Chizmar and Williams (2001) found that 63 percent of the academics \( (n=105) \) in their study agreed that they “would like more academic showcases in instructional technology that demonstrate real-world applications in the classroom” (p. 22). The presence of a mentor for guidance during design and development appears to promote the adoption and integration of educational technology (Daugherty & Funke, 1998). For example, in an experimental study of pre-service teachers \( (n=280) \), Wang, Ertmer and Newby (2004) found that vicarious learning, that is, learning by “observing the performances of others” (p. 232), helped the pre-service teachers to develop the confidence they needed to become effective in the use of technology in the classroom. The effective diffusion of technology may also rely upon a technology champion or a champion course to promote the use of educational technology and show the way (Granitz & Hugstad, 2004; McCorkle et al., 2001). In addition, Carroll-Barefield et al. (2005) suggest that employing an educational technology specialist may also facilitate the integration of educational technology.

In this section, a discussion of institutional factors that enable or facilitate academics’ adoption and integration of educational technology was presented. In the next section, institutional barriers to academics’ adoption and integration of educational technology are addressed.

2.3.3 Institutional barriers

Despite institutional motivations and enablers to the adoption and integration of educational technology, there may be a number of institutional barriers that hinder or inhibit academics’ adoption and integration of educational technology. The word “barrier” has been used interchangeably in the literature with other descriptors such as “inhibitors” and “obstacles” (Khan, 1995; Rockwell et al., 1999; Schifter, 2000; Spodark, 2003).
Institutional barriers to academics’ adoption and integration of educational technology are those that are under the control of the institution to change and include:

- lack of formal planning, policies and processes;
- technological and resource limitations; and
- lack of technical and instructional design support.

These factors are now addressed in turn, commencing with a discussion of lack of formal planning, policies and processes.

A major barrier to academics’ adoption and integration of educational technology arises from the perceived or actual failure by an institution to “establish and implement strategic plans” (Weston, 2005, p. 103). A number of studies have indicated that the lack of formal plans or clear institutional policies, processes and clear standards inhibit the diffusion process (Gulbahar, 2007; McCorkle et al., 2001; Rockwell et al., 1999). For example, in a review of thirteen case studies about academics’ participation in online courses, Maguire (2005) found that academics were concerned about a lack of clear standards for online courses.

Academics may also be hesitant to embrace new technology if there is no clear institutional vision and the attitude of the institution toward technology integration is not clear (McLean, 2005). For example, the lack of a clear understanding or vision of how technology can be used to achieve educational goals has been found to impede adoption (Ertmer, 1999; Franklin et al., 2001). Conversely, institutional pressure to adopt and integrate educational technology may result in academic resistance. For example, some academics may “revolt against technological course delivery and the emerging expectations their institutions will have of faculty members” (Howell, Williams, & Lindsay, 2005, p. 5).

The lack of careful analysis of the curriculum to determine priorities and the lack of the development and implementation of a technology plan may also inhibit effective diffusion and integration of educational technologies (Gulbahar, 2007). In particular, a lack of clearly defined goals for the program appears to create a barrier
to adoption (Covington et al., 2005). Moreover, clear guidelines, learning frameworks and templates are critical because consistency in the format of courses and uniformity of appearance and navigation assists students to adapt to the new learning environment (Buchan et al., 2005; Carroll-Barefield et al., 2005).

The high cost of innovation and software required for the adoption and integration of educational technology coupled with limited resources, creates a barrier for both the institution and individual academics (Daugherty & Funke, 1998; Eastman & Owens Swift, 2001; Ebersole & Vorndam, 2003; Gulbahar, 2007; McCorkle et al., 2001). For example, Chizmar and Williams (2001) found that 54 percent of the academics \( n=105 \) in their survey agreed that “the lack of campus grant funds to support the development of instructional technology is a major deterrent to its adoption” (p. 23). In line with this, Betts (1998) reported that academics rated the lack of grants for materials and expenses to be a key inhibiting factor. Further, when taking into account Kavanagh’s (2001) position that resources and appropriate structures are required to “achieve what is often the significant cultural shift and changing of mindsets for parties involved” (p. 511), it seems that institutions with limited resources should start small, perhaps relying in the early stages on the development of transferable, generic learning objects and then adding complexity over time (Daugherty & Funke, 1998). Moreover, in the event of resource constraints, a phased approach to implementation may lead to greater success (Carroll-Barefield et al., 2005).

Inadequate infrastructure to support the technology and lack of access to appropriate or adequate hardware and software also create significant barriers to technology adoption and integration (Capobianco & Lehman, 2004; Daugherty & Funke, 1998; Jones & Kelley, 2003; Weston, 2005). The RIPPLES model for integrating educational technology into higher education proposes that “infrastructure is the single most important factor in integrating technology into the curriculum” (Surry et al., 2005, p. 328), where infrastructure includes hardware, software, facilities and network infrastructure. Lack of systems reliability, technological problems and malfunctions including slow download times and bandwidth issues are frustrating for both academics and students (Eastman & Owens Swift, 2001; Jones & Kelley, 2003; Smith, 2001).
Another frequently cited reason for the non-adoption or non-integration of technology is the lack of specialised technical support (Bonk, 2001; Jones & Moller, 2002; Lee, 2001; McCorkle et al., 2001; Rockwell et al., 1999; Schifter, 2000). Academics are more likely to use instructional technology if they believe that there is sufficient support to assist them with the implementation (Chizmar & Williams, 2001). Lack of support from instructional designers, editors, technicians, graphic designers, media specialists, teaching assistants and librarians for developing and improving instruction with educational technology has been found to be a major barrier to adoption and integration (Lee, 2001; Northrup, 1997; Olcott & Wright, 1995). In Chizmar and William’s (2001) study, 64 percent of respondents \((n=105)\) agreed “the difficulties of knowing where and from whom to seek help on campus create a barrier to the adoption of instructional technology” (p. 23). Moreover, the adoption and integration of educational technology relies upon ongoing and informal, “hands-on” technical assistance (Capobianco & Lehman, 2004; Willis, 1998).

In this section, a number of institutional barriers that hinder academics’ adoption and integration of educational technologies were addressed. Table 2.1 presents a summary of the institutional enablers and barriers to academics’ adoption and integration of educational technology.

Table 2.1
Institutional enablers and barriers to academics’ adoption and integration of educational technology

<table>
<thead>
<tr>
<th>Institutional enablers</th>
<th>Institutional barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• institutional support and leadership</td>
<td>• lack of formal planning, policies and processes</td>
</tr>
<tr>
<td>• training and professional development</td>
<td>• technological and resource limitations</td>
</tr>
<tr>
<td>• mentors, role models and technology champions</td>
<td>• lack of technical and instructional design support</td>
</tr>
</tbody>
</table>

The institutional factors, discussed in this section, serve to motivate, enable or create barriers to academics’ adoption and integration of educational technology.
Individual factors that influence academics adoption and integration of educational technology are addressed next.

2.4 Individual factors influencing academics' adoption and integration of educational technology

In this section, individual factors (motivators and inhibitors) that influence academics’ adoption and integration of educational technology are addressed. These factors have been derived from the literature, and to provide a preliminary framework for investigation have been categorised as being primarily pragmatic, opportunistic or personal in nature. Individual academics’ pragmatic motivators and inhibitors are discussed first.

2.4.1 Pragmatic motivators and inhibitors

In line with institutional motivations, academics’ pragmatic motivations for the adoption and integration of educational technology include the desire to develop courses that better cater to student needs for greater access, flexibility and convenience (Ebersole & Vorndam, 2003; Jafari et al., 2006; Maguire, 2005; Smith, 2001). For example, Schifter (2000) found that a key motivating factor for academics’ participation in distance education was to provide greater flexibility to students. In particular, meeting the unique needs of distance education students, many of whom are working full-time and/or raising a family and thus are unable to access the traditional on-campus experience, may be of concern to some academics. Indeed, some academics, who appreciate the difficulties faced by external students, are motivated to make study as easy as possible for their students (Wolcott & Betts, 1999). The convenience of being able to communicate effectively with students via electronic means, independent of time and place, is also perceived by many academics to be a genuine practical advantage (Ebersole & Vorndam, 2003; McCorkle et al., 2001). Moreover, in keeping with institutional goals, individual academics may adopt and integrate educational technology as a means of catering more effectively to the changing needs of the “digital generation” (Buckingham & Willett, 2006; Jochems et al., 2004; Oliver & Goerke, 2007).
Some academics have internalised institutional agendas regarding technology and thus adopted educational technology in response to institutional pressure or a sense that it is “the right thing to do” (Betts, 1998; Ebersole & Vorndam, 2003; Jones & Kelley, 2003; Maguire, 2005). These academics may be motivated to respond to institutional directives concerning educational technology out of a sense of institutional commitment and loyalty. In increasingly competitive times, and in the event of government funding cuts, the commercial viability of the institution may also motivate some academics who wish to pursue a career within that institution. Moreover, some academics may simply accept that the integration of educational technology is inevitable (Ebersole & Vorndam, 2003).

Despite these pragmatic motivations, a number of pragmatic inhibitors to academics’ adoption and integration are evident. A major inhibitor to the adoption of educational technology is lack of time and the subsequent negative impact on academic workloads (Berge, 1998; Betts, 1998; Moser, 2007; O’Quinn & Corry, 2002; Schifter, 2000). The time required to develop technology skills, implement technology and maintain technology-mediated courseware is a major area of concern for some academics (Bonk, 2001; Cuban et al., 2001; Jones & Kelley, 2003; Weston, 2005). More specifically, academic concerns include the lack of time to experiment, share experiences with colleagues, adapt lessons and attend the requisite training (Franklin et al., 2001). Exacerbating this time problem may be the institution’s reluctance or inability to allow release time or teaching relief for this purpose (Betts, 1998). Indeed, Chizmar and Williams (2001) found that 58 percent of the academics (n=105) in their study agreed that “the greatest impediment to … seeking training in instructional technology is the lack of release time” (p. 23).

Other pragmatic concerns about participation in distance education courses include increased preparation time and the need to prepare course materials and assessment items well in advance (Daugherty & Funke, 1998; Eastman & Owens Swift, 2001; Pachnowski & Jurczyk, 2003). Moreover, the development and maintenance of a course that involves educational technology is perceived by many academics to be labour intensive and more time-consuming due to the short life-cycle of technology, constant changes to software and Web sites and thus the need for regular updating and maintenance (Brogden & Couros, 2002; McCorkle et al.,
2001; Weston, 2005). However, mitigating this problem, Pachnowski & Jurczyk (2003) found that training time and preparation time for courses involving educational technology decreases over time, with the main commitment of time being associated with the first semester of offer.

For some academics, another pragmatic deterrent is that involvement in this type of course development detracts from their research time (Bates, 2000; Rockwell et al., 1999; Smith, 2001). Hence, when faced with a request to integrate educational technology into their courses, academics may consider the potential negative impact on their career goals in terms of time spent on teaching versus research (Jones & Kelley, 2003; Swift, Wilson & Wayland, 1997).

Other academics have reacted pragmatically to student concerns about the shift from face-to-face to online courses and the shift from printed to electronically-delivered distance education materials (Daugherty & Funke, 1998; McPhail & Birch, 2004). Student resistance may arise due to a variety of factors, including the costs associated with printing materials from the Web, lack of access to the required hardware and software and lack of computing skills (Jones & Kelley, 2003; McPhail & Birch, 2004; Sheard et al., 2001). Hence, academics have argued that students need to be trained to use the technology if technology-mediated courses are to be accepted and valued and some level of procedural scaffolding may be required (Carroll-Barefield et al., 2005; Jafari et al., 2006; McLoughlin, 2002).

Another pragmatic inhibitor to academics’ adoption and integration of educational technology is concern about security issues (Eastman & Owens Swift, 2001). Academics have expressed concerns about intellectual property rights as well as compliance and copyright issues (Covington et al., 2005; Dooley & Murphrey, 2000; O’Quinn & Corry, 2002; Jones & Kelley, 2003; Steinberg & Wyatt, 2000). For example, while copyright may be granted for inclusion of content in printed format, it may not necessarily be granted for digital format. Moreover, academics may be concerned that information provided electronically can be more readily copied than materials in hard copy and thus their intellectual property may be used without their permission. Table 2.2 presents a summary of academics’ pragmatic
motivators for and inhibitors to the adoption and integration of educational technology.

Table 2.2
Academics’ pragmatic motivators for and inhibitors to adopting and integrating educational technology

<table>
<thead>
<tr>
<th>Pragmatic motivators</th>
<th>Pragmatic inhibitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• student demands and need for greater access, flexibility and convenience</td>
<td>• lack of time and academic workloads</td>
</tr>
<tr>
<td>• convenience of communicating via electronic means</td>
<td>• time and cost of training and development</td>
</tr>
<tr>
<td>• response to organisational directives and concern for the commercial viability of the organisation</td>
<td>• student resistance due to printing costs, access issues and technological ability</td>
</tr>
<tr>
<td></td>
<td>• concerns about security issues, including copyright and intellectual property</td>
</tr>
</tbody>
</table>

In addition to pragmatic motivators and inhibitors, a number of opportunistic motivators for and inhibitors to academics’ adoption and integration of educational technology have been identified, and these are discussed next.

2.4.2 Opportunistic motivators and inhibitors

Individual academics may perceive some significant opportunities to be gained from the use of educational technology. For example, some academics are excited by the opportunity to access advanced technology and multimedia and are keen to embrace new technology as a means of enhancing their teaching profile and being seen to be innovative, “state of the art” and progressive (Betts, 1998; Cowan, 2006; Schifter, 2002). However, some academics perceive that embracing new technology may result in personal and career costs. For example, adopting and integrating educational technology may leave academics with less time to devote to research and other
activities that lead to promotion and tenure (Howell et al., 2005; Hughes, 2002; Maguire, 2005).

Some academics may be concerned that participating in distance education may lead to a lack of scholarly respect in promotion and tenure (Bonk, 2001; Howell et al., 2005; Hughes, 2002; Orate, 2003; Wolcott, 1997). However, studies have indicated that academics are undecided as to whether adopting and integrating educational technology into their courses will facilitate or hinder promotion and tenure (Wolcott & Betts, 1999). For example, Betts (1998) found that some academics considered that there are career advantages to be gained from involvement in distance education teaching in terms of gaining credit toward tenure and promotion. These differences in findings across studies may be partially explained by the different agendas of individual institutions concerning the desired balance of research versus teaching and the extent to which teaching is valued for tenure and promotional purposes. Indeed, Wolcott and Betts (1999) argue that there is often a “mismatch between what the institution values and what is rewarded” (p. 43). Table 2.3 presents a summary of academics’ opportunistic motivators for and inhibitors to the adoption and integration of educational technology.

Table 2.3
*Academics’ opportunistic motivators for and inhibitors to adopting and integrating educational technology*

<table>
<thead>
<tr>
<th>Opportunistic motivators</th>
<th>Opportunistic inhibitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• access to advanced technology and multimedia</td>
<td>• a focus on research rather than teaching</td>
</tr>
<tr>
<td>• be seen to be innovative, “state of the art” and progressive and thus enhance their teaching profile</td>
<td>• a focus on activities that are more likely to lead to promotion and tenure</td>
</tr>
</tbody>
</table>

In addition to opportunistic motivators and inhibitors, a number of personal motivators for and inhibitors to academics’ adoption and integration of educational technology have been identified, and these are discussed in the following section.
2.4.3 Personal motivators and inhibitors

Technology has captured the imagination of educators with many academics feeling personally motivated to use technology, enjoying the intellectual challenge, and gaining personal satisfaction and self-gratification from so doing (Bonk, 2001, Capobianco & Lehman, 2004; Jones & Kelley, 2003; McCorkle et al., 2001; Schifter, 2002). For example, Betts' (1998) quantitative study regarding academics’ \(n=532\) motivations for participation in distance education revealed that key motivating factors included the opportunity to develop new ideas, personal motivation to use technology, intellectual challenge and overall job satisfaction. Moreover, in another study, Schifter (2000) found that non-participants in distance education courses agreed that personal dimensions such as personal motivation to use technology, intellectual challenge and overall job satisfaction may motivate them to participate.

The application of educational technology has appealed to some academics in terms of the excitement or novelty of doing something new, different or innovative (Cowan, 2006; Smith, 2001; Weston, 2005; Wolcott & Betts, 1999). For example, a survey of academics \(n=168\) revealed that a key motivating factor for both academics who were already participating in distance education and non-participants was the opportunity to develop new ideas (Schifter, 2000).

An academics’ attitude or approach toward teaching may also influence their adoption and integration of educational technology. For example, the adoption and integration of educational technology has facilitated renewal and regeneration with some academics reporting a desire to “energise” their teaching (Jones & Kelley, 2003). Moreover, an understanding of the relationship between technology and pedagogy appears to influence the adoption of educational technology. For example, Pierson (2001) argues that the extent to which an academic considers technology to be “an integral part of the learning process” determines the extent to which technology is deemed to be central or remains a “peripheral ancillary to his or her teaching” (p. 427).

Personal philosophies about teaching have also been found to influence the use of educational technology. Teachers who hold a constructivist philosophy tend to
use technology in student-centred ways, while teachers who use a teacher-centred approach tend to “use technology in ways that allow them to stay in their comfort zone” (Kurz-McDowell & Hannafin, 2004, p. 104). Jacobsen, Clifford and Friesen (2002) found that “both philosophical and pedagogical barriers to innovation exist when teachers shift from information-transmission to designing technology-enabled, constructivist learning environments” (p. 4). For example, the need for more rigorous course planning has deterred some academics from changing familiar instructional practices (Weston, 2005). Indeed, Covington et al. (2005) found that some non-participants in distance education were “entrenched in traditional tools and pedagogies” and thus were reluctant to change (p. 9). Hence, the need to adapt one’s teaching style and redesign course content has presented a major inhibitor for some educators (Jones & Kelley, 2003).

An academics’ attitude toward change and technology may also inhibit adoption. Resistance to change has been identified as a major impediment to technology adoption and integration (McCorkle et al., 2001; McGee & Diaz, 2007; Miller et al., 2000; Novek, 1999; Zhao & Frank, 2003). Fear of change, a lack of willingness to take risks and a lack of assurance about the benefits of technology has deterred some academics from adoption (Berge, 1998; Hunt, Eagle, & Kitchen, 2004; McGee & Diaz, 2007; Parisot, 1997; Weston, 2005). In particular, some academics have expressed anxiety and fear that they will lose autonomy or control over the curriculum if they embrace organisational initiatives regarding technology (Dede, 1997; Khan, 1995; Rockwell et al., 1999; Schoon & Weber, 1999; Weston, 2005). Moreover, the fear of negative impacts on student evaluations, if the technology does not work or is not accepted by students, has been found to be a major deterrent for some academics (McCorkle et al., 2001).

A lack of incentives has also been found to inhibit academics’ willingness to adopt and integrate educational technology and participate in distance education (Hughes, 2002; McCorkle et al., 2001; Miller et al., 2000). Jacobsen et al. (2002) found that “adoption or non-adoption of instructional technology by faculty members is influenced by how they are supported and rewarded for their efforts” (p. 10). For example, Chizmar and Williams (2001) found that 57 percent of the academics (n=105) in their study agreed that “some tangible rewards and incentives for
spending time developing classroom technology would do more to motivate … than more training” (p. 23).

According to Dooley and Murphrey (2000), encouragement to use educational technology requires recognition of innovation and technological change, and this recognition could be achieved through academic reward systems. When considering rewards for the adoption of educational technology, tertiary organisations should recognise that incentives for academics’ adoption and integration of educational technology can be either extrinsic or intrinsic in nature. Extrinsic rewards may include merit pay, release time and recognition. Lack of recognition for the time and effort involved in adopting and integrating educational technology appears to be a major inhibitor (Betts, 1998; Lee, 2001; Maguire, 2005; Moser, 2007; Wilson, 1998). However, a major incentive that has been found to encourage academics to adopt educational technology is teaching relief or assistance to “free-up” time for development within prescribed workloads (Rockwell et al., 1999; Weston, 2005). Some academics may also be motivated by recognition of their work by management and their peers (Rockwell et al., 1999).

The personal characteristics of the academic may also influence the adoption and integration of educational technology, as discussed in Section 2.2. Innovators and early adopters of educational technology may be more adventurous, less risk averse, more comfortable with change and like to try new and novel ideas (Jacobsen, 1998; Moser, 2007; Rogers, 1995). The need to acquire “cutting-edge” status and dissatisfaction with the status quo have been major driving forces for some academics in adopting educational technology (Ely, 1990; McCorkle et al., 2001). Jacobsen (1998) argues that innovators and early adopters of technology tend to be intrinsically motivated, experimenting with technology and teaching themselves to use it. Moreover, an academic’s attitudes toward technology in terms of their perceptions of its relative advantage over current methods, compatibility with current practices, usefulness and ease of use, are primary determinants of whether a technology will be adopted (Davis, Bagozzi, & Warshaw, 1989; McPhail & McDonald, 2004; Rogers, 1995).
Adoption and integration of educational technology may depend upon the existence of the required knowledge and skills (Ely, 1990). Technological capability allows an academic to embrace educational technology, if they so choose. However, an academic’s perception of their capability, rather than their actual ability to work effectively with technology (that is, their perception of self-efficacy with technology), is a major reason for the adoption or non-adoption of educational technology (Albion, 2001; Bandura, 1986; Cassidy & Eachus, 2002; Moser, 2007; Wang et al. 2004). Indeed, a key barrier arises when an academic perceives he or she has limited technical capabilities (Eastman & Owens Swift, 2001). While this personal hesitancy, lack of self-efficacy or confidence when dealing with technology and the feeling of being overwhelmed or intimidated by technology may be overcome over time through training and/or coaching, in other cases, the level of fear and anxiety associated with the use of technology (techno-phobia) can be quite inhibiting (Cini & Vilic, 1999; McCorkle et al., 2001; Rockwell et al., 1999; Weston, 2005).

Personal dimensions influencing academics’ adoption and integration of educational technology are varied. Indeed, Surry (2000) argues that “the adoption and utilisation of technology are highly individualised and contextualised processes that often deny easy description” (p. 146). Due to these personal differences, there may be no one best approach to encouraging and motivating academics to adopt and integrate educational technology. Hence, institutions should recognise the different needs of different adopter groups and tailor support and training initiatives accordingly (Jacobsen, 1998).

A summary of academics’ personal motivators for and inhibitors to the adoption and integration of educational technology and personal characteristics is presented in Table 2.4. In addition to institutional and individual factors, a number of pedagogical factors that influence academics’ adoption and integration of educational technology have been identified from the literature, and these are discussed next.
Table 2.4

Academics’ personal motivators for and inhibitors to adopting and integrating educational technology and personal characteristics of adopters of educational technology

<table>
<thead>
<tr>
<th>Personal motivators</th>
<th>Personal inhibitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• personal motivation to use technology</td>
<td>• entrenched instructional practices</td>
</tr>
<tr>
<td>• enjoyment in the intellectual challenge</td>
<td>• resistance to change</td>
</tr>
<tr>
<td>• personal satisfaction and self-gratification</td>
<td>• fear of loss of autonomy or control over the curriculum</td>
</tr>
<tr>
<td>• development of new ideas – novelty</td>
<td>• lack of incentives</td>
</tr>
<tr>
<td>• acquisition of cutting-edge status and dissatisfaction with the status quo</td>
<td>• a need to adapt one’s teaching style, develop new skills and redesign course content</td>
</tr>
<tr>
<td>• attitude and approach to teaching</td>
<td>• a need for more rigorous course planning</td>
</tr>
<tr>
<td>• regeneration and energising of teaching</td>
<td>• deviation from entrenched instructional practices</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Personal characteristics of adopters of educational technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>• innovative</td>
</tr>
<tr>
<td>• willing to take risks</td>
</tr>
<tr>
<td>• positive attitude toward technology</td>
</tr>
<tr>
<td>• adequate technological ability – “techno-savvy”</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
2.5 Pedagogical factors influencing academics' adoption and integration of educational technology

Underpinning any approach to the design and delivery of learning resources should be a sound and clear pedagogical rationale (Koehler, Mishra, & Yahya, 2007; Mishra & Koehler, 2006; Winn & Joughin, 1996). Indeed, Earle (2002) states that:

   technologies must be pedagogically sound—they must go beyond information retrieval to problem solving; allow new instructional and learning experiences not possible without them; promote deep processing of ideas; increase student interaction with subject matter; promote academic and student enthusiasm for teaching and learning; and free up time for quality classroom interaction - in sum, improve the pedagogy. (p. 6)

In their study concerning the development of online courses, Chizmar and Williams (2001) found that 88 percent of the academics (n=105) agreed that “for instructional technology to be effective, it must first be driven by pedagogical needs and goals” (p. 20). Knowlton (2002) argues that “when faculty attempt to enhance their courses with technology but do not consider the pedagogy, they are usually disappointed with the results” (p. 2). Indeed, studies have revealed that many attempts at integrating educational technology have resulted in “superficial technological adoption rather than conceptual pedagogical change process” (Davidovitch, 2007, p. 177). Hence, building on the work of Schulman (1986) concerning pedagogical content knowledge, Mishra and Koehler (2006) emphasised the need to consider the “complex and nuanced” relationships between pedagogy (“the process and practice or methods of teaching and learning”), content (“the actual subject matter that is to be learned and taught”) and technology, and proposed a technological pedagogical content knowledge (TPCK) framework which reflects the need to learn how to effectively apply new educational technologies to teaching (p. 1025).
A range of pedagogical motivations for adopting and integrating educational technology, as well as some pedagogical concerns are evident in the literature. These are summarised in Table 2.5 below and addressed in the following sections.

Table 2.5
*Academics’ pedagogical motivations and concerns for adopting and integrating educational technology*

<table>
<thead>
<tr>
<th>Pedagogical motivations</th>
<th>Pedagogical concerns</th>
</tr>
</thead>
<tbody>
<tr>
<td>• catering to diverse learning styles/modalities</td>
<td>• lack of confidence in the benefits for student learning</td>
</tr>
<tr>
<td>• providing multiple representations of information</td>
<td>• concerns about the quality of the course</td>
</tr>
<tr>
<td>• facilitation of the development of important graduate skills</td>
<td>• perceived value of educational technology may vary across subject domains</td>
</tr>
<tr>
<td>• provision of increased opportunities for greater interactivity and connectivity</td>
<td></td>
</tr>
<tr>
<td>• greater student engagement and motivation</td>
<td></td>
</tr>
<tr>
<td>• facilitation of a learner-centred socio-constructivist approach</td>
<td></td>
</tr>
<tr>
<td>• improved instructional design and curriculum</td>
<td></td>
</tr>
<tr>
<td>• provision of access to rich sources of information on the Web</td>
<td></td>
</tr>
<tr>
<td>• provision of a richer learning environment</td>
<td></td>
</tr>
<tr>
<td>• improved learning outcomes</td>
<td></td>
</tr>
</tbody>
</table>

2.5.1 **Catering for diverse learning styles**

A key pedagogical motivation for the use of multimedia or hypermedia for educational purposes is the ability to appeal to a variety of learning styles or modalities (Sankey & St Hill, 2005; Solvie & Kloek, 2007; Young et al., 2003; Zwyno & Waalen, 2002). Learning styles are defined as “characteristic cognitive,
affective, and physiological behaviours that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment” (Ladd & Ruby, 1999, p. 363). Interactive multimodal delivery and the integration of contemporary technologies have provided greater variety in the way that course content is presented and thus may appeal to a wider range of learning styles and modal preferences (Birch & Sankey, 2008; Butler & Blashki, 2003; Moreno & Mayer, 2007).

Numerous categorisations, typologies or inventories of learning styles have been proposed (Biggs, 1979; Curry, 1987; R. Dunn, 2000; Entwistle & Tait, 1994; Felder & Silverman, 1988; Felder & Soloman, 2001; Gardner, 1993; Gregorc, 1979; Honey & Mumford, 1992; Hruska-Riechmann & Grasha, 1982; Kolb, 1984; McCarthy, 1990). These models attempt to explain the different ways that people learn and their modal preferences. For example, Fleming’s (2001) VARK (visual, aural, read/write or kinaesthetic) typology proposes that learners may have a preferred learning modality; however, many learners are multimodal. Multimedia has been used to develop a more inclusive curriculum that appeals to different learning styles and modal preferences, in an attempt to overcome differences in performance that may result from different learning styles (Grensing-Pophal, 1998; Mayer, 2005; Roth, 2002; St Hill, 2000). For example, an experimental study (Karakaya et al. 2001) of marketing students (n=118) revealed that the extensive use of multimedia neutralised differences in performances based on the different learning styles of students. Moreover, a “modality effect”, in which increased learning resulted from audio as opposed to text-based explanations of content, has been found in several experiments (Jochems et al., 2004; Moreno & Mayer, 2007).

Learners are more comfortable learning in an environment that reflects their predominant learning style (Felder & Solomon, 2001; Hazari, 2004; Kolb, 1984). Interestingly, Solvie and Kloek (2007) found that “higher achieving” students do not tend to have a strong learning preference, whereas “lower achieving” students do. However, presenting material in a variety of modes has also been used to encourage students who have a predominant learning style to develop a more versatile learning style (Morrison, Sweeney, & Heffernan, 2003). Interactive multimodal technology-mediated distance education courses use multimedia to appeal to a range of senses.
and create a more enjoyable and engaging learning experience as well as improved student performance (Birch & Sankey, 2008; Moreno & Mayer, 2007; Sankey & St Hill, 2005).

2.5.2 Providing multiple representations of information

Interactive multimodal technology-mediated courses allow material to be presented in more than one sensory mode (dual-coding/multiple representations) and thus have been used by some educators to facilitate student learning (Ainsworth & Van Labeke, 2002; Clark & Paivio, 1991; Mayer, 2001; Moreno & Mayer, 2007; Shah & Freedman, 2003). For example, a study conducted by Sankey and St Hill (2005) which investigated undergraduate students’ \( n = 146 \) perceptions of an interactive multimodal technology-mediated course, which comprised a number of learning objects involving multiple representations (visual and verbal), found that many students agreed (55 percent) or strongly agreed (17 percent) that the multiple representations provided in the course had been helpful for learning. Multimodal presentation may be particularly valuable for English Second Language (ESL) students. For example, Flowerdew (1994) found that non-native speakers comprehended lecture material more successfully when provided with both audio and visual media. Likewise, Smidt and Hegelheimer (2004) found that a web-delivered lecture video comprising oral and textual elements enhanced the listening comprehension and “incidental acquisition of vocabulary” of ESL speakers (p. 530). Moreover, Adams and Brown (2006) call for the need for a more inclusive curriculum which offers choices more aligned with students varying abilities and identified, in particular, the need to provide a more inclusive learning package for students with a disability.

As discussed in Section 2.1, today’s culture is highly visual, with students being exposed to television and video material as well as information from the Web for both entertainment and educational purposes (McGee & Diaz, 2007; Walker & Chaplin, 1997). However, many university distance education courses are still designed and delivered in a way that favours read/write learners (Sarasin, 1999). Multimedia provides the opportunity to include dynamic visual elements in the courseware that aid learning (Angeli & Valanides, 2004; Mayer, 2005). Visual
content which has been traditionally undervalued in the tertiary education sector has been found to lead to improved learning outcomes (Felder & Soloman, 2001; McLoughlin & Krakowski, 2001; Sankey & St Hill, 2005; Stokes, 2002). Students learn more deeply from a combination of words (verbal) and pictures (visual) than from words alone; this is known as the “multimedia principle” (Moreno & Mayer, 2007, p. 310). In particular, visualisations have been found to assist learners with higher visuo-spatial abilities, known as field independent learners (Angeli & Valanides, 2004). Shah and Freedman (2003) identified a number of benefits of using visualisations in e-learning including promoting learning by providing an external representation of the information, deeper processing of information, maintaining learner attention by making the information more attractive and motivating, and making complex information easier to comprehend.

2.5.3 Gaining greater student engagement and interactivity and improving student learning outcomes

A main aim of educators in adopting and integrating educational technology is to improve student learning outcomes including cognitive and social outcomes (Capobianco & Lehman, 2004; Eastman & Owens Swift, 2001; Sankey & St Hill, 2005; Zwyno, 2003b). Perceived learning performance has been defined as “students’ self assessment of their overall knowledge gained, their skills and abilities developed, and the effort they expended in a particular class relative to other classes” (Young, Klemz & Murphy, 2003, p.131). The opportunity to improve learning outcomes, by providing a more engaging and interactive learning environment through the use of multimedia elements, may entice academics to adopt and integrate educational technology into their courses (Ebersole & Vorndam, 2003).

A continuum of interactivity within multimodal learning environments, ranging from highly interactive to non-interactive was identified by Moreno and Mayer (2007). Interactive versus non-interactive multimodal learning environments are differentiated with an interactive multimodal learning environment defined as “one in which what happens depends on the actions of the learner” with the specific goal of facilitating constructive and meaningful learning (Moreno & Mayer, 2007, p.
Interactive learning environments “enable multidirectional communication” (Moreno & Mayer, 2007, p. 310). Five common types of interactivity in multimodal learning environments are identified by Moreno and Mayer (2007), viz., “dialoguing, controlling, manipulating, searching and navigating” (p. 311). A range of strategies are suggested by Moreno and Mayer (2007) to enhance interactivity in multimodal learning environments including interactive games and simulations, on-screen pedagogical agents (e.g. online tutors), digital libraries, video cases and embedded authentic assessments (e.g. blogs).

However, despite the promise of improved learning outcomes, academics need to be assured that these interactive learning strategies represent perceived value for students in terms of improving their learning performance (Moreno & Mayer, 2007; Jacobsen et al., 2002). For example, in a study of the learning effects of interactivity in multimedia learning, Evans and Gibbons (2007) found that students using an interactive version of a multimedia system to learn about the operation of a bicycle pump demonstrated greater retention of information and completed the problem-solving test faster than students using a non-interactive version. The interactive and non-interactive multimedia systems differed in terms of “control of pace, self-assessment questions and an interactive simulation” (Evans & Gibbons, 2007, p. 1147). Moreover, in another study of undergraduate marketing students’ (n=117) perceptions of interactive multimodal technology-mediated courses, the findings revealed that students enjoyed using the course CD, found it easy to use and navigate and believed that it assisted their performance in the course (Birch & Gardiner, 2005).

### 2.5.4 Encouraging higher-order thinking and active student learning

Complex learning and the development of higher-order skills are becoming increasingly important for today’s graduates and thus the focus of many academics when developing curriculum (Cowan, 2006; Jochems et al., 2004). In a review of teaching improvement grants, McAlpine and Gandell (2003) found that academics intended to integrate technology to achieve higher-order thinking and more active student-centred learning. Indeed, educational technology has been found to lead to improved student inquiry and can be used to develop higher-order and critical
thinking skills and tasks (Capobianco & Lehman, 2004; Kandlbinder, 2004; Tan et al., 2006).

2.5.5 Facilitating a constructivist approach

In recent times, there has been a shift away from teacher-centred, instructivist styles of teaching toward a more learner-centred constructivist approach. The constructivist learning paradigm encourages students to discover principles for themselves, to be resourceful and to take greater responsibility for their own learning (Bruner, 1990; Jonassen, 1999). In this paradigm, the role of the instructor is to facilitate learning and the co-construction of knowledge with the learner rather than to impart knowledge. To use the common vernacular, the teacher operates as a “guide on the side” rather than a “sage on the stage.” The constructivist approach advocates the use of modern technologies to facilitate the social construction of knowledge and encourage multiple modes of representation (Hirumi, 2002; Wilson, 1996). Technology-mediated learning resources lead to more student-centred, independent approaches to teaching and learning and thus support this constructivist paradigm (Cowan, 2006; Jonassen, 1999; Laurillard, 2002; Markel, 1999; Salter & Hansen, 2000; Solvie & Kloek, 2007).

New instructional strategies, more in line with a constructivist approach, have been designed in response to advances in technology and access to rich information on the Web (Young, 1998). For example, links to the Web within technology-mediated courses allow the use of interactive resources that may encourage greater student involvement and engagement and thus support a constructivist approach (Sheard et al., 2001). The student is encouraged to explore the resources in their own time and at their own pace and to interact with the various elements housed in these learning environments (Buchan et al., 2005). Moreover, depending upon their predominant learning style, students may self-select those learning objects or representations within an interactive multimodal technology-mediated course that best suit their modal preference (Sankey & St Hill, 2005).

Interactive multimodal technology-mediated distance education may create a richer environment for learning by focusing on connection, interaction, exploration
and discovery, rather than the one-way transmission of information (Bourne, 1998; Oliver & Goerke, 2007; Peters, 2000; Waddoups & Howell, 2002). Moreover, interactive technology-mediated courses may reduce the isolation that some distance education students experience and allow greater personalisation of the learning experience and thus may facilitate high-quality instructor to student interactions (Birch & Volkov, 2007; Buchan et al., 2005; Evuleocha, 1997; Waddoups & Howell, 2002).

2.5.6 Improving instructional design and curriculum

The adoption and integration of educational technology has uncovered benefits associated with improved instructional design and curriculum (Andriole, 1997; Dooley & Murphrey, 2000). Instructional design is defined as “the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction” (Hazari, 2004, p. 25). Instructional design involves analysing learners’ needs and goals and developing learning resources and activities that meet those needs. Educational technologies provide an opportunity to provide innovative instruction and apply new teaching and assessment techniques (Franklin et al., 2001; Mishra & Koehler, 2006; Rockwell et al., 1999; Weston, 2005). For example, in line with Gagne’s (1977) sequence of instruction which proposes a progression from gaining students’ attention to providing meaningful feedback, multimedia elements such as recorded lecture presentations and interactive diagrams may be useful for gaining attention and presenting the information in an interesting way while self-testing via interactive quizzes may be used to provide formative feedback. Further, by inserting relevant visual and audio learning objects and interactive exercises throughout the materials, the instructor can apply principles of effective instructional design by dividing the course content into logical and manageable units and building from more simple to more complex information (Ausubel, 1963; Reigeluth, 1992).

While technology offers some clear benefits to students, there are issues that need to be carefully considered with respect to the design of the learning environment (O’Donoghue et al., 2001). For example, valued educational outcomes will only occur with the adoption and integration of educational technology if
“simultaneous innovations occur in pedagogy, curriculum and assessment” (Dede, 1997, p. 13). Further, Valenta, Therriault, Dieter and Mrtek (2001) argue that “the uniqueness of technology-based instruction makes it necessary to adopt more rigorous course requirements and design, development, delivery and evaluation” (p. 112). Indeed, Waddoups and Howell (2002) found that hybridisation of courses (in their case, a combination of on-campus and online delivery) led to an increased level of attention being paid to instructional design and a refinement of the curriculum. Hence, institutions seeking to encourage academics to adopt and integrate educational technology into the curriculum should take a holistic approach and provide the necessary resources, training and support to allow academics to make the necessary adjustments to teaching programs (Dede, 1997; McLean, 2005).

The successful integration of educational technology requires an adjustment of pedagogy to allow for active participation, authentic tasks, collaborative learning, and individualised feedback (Knowlton, 2002; Mishra & Koehler, 2006). Therefore, educators may need to alter teaching styles and develop new skills when they integrate technology into their program and they need to understand the relationship between learning, interactivity and technology (Rockwell et al., 1999). Thus, in adopting and integrating educational technology, there is a need for training in this different approach to instructional design (Eastman & Owens Swift, 2001; Hazari, 2004).

A key motivating factor for participation in distance education is the opportunity for academics to improve their teaching and diversify the program offering (Schifter, 2000). The development of technology-mediated courses allows for innovation, the emergence of new ideas, enhanced course quality and diversification of academic programs (Maguire, 2005; Weston, 2005). Moreover, the development of technology-mediated courses may result in a more current, meaningful and relevant curriculum (Smith, 2001). Indeed, many educators strive to provide “rich, meaningful, realistic learning tasks as the driving force for learning” (Jochems et al., 2004, p. 3). Some academics have used educational technology for vicarious learning and modelling purposes by using its power to demonstrate processes, principles and concepts (Buchan et al., 2005). For example, video and audio segments can be used to facilitate situated learning, bring the subject matter to
life and provide the basis of authentic assessment tasks based on real-life situations (Laurillard, 2002; Raider-Roth, 2004).

2.5.7 Providing access to a wealth of information and developing important graduate skills

Technology-mediated courses allow access to rich sources of information on the Web through the use of hyperlinked activities and examples (Knowlton, 2002; O’Donoghue et al., 2001). Cowan (2006) argues that today’s learners do not require to be given extensive and detailed information up-front, as students can readily access this information via new technologies; rather students need to develop skills in searching for, analysing and applying information. Further, the need for students to be able to engage with computer technology, communicate effectively in the electronic environment and become competent with the use of multimedia has encouraged some educators to adopt educational technologies (Buchan et al., 2005; Eastman & Owens Swift, 2001; Jacobsen, 1998; Maguire, 2005).

Despite these apparent pedagogical benefits, some academics have expressed concerns in terms of the negative impacts that educational technology may have on student learning. For example, the issues of limited working memory, split attention and cognitive overload that can arise from multiple representations of content (Jochems et al., 2004; Sankey, 2005; Sweller, 1999) and the potential for the overuse of “nice” extra information elements (“bells and whistles”) that may distract from the core content, leading to decreased learning (Moreno & Mayer, 2007). Other academics have expressed a lack of confidence in the benefits of educational technology for students (Ebersole & Vorndam, 2003; McAlpine & Gandell, 2003). Thus, Munoz (1993) stresses the importance of being ethical in the use of educational technology and warns that educators should “resist the seductive force of technology to replace rather than enhance” (p. 49).

Academics’ perceptions of the applicability and value of educational technology may vary across subject domains (Berge, 1998; Betts, 1998). For example, while some disciplines such as the Arts may lend themselves more to
visualisations, others, such as business-related subjects might make greater use of information on the Web.

In this section, a range of pedagogical motivations and concerns for academics when adopting and integrating educational technology have been identified. However, only a limited number of studies have specifically addressed these factors in the context of distance education courses and very few studies have focused on interactive multimodal technology-mediated distance education courses, particularly from the academics’ perspective. Hence, further investigation of these pedagogical motivations and concerns which appear to be central to academics’ motivations for the development of interactive multimodal technology-mediated distance education courses is required. In the next section, the need to identify factors pertinent to the context of this study is discussed.

2.6 Factors relevant to the development of interactive multimodal technology-mediated distance education courses

Numerous studies have investigated factors that influence academics’ adoption and integration of educational technology across a variety of educational contexts. In particular, two major quantitative studies (Betts, 1998; Schifter, 2000) addressed academics’ willingness to participate in distance education, while more recent studies have focussed on academics’ participation in the development of online courses (Chizmar & Williams, 2001; Ebersole & Vorndam, 2003; Maguire, 2005; Weston, 2005). However, these studies have not addressed academic motivations for the development of interactive multimodal technology-mediated distance higher education courses. Studies on multimodal distance education courses that have been conducted to date have addressed students’ perceptions and have not focussed on factors influencing academics’ development of these courses (Birch & Gardiner, 2005; Gordon, 2005; McPhail & Birch, 2004; Sankey & St Hill, 2005).

While it is assumed that many factors that impact on academics’ adoption and integration of educational technology in other contexts will also impact in this context, there may be other factors that explain why academics develop (or choose
not to develop) interactive multimodal technology-mediated distance education courses. Moreover, the major studies on academics’ willingness to participate in distance education were conducted some time ago and were quantitative in nature (e.g. Betts, 1998; Schifter, 2000). Rapid advances in technology and the imperative for academics to adapt to those changes, for example, the mandated uptake of learning management systems, may mean that factors that were more pertinent in the past such as academics’ technical capabilities and attitudes toward technology may be less salient now (Mishra & Koehler, 2006).

Moreover, while the use of instructional and educational technology for learning and teaching including multimedia has been frequently addressed (see, for example, Mayer, 2005; Naidu, 2003; Newby et al., 2000), motivations and the influence that the individual academic’s attitude toward teaching and their personal philosophies of teaching may have on their adoption and integration of educational technology for distance education purposes requires further investigation (Kurz-McDowell & Hannafin, 2004; Mishra & Koehler, 2006). Hence, this research seeks to address these issues.

2.7 Provisional research framework

Academics’ adoption and integration of educational technology across a variety of educational contexts involves both driving and restraining forces, and these forces include pedagogical, individual and institutional factors. The purpose of this study is to determine the extent to which these factors also influence academics’ adoption and integration of educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses, and whether other factors that have not been adequately explored in the literature might apply in this context. Indeed, most studies have focussed primarily on institutional and individual factors influencing academics’ adoption and integration of educational technology, with few studies adequately addressing academics’ pedagogical motivations, and yet pedagogical motivations may be central to academics’ adoption and integration of educational technology and specifically, in this case, the development of interactive
multimodal technology-mediated distance education courses (Earle, 2002; Jafari et al., 2006; Mishra & Koehler, 2006).

Further, much of the literature on the adoption and integration of educational technology has concerned the shift away from face-to-face on-campus teaching to online teaching, or some combination of the two ("blended" or "hybrid" delivery) (Betts, 1998; Chizmar & Williams, 2001; Maguire, 2005; Schifter, 2000). This study, however, focuses on distance education and the shift from a static "correspondence" (read/write) model to a more dynamic and interactive multimodal technology-mediated model. Based on the review of the literature, a provisional framework for investigating the driving and restraining forces that influence academics’ adoption and integration or educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses is presented in Figure 2.1.

Figure 2.1
A provisional framework for investigating factors that influence academics’ development of interactive multimodal technology-mediated distance education courses

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The provisional framework indicates that pedagogical, individual and institutional factors impact on academics’ adoption and integration of educational technology. Institutional factors include institutional motivations, enablers and barriers. Likewise, individual factors include opportunistic, pragmatic and personal motivators and inhibitors. Pedagogical factors concern both the institution’s educational aims and the individual academic’s educational goals and concerns. The provisional status of the framework has allowed for the investigation of other factors or issues that influence the adoption and integration of educational technology that have not been identified in other contexts. Moreover, the framework indicates that lessons learnt from past experiences with the adoption and integration of educational technology will impact on future directions.

2.8 Summary

In this chapter, pedagogical, individual and institutional factors that influence academics’ adoption and integration of educational technology for the design and delivery of interactive multimodal technology-mediated distance education courses were addressed. First, the transformation of distance education was discussed. Second, a discussion of the development of interactive multimodal technology courses and the adoption and integration of educational technology-mediated distance education courses was presented. Third, institutional motivations, enablers and barriers that influence academics’ adoption and integration of educational technology across a variety of educational contexts were reviewed. Fourth, individual factors that influence academics’ adoption and integration of educational technology were presented including pragmatic, opportunistic and personal dimensions. Fifth, a discussion of pedagogical motivations and concerns for academics in adopting and integrating educational technology was presented. Finally, based on the review of the literature, a provisional framework for investigating factors that influence academics’ adoption and integration of educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses was presented. In the next chapter, a discussion of the research methodology used to investigate the research question and key issues is provided.
Chapter Three

RESEARCH METHODOLOGY

In this chapter, the research methodology used to investigate the research question for this study is addressed, that is:

what are the pedagogical, individual and institutional factors that influence academics’ adoption and integration of educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses?

The chapter commences with an overview of the research process used for the study. The qualitative research design used for this study involving undertaking a single case study of USQ which was exploratory, intrinsic and embedded in nature is explained. Next, the multiple sources of evidence used for the case study are described. The protocol and procedures used for the in-depth, semi-structured interviews, the method for selecting participants for the study and the strategy used to analyse the multiple sources of data are explained. Finally, a discussion of ethical considerations for the research and limitations of the case study approach is provided.

An overview of the process used for undertaking this study is presented in Figure 3.1. The first two steps in the research process were addressed in Chapters One and Two.
Figure 3.1
Overview of the research process

3.1 Research methodology: Case study design

This study examined the pedagogical, individual and institutional factors that influence academics’ adoption and integration educational technology for the development of interactive multimodal technology-mediated distance higher education courses, as outlined in Chapters One and Two.
3.1.1 Qualitative research

The purpose of this study was to identify, understand and interpret the factors that influence academics’ development of interactive multimodal technology-mediated distance education courses, and focussed on the academic’s perspective. A qualitative research methodology was selected for the study because qualitative research is “a situated activity that locates the observer in the world…it consists of a set of interpretive, material practices that make the world visible” (Denzin & Lincoln, 2003, p. 4). Qualitative research acknowledges that knowledge is socially situated and is undertaken in natural settings with the researcher “attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them” (Denzin & Lincoln, 2003, p. 5). Moreover, qualitative inquiry facilitates the gathering of “rich data or thick descriptions, rather than the simple measurement of phenomena or experimental examination” (Denzin & Lincoln, 2003, p. 16). Where the researcher is seeking to gain an understanding of how and why factors influence people’s decisions and behaviours, a qualitative research methodology allows for the complexity and richness of explanations that emerge from the blend of a particular situation and the actors within it (Leedy & Ormrod, 2005). The exploratory nature of the case study design used for this study is discussed next.

3.1.2 Exploratory case study

The research design used for this study reflected: (1) the substance and form of the research question (e.g. what, when, where, how or why?); (2) whether the researcher had control over behavioural events; and (3) whether the focus was on contemporary, as distinct from historical events (Yin, 2003). The aim of this study was to determine what, and also how, pedagogical, individual and institutional factors have influenced academics’ adoption and integration of educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses. Questions of “what” and “how” lend themselves to an exploratory case study (Yin, 2003).

This study investigated issues that are relevant to academics’ development of interactive multimodal technology-mediated distance education courses at USQ. Due
to the unique context of this study, there was no attempt to quantifiably measure or test relationships between a pre-determined set of factors that influence academics’ adoption and integration of educational technology, as have other major quantitative studies investigating academics’ participation in distance education (see, for example, Betts, 1998; Schifter, 2000). Moreover, as the researcher had “little or no control over behavioural events” and was attempting to understand complex contemporary events, a qualitative exploratory case study design was deemed appropriate (Yin, 2003, p. 9). Indeed, the emphasis of an exploratory case study approach is on “discovery”, rather than confirmation of any pre-existing theory (Krathwohl, 1998, p. 230). A major advantage of the case study approach is that it allows the investigator to gain a richer, more holistic understanding of the phenomenon and the institution under study, and allows the researcher to go beyond pure measurement of attitudes and perceptions to explore people’s feelings and emotions through probing questions and clarification of issues raised (Krathwohl, 1998).

3.1.3 Single case study

As noted in Section 1.1.2, this study focused on the experiences of academics at the University of Southern Queensland (USQ). USQ is a major provider of distance education in Australia and is internationally recognised for its excellence in e-learning and electronic delivery of distance education courses (USQ, 2007a). While other major distance education providers in Australia such as Charles Sturt University, Deakin University and Edith Cowan University have also commenced development of distance courses in an interactive multimodal technology-mediated format, discussions with an instructional designer from Charles Sturt University (J. Buchan, personal communication, October, 2005), observation by the researcher of examples on the Institute of Learning and Teaching website of Deakin University (Deakin University, 2007), and recent discussions with an instructional designer and fellow researcher of interactive multimodal technology-mediated course development at USQ (M. Sankey, personal communication, October, 2007) indicate that these institutions are also in the relatively early stages of this process.
As discussed in Section 1.5, the researcher for this study has been actively involved with the development of interactive multimodal technology-mediated courses at USQ, and thus was specifically interested in identifying the pedagogical, individual and institutional factors that impact on academics at USQ and sought to uncover strategic implications and make recommendations for USQ management. Hence, the purpose of this study was to uncover issues that are pertinent to the development of interactive multimodal technology-mediated distance education courses at USQ, and these may or may not have been identified in previous studies that addressed academics’ adoption and integration of educational technology, participation in distance education or the delivery of online courses. Krathwohl (1998) argues that the single case study approach is particularly appropriate when the phenomenon being studied is complex and contextual factors are highly pertinent, as was the case with this study. In this case, the aims of the researcher were: (a) to see if factors found to influence academics’ adoption and integration of educational technology in other distance education contexts were also relevant to this context; and (b) to discover if other factors, specific to this context, were present. Hence, a single case study allowed the researcher “to determine whether a theory’s propositions are correct or whether some alternative set of explanations might be more relevant” (Yin, 2003, p. 40).

### 3.1.4 Intrinsic case study

Cases may be categorised as intrinsic or instrumental (Stake, 1995). An intrinsic case is one where the researcher is seeking to gain a deep and “holistic” understanding of a particular situation (Punch, 2005). Indeed, for this study, it was not the primary aim of the researcher to develop new theoretical explanations, as is the case with instrumental cases, but rather to gain a clearer understanding of the intrinsic aspects of the particular case under study (Berg, 2001). Hence, this research involved conducting a case study of the University of Southern Queensland which was exploratory, single and intrinsic in nature.

In this section, the research methodology used for this study, that is, a case study design of the University of Southern Queensland which was exploratory, single
and intrinsic in nature was discussed. In the next section, the methods used for collecting the research data are addressed.

### 3.2 Research method: Multiple sources of evidence

Multiple sources of evidence or data are required to conduct a case study, allowing triangulation of the data, leading to improved construct validity (Creswell, 2003; Yin, 2003). Construct validity concerns whether the researcher is actually measuring what was intended to be measured and is discussed in more detail in Section 3.5.1 (Cooper & Schindler, 1998). Multiple sources of evidence allow the researcher to gain multiple perspectives and determine whether the findings from each source corroborate the findings from other sources (Yin, 2003). Hence, multiple sources of evidence improve the reliability and accuracy of the results. Issues of reliability are also discussed in more detail in Section 3.5.1. The multiple sources of evidence used for this case study included:

- interviews: in-depth, semi-structured interviews with
  - a purposive sample of fourteen academic staff from three faculties across three adopter categories (viz., pioneers, early adopters and non-adopters)
  - three instructional designers who have assisted the pioneers and early adopters with the development of interactive multimodal technology-mediated distance education courses
- informal interviews with two managers from DeC
- document analysis: analysis of USQ documents related to the design and delivery of interactive multimodal technology-mediated distance education courses
- artefact analysis: analysis of examples of interactive multimodal technology-mediated distance education courseware developed by the pioneers and early adopters interviewed for this study
- self-reflective personal narrative: the researcher’s perspective on some of the issues raised in the interviews, based on her personal experience with the
development of interactive multimodal technology-mediated distance education courses.

Each data collection method is now explained, in turn, including a discussion of advantages and limitations of each method.

3.2.1 Interviews

This study involved conducting semi-structured in-depth interviews with a purposive sample of fourteen academic staff, three instructional designers as well as informal interviews with two managers from the Distance and e-Learning Centre (DeC). Academics were selected across three adopter categories viz., pioneers, early adopters and non-adopters (Rogers, 1995). Three instructional designers who have worked closely with pioneers and early adopters on the conversion of print-based courses to interactive multimodal technology-mediated format were also interviewed. The instructional designers were able to provide insights into the pedagogical and individual motivations of these academics as well as some of the institutional factors that have enabled or inhibited academics in the conversion of print-based distance education courses. The two managers from DeC are responsible for developing policies and procedures for the delivery of distance education materials at USQ and thus were able to provide insight into the current status of interactive multimodal technology-mediated courses at USQ as well as future directions.

The purpose of the interviews was to capture the individual academic’s perspective or point of view (Denzin & Lincoln, 2003). The in-depth interview is a common technique for gathering data, on a case by case basis, in the study of real-world issues involving people (Zikmund, 2000). In-depth interviews allow elaboration, fine detail, thick descriptions and a variety of perspectives arising from “contrasting and complementary talk on the same theme or issue” (Rapley, 2004, p. 18). Face-to-face interviews enable the researcher to capture non-verbal responses and to gain “special insight into subjectivity, voice and lived experiences” (Rapley, 2004, p. 15). Hence, during the interviews, the researcher observed non-verbals and body language to assist them to interpret what the interviewees were seeking to
explain and to guide the researcher in whether to pursue a topic or seek further clarification where ambiguity was detected.

The interview accounts are deemed to be co-constructed, as the researcher was actively involved in the topic of discussion, had her own experiences with the phenomenon of interest and thus held individual perspectives and viewpoints (Baker, 1997). Hence, when analysing the interview data, the researcher acknowledged that the interview data was co-constructed with the interviewer and the interviewee “mutually monitoring” one another’s conversation during the interview (Rapley, 2004, p. 16). Thus, the interview data reflects the co-constructed, shared meanings and perspectives of the interviewer and the interviewees.

A semi-structured interview technique was used. Gillam (2000) points out that, when done well, semi-structured interviews may be the most important form of interviewing for case studies as they yield the “richest single source of data” (p. 65). While the semi-structured nature of the interviews involved pre-determining the questions to be asked and the order in which they were asked, it also allowed for open-ended responses (Krathwohl, 1998; Yin, 2003). Hence, this approach allowed for some degree of structure, thus ensuring that the research questions and issues were covered while allowing flexibility for the emergence of issues or themes that had not been pre-conceived. Indeed, the interviews may be considered to be “guided conversations rather than structured queries” and were characterised by fluidity rather than rigidity (Yin, 2003, p. 89).

Interviews are a valuable source of data for case studies, as they allow the researcher to take a targeted approach and focus on key issues while gaining insight on the phenomenon under study (Yin, 2003). However, there are a number of limitations that should be acknowledged with interview data, including the need to manage the influence of the researcher and interviewees’ responses, and these are discussed next.

The aim of the researcher was to approach the study with scholarly disinterest so as to avoid setting out to find what she expected to find (Yin, 2003). The researcher in this study was a member of the pilot group for the development of
interactive multimodal technology-mediated distance education courses at USQ and, as discussed in Section 1.6, has been intimately involved in the topic of analysis and thus came to the study with a pre-existing set of beliefs, knowledge and understandings. Hence, the influence of the researcher’s perspectives on the interview accounts and findings cannot be ignored. Indeed, at times, it was difficult during the interviews for the researcher not to project her own values, perspectives, views, experiences onto the interviewees and to assume that they thought and felt the same way or that they perceived things in the same light.

Rapley (2004) argues it is misleading to purport to be neutral, when the active interviewer may have “overarching control … guide the talk, they promote it through questions, silence and response tokens (e.g. ‘okay’)” and “they decide which particular part of the answer to follow up” (p. 20). Hence, in interpreting the interview data, it was important for the researcher to recognise her potential, even if inadvertent, influence in the interview and her own position and likely subjectivity. Indeed, Denzin and Lincoln (2003) argue that:

there is no clear window into the inner life of an individual. Any gaze is always filtered through the lenses of language, gender, social class race, and ethnicity. There are no objective observations, only observations socially situated in the worlds of – and between – the observer and the observed. (p. 31)

Hence, when engaging in the data collection process and reporting the findings, the lens through which the researcher has interpreted the findings is acknowledged and made explicit. The researcher’s perspective is made evident in the postscript in Section 7.6. Nevertheless, when interpreting the data, the researcher sought to be as scrupulous as possible while recognising that the knowledge generated from the interviews was situated and acknowledging the presence of multiple realities (Rapley, 2004).

Care was taken with how questions and prompts were worded, phrased, structured and sequenced. The involved and empathetic interviewer seeks to promote dialogue rather than to interrogate the respondent (Ellis & Berger, 2003).
However, care was taken when probing for further information so as not to introduce or place greater emphasis on an issue than what was intended by the interviewee (Rapley, 2004). Further, due to the face-to-face nature of the personal interview, the researcher was aware of the potential influences of her non-verbal gestures. For example, she was aware that the expression on her face and other body language could be communicated to the interviewee. Hence, the challenge was to facilitate open discussion of questions and issues relevant to the research while avoiding “overly directing the interviewee’s talk” (Rapley, 2004, p. 20).

When asking people to discuss their experiences and perspectives it is necessary to recognise that perceptual processes impact on the data provided. Perception is defined as “the process by which people select, organise and interpret information to form a meaningful picture of the world” (Kotler, Brown, Adam, & Armstrong, 2004, p. 249). People’s perceptions are influenced by their past experiences, needs and motives. Thus, different people may perceive the same stimulus differently, leading to multiple realities. Moreover, when asking people to discuss their activities and viewpoints rather than observing their behaviour, some degree of self-reporting bias is inevitable. Indeed, Denzin and Lincoln (2003) explain “individuals are seldom ever able to give full explanation of their actions or intentions; all they can offer are accounts, or stories, about what they did and why” (p. 31). Responses during an interview may also be influenced by “poorly constructed questions” and “poor recall” or the interviewee telling the interviewer what they want to hear (Yin, 2003, p. 86). Hence, care was taken in the wording of the questions and the use of prompts to avoid overly influencing the interviewee’s conversation.

In summary, it was important to recognise the complexities of interviews and the need to be aware of the influence of the researcher on the interview data and factors influencing interviewees’ responses. Hence, in interpreting the interview data, these issues were acknowledged and made explicit.
3.2.2 Document analysis

USQ documents relevant to the development of interactive multimodal technology-mediated distance education courses have been examined. A summary of these documents and relevant content is provided in Appendix E. Document analysis allowed the researcher to gain an understanding of the institution’s strategic directions, policies, procedures and processes for the development of interactive multimodal technology-mediated courses. Hence, this data has been useful in understanding institutional factors that may enable or create barriers to academics’ development of interactive multimodal technology-mediated distance education courses at USQ. Document analysis included examination of policy statements regarding “transmodal” delivery at USQ, procedures and processes for the development of interactive multimodal technology-mediated courses, relevant staff development programs, web pages and other resources that have been developed to support staff with the development of interactive multimodal technology-mediated distance education courses.

Documents are “social facts, in that they are produced, shared and used in socially organised ways” (Atkinson & Coffey, 2004, p. 58). Atkinson and Coffey (2004) warn that documents cannot be considered to be “accurate portrayals” (p. 73) or “transparent representations” (p. 58) of an organisation’s policies, procedures or processes. Thus, they need to be supported with other sources of information. The value of documentary evidence lies in its capacity to “corroborate and augment evidence from other sources” (Yin, 2003, p. 87). However, it is important to check the authenticity and credibility of the documents and to be critical when interpreting the documents (Yin, 2003).

Documentary evidence may have the advantage of being stable, unobtrusive and exact and providing broad coverage across time, events and settings (Yin, 2003). However, documentary evidence may be difficult to access and retrieve and, if incomplete, may not be able to show all aspects of the phenomenon under study (Yin, 2003). Indeed, web pages on “hybrid” delivery, and later “transmodal” delivery, at USQ as well as web-based documents explaining the process for
developing these courses have been regularly updated since 2003. Thus, previous iterations and information (available, for example, at the time that pioneers and early adopter developed their courses) can no longer be retrieved.

3.2.3 Artefact analysis

During the interviews, participants who had converted their courses were asked for examples that demonstrated their approach to developing their interactive multimodal technology-mediated distance education course. These examples were analysed to determine the ways in which multimedia has been used and the approach that has been taken in terms of seeking to present content in a manner that may appeal to different sensory modes. These examples of multimodal courseware provided insight into the pedagogical and individual motivations underpinning the academics’ approach to the development of their course as well as the extent to which they have adopted and integrated educational technology.

3.2.3 Self-reflective personal narrative

As discussed in Section 1.5, the researcher has been actively involved in the development of five interactive multimodal technology-mediated distance education courses at USQ, has conducted research on students’ perceptions of these courses, and has published in this area (Appendix C). Thus, the researcher has experiences and perspectives that may provide further insight into the phenomenon under study. Hence, prior to conducting the semi-structured interviews, the researcher wrote and then analysed a self-reflective personal narrative based on the same interview questions that were directed at participants (Personal Narrative Group, 1989). Moreover, based on thoughts that arose during the interviews, further reflections of the researcher were captured.

As explained by Burnett (2003), personal narratives “often constitutes content which refuses to be blended into established theoretical approaches to writing” (p. 438). However, personal narratives or “stories” are “suitably grounded in experience as a research methodology” which seeks to “yield an innovative form of data and also a means of re/presenting or displaying this data to readers” (Burnett, 2003, p. 443). These documented reflections allow the researcher’s perspectives and position
on the topic of analysis to be made explicit and transparent and thus indicate the lens that has been used by the researcher when interpreting data arising from the other sources (Denzin & Lincoln, 2003). Hence, the self-reflective personal narrative allowed the researcher to reveal her subjectivity and “bring it forward for scrutiny” (Burnett, 2003, p. 434). The reflections of the researcher are captured in a postscript in Section 7.6.

In this section, the method for collecting the qualitative data for the case study was discussed. The data collection for this study involved analysing multiple sources of evidence including in-depth interviews, document analysis, artefact analysis and self-reflective personal narrative. In the next section, the protocol and procedure used for the in-depth semi-structured interviews is presented.

3.3 Interview protocol and procedures

In this section, the protocol and procedures used for conducting the in-depth semi-structured interviews with the academics and instructional designers are discussed. The interview protocol served two main purposes. First, it clarified precisely the questions to be asked in the interview (Yin, 2003). Second, it ensured that the questions covered the research issues which needed to be addressed to explore the research problem. The interview questions for this study were:

- developed from the literature and the researcher’s personal experiences with the topic of inquiry;
- designed to address the research question; and
- based on the main constructs within the provisional research framework (Figure 2.1).

As discussed in Chapter One, the central question addressed in this study was:

What are the pedagogical, individual and institutional factors that influence academics’ adoption and integration of educational technology for the
purpose of developing interactive multimodal technology-mediated distance education courses?

Three key issues and three sub-issues were explored to address the central research question, as follows:

1. What pedagogical factors influence academics to adopt and integrate educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses?
   a. What lessons have been learnt by academics who have developed interactive multimodal technology-mediated distance education courses?
2. What individual factors influence academics to adopt and integrate educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses?
3. What institutional factors influence academics to adopt and integrate educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses?
   a. What are the current attitudes of academics towards interactive multimodal technology-mediated distance education courses and what are the perceptions of students?
   b. What direction should USQ take with respect to the development of interactive multimodal technology-mediated distance education courses in the future?

The specific questions asked during the interviews for each academic adopter group and the instructional designers are presented in Appendix F. The preamble for the interviews is presented in Appendix G.

A pilot interview with one interviewee from each interviewee group \( (n=4) \) was conducted to allow the assessment of the usefulness, reliability and validity of the interview protocol and the efficacy of the interview procedures (Eisenhardt, 1989; Yin, 2003). Care was taken that the pilot interviewee was representative and not substantially different in any way from other members of the group under study.
(Stake, 2003; Yin, 2003). The pilot interview allowed the efficacy and appropriateness of the questions to be examined. First, the pilot interviews indicated that the questions in the interview protocol were relevant and appropriate to the research question. However, depending upon how, and to what depth, interviewees responded to earlier questions, later questions either became redundant and thus were excluded or were used as an opportunity to revisit in greater depth or summarise issues raised earlier in the conversation. Second, the pilot interviews reinforced the semi-structured nature of the inquiry and the need to be flexible or adaptive as interviewees raised issues in a more random manner than was anticipated and the interviewer was reluctant to break their train of thought or impede the conversation.

Interviewees were contacted personally by the researcher to seek their participation in the study, and when they consented, a suitable date and time for them was arranged. The interviews were conducted in the interviewee’s private office as it was considered that the interviewees would feel more comfortable in their own environment and they had ready access to artefacts (e.g. examples of their courseware) to show the researcher during the interview. Where possible, a time was selected to minimise interruptions such as the phone ringing or visitors arriving; however, there were still some interruptions. The interviews lasted between 45 - 90 minutes in duration.

The researcher sought to establish rapport with the interviewee in the early stages of the interview and thus achieve a “relaxed and encouraging” atmosphere (Ackroyd & Hughes, 1992, p. 108). As many of the interviewees were colleagues of the interviewer, it was relatively easy to establish rapport; however, it was still necessary to assure interviewees that there were no hidden agendas. The aim was to establish trust and thus encourage accounts that were authentic and truthful (Rapley, 2004). At the commencement of the interview, the researcher explained the purpose and perceived benefits of the study and interviewees were assured of confidentiality and anonymity (Appendix G). With the informed consent of the interviewees, the sessions were recorded to allow for ease of analysis and to permit the interviewer to focus her attention on what the interviewee was saying (Appendix H).
In this section, the interview protocol and procedures used for the semi-structured in-depth interviews were discussed. In the next section, a discussion of the selection of participants for the study is provided.

3.4 Selection of participants

The aim was to select participants for the study who were representative of the population of interest (Denzin & Lincoln, 2003). The population for this study was academics involved in the development of distance education materials at the USQ, Australia. However to allow for a broader perspective to be gained, the main subjects of analysis for this study were academics responsible for the development of the distance education course resources and the instructional designers who assist academics with the development of their distance education course resources.

In 2006, approximately 50 courses (of a total of 1000 courses offered by USQ in 2006) had been converted from print to interactive multimodal technology-mediated format. At the time of the interviews, only academics from three faculties at USQ (viz., Arts, Business and Education) had been actively involved in the development of interactive multimodal technology-mediated distance education courses; hence, only academics from these three faculties were interviewed. The three instructional designers assigned to assist academics in these faculties with the development of course resources were included in the study to provide insight on factors that influence academics’ adoption and integration of educational technology for the purpose of designing and delivering interactive multimodal technology-mediated distance education courses.

The interview process involved identifying knowledgeable informants, gathering a range of views, exploring “emergent themes with new interviewees and choosing interviewees to extend results” (Rapley, 2004, p. 17). In-depth interviews are time-consuming to conduct and analyse as they yield a vast amount of rich and complex data. Therefore, while it is desirable to gather a broad range of views, in the interests of thorough and timely analysis of interview data, it was also judicious to limit the amount of data gathered by limiting the number of interviews. Hence, the
number of interviews for this study was limited to fourteen academics and three instructional designers. Moreover, Tellis (1997) proposes that, due to time limitations, easy and willing subjects who maximise what can be learnt should be selected (Stake, 2003). Hence, purposive sampling was used and the researcher selected those academics who she believed would maximise what could be learnt.

Given the early stage of diffusion or development of interactive multimodal technology-mediated distance education courses at USQ, an issue of interest for this study was any potential differences between pioneers, early adopters and non-adopters (Rogers, 1995). The selection of pioneers and early adopters was based on the year that their course was converted. This involved selecting:

- four academics who converted their courses prior to 2005 (pioneers);
- six academics who converted their courses after 2005 (early adopters); and
- four academics who had not converted their courses (non-adopters).

In total, fourteen interviews of academics across three different adopter groups as well as three instructional designers were conducted, comprising four sub-units of analysis (Figure 3.2).

![Figure 3.2](image)

*Figure 3.2*
Embedded case study design
(Source: Adapted from Yin, 2003, p. 40)
These four sub-units of analysis are embedded within the single case study (Yin, 2003). Moreover, two managers from DeC were informally interviewed to gain insights on the current status and future directions of interactive multimodal technology-mediated distance education courses at USQ. These informal interviews were not recorded; however, the researcher took notes based on her questions for later analysis. The informal interviews were used for triangulation purposes and to corroborate the other sources of evidence (Yin, 2003).

The researcher purposively selected interviewees from a list of potential academics in each of the three adopter categories (Appendix D). A list of academics from the faculties of Arts, Business and Education, who had converted their courses to interactive multimodal technology-mediated format prior to 2006, was made available to the researcher by DeC management. Non-adopters were selected from the remaining academics in the faculties of Business and Arts. At the time of the interviews (2006), only one academic from the Faculty of Education had recently converted to interactive multimodal technology-mediated format and thus it was deemed too early to consider interviewing non-adopters in that faculty.

Due to the time it takes to conduct and analyse the rich and complex data arising from semi-structured in-depth interviews it was necessary to limit the number of interviews. However, every attempt was made to select participants who were representative of the faculties involved in the development of interactive multimodal technology-mediated courses and to interview academics from each of the three adopter categories. For example, within the Faculty’s of Business and Arts there are a range of discipline areas and hence, academics across a range of disciplines were included in the study. Likewise, gender representation was sought and attained in all three adopter groups (Appendix D). However, it is acknowledged that the limited number of cases may impact on the generalisability of the findings, particularly with respect to the larger non-adopter population (Stake, 2003).

In this section, an explanation of the selection of participants for the study was provided. In the next section, a discussion of the method used to analyse the data is presented.
3.5 Data analysis method

Analysis of the multiple sources of evidence for this case study involved identifying key themes or issues and was guided by the factors within the provisional research framework, as presented in Figure 2.1. The framework was provisional and under construction and thus care was taken when analysing interview accounts to allow for modification of the framework arising from complexity, rather than attempting to confirm these pre-conceived categories. The provisional research framework was based on factors identified from studies, and discussed in Chapter Two, concerning academics’:

- adoption and integration of educational technology for participation in distance education generally (Betts, 1998; Schifter, 2000);
- development of online courses (Chizmar & Williams, 2001; Ebersole & Vorndam, 2003; Maguire, 2005; Weston, 2005); and
- use of multimedia learning supplements in face-to-face learning environments (Evans & Gibbons, 2007; Young, 1998; Zwyno, 2003a).

First, NVivo 7 software was used to assist with the organisation (coding and categorisation) of the data for analysis. Numerous issues were raised during the interviews and these were coded to the relevant node (which represented the issue) and then nodes were categorised as pertaining mainly to pedagogical, individual or institutional factors. For example, if the interviewee discussed student learning styles, this was coded to a node called “learning styles,” and then “learning styles,” along with other issues related to pedagogy, for example, “cognitive overload,” were classified as pedagogical factors. As might be expected with a study of this nature, there was some level of overlap and thus, in some instances, it was difficult for the researcher to determine where an issue should be categorised. In this case, the researcher made a subjective decision as to which factor (pedagogical, individual or institutional) she believed the issue predominately belonged.
Next, the data was analysed to determine whether the pedagogical, individual and institutional factors that had been uncovered from the literature in other educational contexts were also evident in this context. This analytical technique or logic is a type of “pattern matching” and involved comparing “an empirically-based pattern with a predicted one,” as depicted in the provisional research framework (Yin, 2003, p. 116). However, the qualitative nature of this study went beyond simply identifying “what” factors influence the adoption and integration of educational technology and allowed an in-depth investigation of how these factors influence academics’ adoption and integration of educational technology, specifically, for the purpose of developing interactive multimodal technology-mediated distance education courses at USQ, what lessons have been learnt thus far, and what the future directions of interactive multimodal technology-mediated distance education course at USQ should be. The data was also analysed to determine if there were other factors and/or issues or “alternative explanations,” not previously identified in the literature, that were unique or particularly relevant to this context (Yin, 2003, p. 112).

When analysing the interview data, the researcher sought to determine if there were any differences across the various academic adopter groups and whether the instructional designers identified or emphasised different factors from the academics. For example, when investigating factors influencing academics’ participation in distance education, Betts (1998) and Schifter (2000) identified differences across participants, non-participants and administrators.

To ensure quality of analysis of the multiple sources of evidence used for the case, the analysis was based on the following four key principles:

1. analysis was based on relevant and multiple sources of evidence;
2. rival or alternative interpretations of the data were explored;
3. the most significant aspects of the case, as they related to the research question case issues were addressed; and
4. the researcher’s expert knowledge and prior experience with the topic of inquiry was used

(Tellis, 1997; Yin, 2003).
In this section, the method used for analysing the data gathered from multiple sources was addressed. In the next section, issues concerning the validity, generalisability and reliability of the results are discussed.

3.5.1 Validity, generalisability and reliability of the results

A critical issue with qualitative research is to demonstrate the reliability and transparency of results so that the findings can be trusted (Carson, Gillmore, Perry, & Gronhaug, 2001). Yin (2003) argues that results from a case study design should be trustworthy, credible, confirmable and dependable. The quality of research findings depends upon construct validity, internal validity, external validity and reliability (Yin, 2003).

Construct validity concerns whether the researcher is actually measuring what was intended to be measured (Cooper & Schindler, 1998). As discussed in Section 3.2, careful analysis of multiple sources of evidence allows for triangulation of the data, thus leading to improved construct validity (Creswell, 2003; Yin, 2003). Triangulation involves gathering “multiple perceptions to clarify meaning, verify the repeatability of an observation or interpretation” (Stake, 2003, p. 148). Yin (2003) argues that multiple sources of evidence allow the development of “converging lines of inquiry” (p. 98) or corroboration of phenomena and thus improve the accuracy and credibility of the findings. However, the limitations of data arising from these multiple sources and difficulties arising from interpretation of the data are also acknowledged (see Section 3.2).

Issues of internal validity, which concern whether there is a causal effect between the independent variable and the dependent variable or whether another extraneous or confounding variable is causing the relationship, are more applicable to explanatory or descriptive cases than for exploratory cases (Campbell & Stanley, 1966; Yin, 2003). However, while this case is primarily exploratory in nature, prior theory from other distance education contexts allowed some level of pattern matching. This involved determining whether factors and issues that influence the adoption and integration of educational technology in other distance education
contexts also applied in this context. Moreover, prior theory allowed for searching for alternative or rival explanations. This involved determining whether there are other factors or issues that influence the adoption and integration of educational technology in the context of the design and development of interactive multimodal technology-mediated distance education courses.

External validity concerns the extent to which the findings of this study can be generalised or applied to other settings (Campbell & Stanley, 1966; Leedy & Ormrod, 2005). Despite the exploratory and intrinsic nature of the study, the findings arising from this case may be generalised both to prior theory (Yin, 2003) and to other distance education universities developing interactive multimodal technology-mediated distance education courses. Indeed, despite institutional differences, many contextual factors are common across tertiary distance education providers (Stake, 1995). Moreover, Yin (2003) argues that for single case studies, generalisability primarily arises from methodological rigour (analytical generalisation) with generalisations being made to theory rather than to populations (Tellis, 1997; Yin, 2003).

The reliability of the findings is important in order to demonstrate the objectivity and credibility of the findings (Silverman, 2001). Reliability is defined as “the degree to which the finding is independent of accidental circumstances of the research” (Kirk & Miller, 1986, p. 20). Yin (2003) proposes that adhering to a case study protocol and the use of a case study database will facilitate reliability. In this study, reliability has been improved by careful and accurate transcription of the interview data and retention of the audio-tapes of the interviews and interview transcripts, thus allowing the data to be readily accessed if required (Perakyla, 2004). Moreover, the quality of the data has been improved by being methodical and maintaining quality control over the analysis procedures.

In this section, issues of validity, generalisability and reliability of the findings were addressed. In the next section, ethical considerations for the study are discussed.
3.6 Ethical considerations

Prior to conducting the study, permission to conduct the research and interview staff was gained from USQ management and ethical clearance for the research was gained from the Queensland University of Technology. Participation was voluntary and participants were required to sign an informed consent form before the interviews were conducted (Appendix H). Interviewees were asked to discuss their experiences and thus this study was deemed to be a low risk study.

It was essential to assure participants of anonymity and confidentiality, as they may have been concerned that their responses were not in line with institutional directives and thus be concerned about the possible ramifications for their professional standing within the institution. Only the researcher, her administrative assistant and the supervisory team had access to the interview recordings. Transcripts were de-identified and stored on a password-protected computer file, and informed consent forms and audio tapes were stored securely in a locked filing cabinet. To ensure anonymity, individual participants are not identified when findings are reported. Due to the small number of pioneers and early adopters, particularly in the faculties of Arts and Education, it was not possible to use identifying tags for interviewees during reporting as the need to preserve anonymity was paramount. In addition, when direct quotes from participants were used, care was taken that the participant who made the statement could not be identified by the nature or wording. These issues were addressed with the interviewee in the preamble for the interview (Appendix G).

3.7 Limitations of case study research

In Section 3.1, the case study approach used for this study was justified including a rationale for conducting a single case study which is exploratory, intrinsic and embedded in nature. However, the case study approach to research has been critiqued at three levels.
First, intrinsic case studies have been critiqued for their tendency to develop overly complex theories due to a focus on induction rather than deduction (Eisenhardt, 1989; Parkhe, 1993). While this study sought to develop and extend theory relative to this specific context, the study was based on prior theory embodied in the literature concerning academics’ adoption and integration of educational technology in other educational contexts. The purpose of this study was to apply and extend prior theory to the context of the development of interactive multimodal technology-mediated distance education courses. Hence, both induction and deduction were involved in this case study and this prevented the development of an overly complex theory that has little relevance for other contexts (Carson et al., 2001).

Second, case studies have been found to be logistically and operationally difficult to conduct (Eisenhardt, 1989; Parkhe, 1993). However, the development of a case protocol and careful planning minimised these problems. Moreover, as the case study concerned the researcher’s institution, access to relevant documents and interviewees was not difficult.

Third, the issue of external validity or generalisability must be acknowledged, particularly, when undertaking an exploratory single case study which is intrinsic in nature (Yin, 2003). Issues related to generalisability and the reliability and accuracy of the results were addressed in Section 3.5.1. The use of multiple sources of evidence and the embedded nature of case study design which involved investigating four sub-units within the single case study, improves the reliability of the findings (Yin, 2003). For example, by comparing the perspectives of different academic adopter categories as well as gaining perspectives of instructional designers and the researcher, it was possible to identify and corroborate common themes and issues and to identify discrete differences across the groups (Figure 3.2). Moreover, with a single case of an intrinsic nature, generalisability results from methodological rigour with generalisations being made to theory rather than to populations (Tellis, 1997; Yin, 2003).
3.8 Summary

In this chapter, the research methodology used to investigate the research question for this study was addressed. A qualitative research design involving a single exploratory case study of the USQ was conducted. The multiple sources of evidence used for the case study were explained and the advantages and limitations of each source were addressed. A discussion of the selection of participants for the study including academics across three adopter groups and instructional designers was provided, and then the embedded nature of the case involving four sub-units of analysis was addressed. The methods used to analyse the multiple sources of evidence was explained and finally, ethical considerations and limitations of the case study approach were discussed.
Chapter Four

PEDAGOGICAL FACTORS

In this chapter, an overview of the analysis of the data and a discussion of the interviewees understanding of the term “interactive multimodal technology-mediated distance education course” is presented. In the second part of this chapter, pedagogical factors that appear to influence academics’ development of interactive multimodal technology-mediated distance education courses are discussed.

In the previous chapter, the methodology used to explore the research question was presented. Multiple sources of evidence were used to investigate the research question. The primary source of information to address the research question was gathered from in-depth, semi-structured interviews. Four pioneers, six early adopters, four non-adopters, and three instructional designers were interviewed for the study. The interviewees came from various disciplines across three faculties, as summarised in Appendix D. To explore the research question, interviewees were asked to identify:

1. factors that have or may influence academics’ development of interactive multimodal technology-mediated distance education courses;
2. what their attitudes towards interactive multimodal technology-mediated courses are;
3. what feedback they have received from students;
4. what lessons they have learnt; and
5. what they see as the future direction of interactive multimodal technology-mediated distance education courses at USQ.
Throughout the analysis, other sources of evidence were used to provide further insight into the research question including:

1. relevant USQ documents;
2. informal interviews with two DeC managers;
3. examples of interactive multimodal technology-mediated distance education courseware; and
4. the researcher’s perspective captured in a self-reflective personal narrative.

The analysis of the interview transcripts was conducted with the assistance of NVivo 7 software which allowed the researcher to code and organise the interview data into key factors and issues. For the purpose of analysis and reporting, the issues were clustered into three major areas representing primarily pedagogical (Chapter Four), individual (Chapter Five) or institutional factors (Chapter Six). However, it is acknowledged that there is some degree of overlap between the factors. For example, pedagogical issues arise from both the institution’s educational aims and the individual academic’s pedagogical goals and thus these are addressed separately in this chapter. Issues were classified as individual factors if it was deemed that the individual academic had some control over that issue, and likewise, issues were classified as institutional factors if it was deemed these issues were within the direct control of the institution to change. However, many issues of concern to the individual academic are also of concern to the institution, and vice versa. To provide greater insight into individual academics’ motivations and inhibitors, individual factors were further classified as being primarily pragmatic, opportunistic or personal in nature.

In this section, an overview of the data analysis was provided. In the next section, the interviewees’ understanding of the term “interactive multimodal technology-mediated distance education course” is addressed.
4.1 What is an interactive multimodal technology-mediated distance education course?

The term “interactive multimodal technology-mediated distance education course” may represent different things to different people. As discussed in the background section to this study (Section 1.1.3), the University of Southern Queensland has used a variety of terms to describe courses delivered electronically, rather than in a traditional print-based package. In 2003, when the concept of delivering courses in CD format was first discussed at the University, these courses were referred to as “hybrid courses”. Likewise, a number of those interviewed for this research (in mid 2006) used the term “hybrid” to describe a course that was delivered primarily in CD format and included multimedia and hypermedia elements. However, some interviewees described a “hybrid” course as comprising a blend of printed materials, a course CD and an online course homepage, while others perceived the “hybrid CD” to be a total replacement of the traditional print-based package with the online component of the course (the course homepage) being peripheral to the core offering.

In 2006, the term “hybrid” was replaced with the term “transmodal” in USQ documentation (USQ, 2007b). This change in the nomenclature reflected USQ’s mission, at that time, to be Australia’s leading transnational educator (USQ, 2007c). The term “transmodal” was used to describe the delivery of course materials across a range of modes including on-campus, external and web. More recently (late 2007, and after the interviews for this research had been conducted), the term “flexi-mode” has been introduced in USQ communications to explain a concept whereby all students, regardless of mode of study (on-campus—across three campuses; external; or web) will receive an identical set of course materials. In order to achieve this cost-effectively, all course materials will be delivered online and/or via CD ROM.

The changing nomenclature, used at USQ since 2003, to describe a technology delivered course (“hybrid”, “transmodal”, “flexi-mode”) reflects a primary goal of USQ management which is cost-effective delivery of distance education courses across three modes (on-campus, external or web). However, Goal Four of the University’s Learning and Teaching Plan states that one of USQ’s strategies for
providing a flexible and responsive learning environment for students is to “develop a hybrid delivery mechanism, as a core educational resource for all courses as practicable, that accommodates different learning styles and opportunities” (USQ, 2006a, para 2). Likewise, the term “interactive multimodal technology-mediated course” used for this research refers to the way in which the course content is presented within a course; that is, in a manner that appeals to multiple sensory modes and different learning styles.

For the purpose of this research, an interactive multimodal technology-mediated course is defined as a course that involves the use of multimedia and ICT to develop engaging and interactive course resources and uses multiple presentation modes to represent the content knowledge and appeal to different learning styles and modal preferences (Birch & Sankey, 2008). While interviewees expressed slightly different perceptions of what the term “multimodal course” meant, for the most part, they perceived an interactive multimodal technology-mediated course to contain multimedia and hypermedia elements which are housed in a digital medium and could not be housed in the traditional print-based package and hence, represents a different way of delivering distance education course content.

In USQ documentation, interactive multimodal technology-mediated distance education courses are currently described as a “resource-based learning package on CD” (USQ, 2007b). These courses can include any or all of the following elements:

- introductory materials, study guide, essential readings, PowerPoint presentations, audio and video files, other multimedia applications and simulations, software, reference lists and links to online systems via USQConnect

(USQ, 2007b).

The pioneers and early adopters in this study identified a range of multimedia and hypermedia elements that had been included in their interactive multimodal technology-mediated distance education courses including:
• audio introductions at the beginning of each module
• video elements, including talking head introductions, lectures, student presentations, demonstrations, scenarios, interviews with experts
• recorded “Breeze” presentations (PowerPoint with audio) including lectures, and presentations on assessment items and the use of library resources (e.g. Web searching, using e-Books, Harvard referencing, etc.)
• interactive diagrams and simulations - animated diagrams with narration
• interactive quizzes and crosswords
• interactive drag and drop activities
• interactive forms and checklists
• links to external websites, including the online VARK learning styles inventory website and textbook websites
  o hyperlinked examples and activities
• links to online course homepages (USQ StudyDesk)
• links to USQ online resources (e.g. library, USQ handbook, etc.)
• spoken glossaries
• coloured illustrations, photographs, diagrams, charts, tables, etc.

An analysis of examples of the interactive multimodal technology-mediated course materials provided to the researcher by the pioneers and early adopters confirmed that these elements have been used. However, while every course has a similar format and “look and feel,” the extent to which interactive multimedia elements have been used varies greatly across courses with some courses having a much greater degree of technological enhancement and interactivity than others (Moreno & Mayer, 2007).

4.2 Overview of pedagogical factors

As discussed in Chapter Two, studies on factors influencing academics’ adoption and integration of educational technology in the distance education context have focussed primarily on institutional and individual factors with fewer studies adequately addressing pedagogical factors (Earle, 2002; Jafari et al., 2006). Issues of pedagogy
have been found to be critical to the effective implementation of educational technology (Mishra & Koehler, 2006). For example, a study on the development of online courses conducted by Chizmar and Williams (2001) revealed “for instructional technology to be effective, it must first be driven by pedagogical needs and goals” (p. 20). While the use of instructional technology for learning and teaching has been addressed in numerous studies across a variety of educational contexts (Moreno & Mayer, 2000; Naidu, 2003; Newby et al., 2000), fewer studies have specifically addressed pedagogical factors that influence academics’ adoption and integration of educational technology for the design and delivery of distance education courses (Kurz-McDowell & Hannafin, 2004).

Pedagogical factors revealed in the literature to influence academics’ adoption and integration of educational technology were summarised in Table 2.5. In this study, interviewees identified a wide range of pedagogical factors that appear to influence academics’ development of interactive multimodal technology-mediated distance education courses including:

- catering to the learning needs of different students (Section 4.3)
- improving learning outcomes, retention and progression rates (Section 4.4)
- challenging students to become independent learners (Section 4.5)
- replicating the on-campus experience (Section 4.6)
- revitalising the curriculum (Section 4.7)
- engaging students (Section 4.8)
- providing a rich learning environment (Section 4.9)
- providing manageable content (Section 4.10)

Each of these pedagogical factors is addressed, in turn, commencing with a discussion of the desire to cater to the learning needs of different students.
4.3 Catering to the learning needs of different students

A key theme that was raised during the interviews concerned the desire to provide a more equitable and inclusive learning package that catered for students with different learning styles and modal preferences, as well as different cohorts of students, including Generation Y (born between 1981–1995), ESL and disadvantaged students. This desire is in line with Key Goal Four in USQ’s Learning and Teaching Plan which is “to enhance and maintain a learning environment that has the structural ability to be flexible and responsive, in order to adapt to the diversity of student needs” (USQa, 2006, para 1).

4.3.1 Catering to different learning styles and modal preferences

The literature revealed that educators’ motivations for using multimedia and hypermedia include the desire to provide a more inclusive curriculum and improve learning outcomes by appealing to a range of learning styles or modalities (Butler & Blashki, 2003; Solvie & Kloek, 2007; Young et al., 2003). Interactive multimodal technology-mediated distance education courses include multimedia and hypermedia elements and thus appeal to a range of sensory modes (Sankey & St Hill, 2005). An underlying principle of the development of interactive multimodal technology-mediated courses is an understanding of VARK learning styles (visual/aural/read-write/kinaesthetic) or modal preferences for learning (Fleming, 2001). However, most previous studies concerning student learning styles have focussed on on-campus or face-to-face learning environments.

In line with the literature, most of the pioneers and early adopters indicated that they were motivated to cater to a range of student learning styles and modal preferences. The literature revealed that learners are more comfortable learning in an environment that reflects their predominant learning style (Felder & Soloman, 2001; Hazari, 2004; Kolb, 1984). Likewise, one pioneer concurred, “depending on the person’s modal preference, they pick the information up in a modality that they’re more comfortable with.” However, the extent to which academics perceive the need to adapt their materials to match the learning styles and modal preferences of
students appears to depend upon the academics’ degree of understanding of the different ways in which people learn. Moreover, and critically, the learning style of the academic appears to influence the way they teach, and in the context of this study, how they develop their distance education materials. This match between an academic’s learning style and how they develop their distance education materials was not evident in the literature examined for this research.

Most of the pioneers and early adopters revealed a sound understanding of their own learning style and were conscious of how their learning style influenced the way they teach and develop distance education learning materials. For example, one early adopter revealed she was a visual learner and thus emphasised the power of imagery and pictures in her learning materials to “inspire students to learn”. This finding is in keeping with the literature that revealed visual content, which has been traditionally undervalued in the tertiary education sector, has been found to lead to improved learning outcomes (Angeli & Valanides, 2004; Mayer, 2005). Another early adopter described himself as an aural/kinaesthetic learner, referring to himself as a “chatty kind of person” and describing his learning style as “more a hands on.” His learning style was also reflected in the way he developed his distance education learning materials which contained numerous audio and kinaesthetic elements.

Likewise, one of the pioneers considered he was “an auditory or a visual person” and consequently included audio elements in his course to assist students to learn.

However, one of the pioneers observed that “many academics don’t think about the way in which they learn and they actually transfer that on to their students.” Many academics are read/write learners, who performed well at university in a traditional read/write learning environment and hence, most university courses are designed and delivered in a way that favours read/write learners (Sarasin, 1999). Indeed, one pioneer acknowledged that he had been “inadvertently giving a small advantage to read/write students” because he “was presenting everything read/write.” One of the early adopters observed “some students learn by listening rather than by reading,” hence, he was motivated to provide “alternatives to just text, text, text.” Another early adopter believed “students are picking up the concepts a lot better when they can actually see and hear rather than just simply confined to reading.” However, an instructional designer explained that some read/write academics
“haven’t actually learnt to represent things in other ways,” or as one of the pioneers argued, “ways that might not be their preferred mode.”

Document analysis revealed that an information flyer titled Learning Styles: Responding to Diversity and a series of recorded Breeze presentations on learning styles and how to accommodate these in teaching and design and delivery of distance educations materials are now provided on the USQ Learning and Teaching Support Unit (LTSU) website (USQ, 2007d). However, these valuable sources of information were not available at the time that the pioneers and early adopters in this study were converting their courses.

The literature revealed that when material is presented in a variety of modes, learners may perceive that it is easier to learn and thus pay greater attention to the content, leading to improved learning performance (Chen & Fu, 2003; Moreno & Mayer, 2007). For example, some pioneers and early adopters explained that aural explanations of more difficult concepts or assessment items appear to be valuable, in particular for those students with an “auditory modality.” Hence, many pioneers and early adopters included video and audio elements in their courses as well as interactive diagrams to provide both a visual representation of the concept (illustrations and/or text) and an audio explanation (Fleming, 2001). While the impact of audio material on comprehension of content has been extensively addressed in the literature, less has been written about the use of purposefully designed interactive diagrams using visual, textual and aural explanations of key concepts (Sankey & St Hill, 2005). When espousing the benefits of these multimodal interactive diagrams, one pioneer commented “instead of just giving them a written version of it, I’m able to talk to them about it and I’m able to demonstrate it.” One of the instructional designers explained “multimedia rich material provides a lot of different things, different ways and different pathways to work through the learning material.”

Multimodal courseware facilitates student learning by allowing content to be presented in more than one sensory mode (dual-coding), known as “multiple representations” (Ainsworth & Van Labeke, 2002; Clark & Paivio, 1991; Mayer, 2005; Moreno & Mayer, 2007). One pioneer had extensively used multiple
representations in his course to “provide repetition and redundancy to maximise the message.” Research on his interactive multimodal technology-mediated course had revealed that these “multiple representations, together with constant reminders to the students about how they learn, actually improved their assessment outcomes.” Hence, interactive diagrams utilising visual, verbal and aural explanations appear to be a powerful learning tool for use in technology-mediated distance education courses. However, one of the instructional designers pointed out the need to be selective in the use of multiple representations and suggested, “you can only do that really with those concepts that are foundation to the course, otherwise you’d be going forever making this stuff.”

4.3.2 Developing a more inclusive learning package

Pioneers and early adopters indicated a desire to cater more effectively to the learning needs of various student cohorts including Generation Y, students with disabilities, and ESL students. In line with the literature, a number of interviewees observed that the younger generation (Generation Y) have grown up in a highly visual culture and “don’t read very well” (Walker & Chaplin, 1997; McGee & Diaz, 2007). One pioneer lamented “we constantly have problems with their ability to just get them to read the textbook.” Hence, one of the non-adopters acknowledged the need to be “pragmatic” and reduce the amount of reading material in courses in order to more closely match the needs of the younger generation and “keep them interested and coping.” An issue that has been less well addressed in the literature is the need to provide a more inclusive learning package for students with a physical disability (Adams & Brown, 2006). One of the early adopters had specifically sought to meet the needs of students with a disability in his interactive multimodal technology-mediated course by providing aural explanations for the visually impaired and transcripts of audio elements for the hearing impaired.

Another motivating factor for pioneers and adopters was a desire to cater more effectively to the needs of ESL students who appear to comprehend content more successfully from hearing and seeing the content (Flowerdew, 1994). Early adopters perceived that ESL students “want to hear it and see how it works” and thus appreciate the audio explanations of assessment items. One pioneer observed that
“having the audio as an accompaniment had been a major benefit” for ESL students because they can listen to the audio “as many times as what they want.” Smidt and Hegelheimer (2004) found that a web-delivered lecture video, comprising oral and textual elements, enhanced the listening comprehension and “incidental acquisition of vocabulary” of ESL speakers (p. 530). Likewise, one of the instructional designers elaborated on the benefit to ESL students of “hearing how the words are actually put together, even pronunciation of terms and jargon which is within that particular content area.”

4.4 Improving learning outcomes, retention and progression rates

Previous studies have revealed that a key goal of educators in adopting and integrating educational technology is to improve student learning outcomes (Capobianco & Lehman, 2004; Sankey & St Hill, 2005; Zwyno, 2003b). Studies of undergraduate marketing students’ (n=117) perceptions of interactive multimodal technology-mediated distance education courses revealed that students believed the interactive course CD assisted their performance in the course (Birch & Gardiner, 2005). In line with the literature, the instructional designers observed that academics involved in the development of interactive multimodal technology-mediated courses are motivated by the opportunity to “increase or improve the level of learning that goes on in the students’ minds.” For example, one early adopter believed that recorded lecture presentations “keep the attention span focused.” Interactive multimodal technology-mediated delivery allowed another early adopter to “emphasise some of the content that was important.” Yet another early adopter explained that in order to assist students “to understand the concepts a lot better,” she kept her recorded presentations “simple,” used “conversational language that students could understand” and provided “numerous examples.”

Complex learning and the development of higher-order skills is becoming increasingly important for today’s graduates (Cowan, 2006; Jochems et al., 2004). The literature revealed that educational technology has led to improved student inquiry and the development of higher-order and critical thinking skills (Capobianco
& Lehman, 2004; Kandlbinder, 2004; Tan et al., 2006). In line with these findings, some of the pioneers and early adopters expressed the desire to encourage higher order thinking and reflective learning as a means of improving student learning outcomes. For example, two early adopters discussed the desire to move students towards higher order thinking while one of the pioneers aimed for more reflective learning. This pioneer explained that “having the range of modalities catered for and getting them [distance students] to actually reflect and talk” was an “important aspect of the teaching strategy.”

Moreover, the desire to assist lower achieving students and thus improve student retention and progression rates was expressed by some interviewees. While one of the non-adopters proposed that interactive multimodal technology-mediated courses may lead to improved retention for the “better student,” one of the pioneers reported that, since converting his course, “high distinctions and distinctions are basically unchanged.” However, there had been a marked improvement in the lower grades, with fewer failures. This finding was in keeping with the findings of a previous study on the use of hypermedia instruction which revealed benefits for lower achieving students, especially at the lower levels of cognition including comprehension and application (Zwyno, 2003a). Solvie and Kloek (2007) found that lower achieving students tend to have a strong learning preference, whereas higher achieving students do not and this may explain differences of performance with multimodal courseware that caters for a wider range of learning styles.

While the link between educational technology and learning outcomes has been frequently addressed in the literature, the issue of using interactive multimodal technology mediated courseware as a means for improving retention and progression of distance education students had not been addressed in the literature examined for this study. Allocations of the Australian Government’s Learning and Teaching Performance Fund are partially based on retaining and progressing students, and hence, issues of student retention and progression are high on the agenda for USQ, as well as individual academics (Department of Education Science and Training, 2007). For example, one pioneer stated he was “highly motivated to get the failure rate down” in his course “without compromising academic standards.” Another pioneer argued; “from the point of view of the university’s strategy, with the pastoral care of
retention and getting people to progress, I think it [the multimodal course] is making a contribution.” Indeed, one pioneer who previously had a course “drop-out” rate of 25 percent, stated “no-one drops out anymore.” One of the early adopters also reported a reduction in the “drop-out” rate in his course, while another early adopter proposed that because students “feel rather connected, the retention rate will be higher as well.” However, one of the instructional designers cautioned that it may be too early to draw strong conclusions about the impact of interactive multimodal technology-mediated courses on the retention and progression of distance education, and emphasised the need for further research.

4.5 Challenging students to become learner-centred, self-directed, resourceful and independent learners

The literature revealed that the adoption and integration of educational technology has led to more student-centred and interactive approaches which support the shift away from teacher-centred, instructivist styles of teaching toward a more learner-centred constructivist approach (Bruner, 1990; Laurillard, 2002). Interactive distance education, designed in response to advances in technology and access to rich information on the Web, provides a richer environment for learning, more in line with a constructivist approach (Cowan, 2006; Jonassen, 1999; Laurillard, 2002; Markel, 1999; Salter & Hansen, 2000; Solvie & Kloek, 2007). However, much of the debate concerning the use of educational technology to support a constructivist approach in the literature has focussed primarily on the use of online discussion forums to facilitate collaborative learning and the social construction of knowledge, with less focus on other learner-centred activity such as searching for resources and information and independent learning (Wilson, 1996; Hirumi, 2002).

The desire to challenge students to become more learner-centred, self-directed, resourceful and independent learners was raised by a number of the interviewees. For example, two instructional designers observed that academics who have converted their print-based distance education courses to interactive multimodal technology-mediated format appear to have changed their “approach of traditional
teaching into a more learning-centred style and into one that really includes the students and engages the students in a different way.”

With technology-mediated courses, the student is encouraged to explore the electronic resources in their own time and at their own pace, and interact with the various elements housed in these learning environments (Buchan et al., 2005). Likewise, one pioneer sought to get his students to become “very much the independent learner” and “more exploratory in the way they learn.” His aim was to “challenge the existing paradigm of how students approach the learning process.” To this end, he had removed a lot of the textual content and “spoon-feeding” from his course and set students the “challenge of finding equivalent material on the Web.” He encouraged students to conduct “adequate research of their own to understand the principle and to be able to apply it.” Likewise, an early adopter discussed his desire to challenge students, so that they “don’t just stay in their comfort zones.” Yet another early adopter emphasised the importance of a more “participative education model” with students taking greater “ownership” of their learning. Another early adopter observed that her students were “comprehending the material better” and were “becoming more independent learners and more confident.”

The need for students to be able to engage with computer technology, communicate effectively in the electronic environment and become competent with the use of multimedia has encouraged some educators to adopt educational technologies (Buchan et al., 2005; Eastman & Owens Swift, 2001; Maguire, 2005). Indeed, one of the pioneers advised that she had moved to an interactive multimodal technology-mediated format because she wanted her distance education students to experience new technologies for themselves. She sought to “challenge students technically as well as in other ways.” Likewise, a number of those interviewed, including non-adopters, identified the need for graduates to be able to use technology themselves and be comfortable and competent operating, searching for information and communicating in an electronic environment.
4.6 Replicating the on-campus experience

A key motivation raised by adopters of the interactive multimodal technology-mediated approach to distance education courses concerned the ability to overcome the limitations of the traditional print-based distance education package by using educational and communications technology to replicate, at least to some extent, aspects of the on-campus experience. This is an issue that has not been adequately addressed in the literature examined for this study. Indeed, much of the literature on academics’ adoption and integration of educational technology has concerned their willingness to shift away from face-to-face on-campus teaching to teaching online, or some combination of the two (“blended” delivery) (Betts, 1998; Chizmar & Williams, 2001; Schifter, 2000; Maguire, 2005). In a “blended” model, students reap the benefits of both an on-campus and an online experience. However, this study focuses on the shift from a static “correspondence” (read/write) distance education model in which students do not have the benefit of an on-campus experience, to a more dynamic and interactive multimodal technology-mediated model whereby some aspects of the on-campus students’ experience may be replicated.

Indeed, pioneers perceived that a key motivation for developing interactive multimodal technology-mediated courses was the potential to make the “on-campus and off-campus less different” and to “replicate the on-campus experience for the external students.” One non-adopter also perceived the capacity to make “external offerings just as meaningful as the internal offerings.” When referring to the capacity of technology to bridge the gap between on-campus and distance education, one of the pioneers commented they “like the way technology can bring a lot of things together…technology has no boundaries between what is distance education and what is not.” Issues related to replicating the on-campus experience included the capacity to facilitate multimodal learning, provide an equitable learning experience for all students, develop a social presence and rapport, achieve greater interactivity and provide timely feedback. Each of these issues is now addressed, in turn.
4.6.1 Facilitating multimodal learning

Multimodal learning is inherent in the on-campus experience with students using a range of sensory modes (visual, aural, read/write, kinaesthetic) to learn during lectures, tutorials, workshops where material is presented to them in range of presentation modes (visual and verbal). However, the traditional “correspondence” distance education model, whereby students are presented with a set of textual print-based materials, caters primarily to students with a read/write modality. As discussed in Section 4.3.1, interactive multimodal technology-mediated courses cater for different learning styles and modal preferences and thus facilitate multimodal learning. As explained by one of the early adopters, “multifaceted delivery” can be achieved in an interactive multimodal technology-mediated distance education course.

4.6.2 Providing an equitable student learning experience

As discussed in Section 4.3.2, interactive multimodal technology-mediated distance education courses allow for the delivery of a more inclusive learning package. Goal Four of USQ’s Learning and Teaching Plan identifies that one of the University’s strategies is to “ensure equity of educational experience across modes of delivery” (USQa, 2006, para 2). Indeed, replication, where possible, of the on-campus experience for external students was perceived to be a question of equity for one early adopter who argued, “if they (external students) are part of our program,” they should be “treated in an equitable way.” Another early adopter revealed that by recording a presentation for her early childhood students concerning their practicum, she had provided consistent and equitable advice to both on-campus and external students. In addition, she provided her distance students with videos of activities conducted in her on-campus early childhood classes such as “demonstrating a baby massage” or a “finger play of hot cross buns.”

4.6.3 Personalising the course and developing a social presence

Educational technology has allowed greater personalisation of the learning experience for distance learners and facilitated high-quality instructor to student interactions (Buchan et al., 2005; Waddoups & Howell, 2002). In keeping with the
literature, the ability to use communications technology and multimedia to personalise the course, develop a social presence and closer relationships with distance students were identified as major benefits of interactive multimodal technology-mediated distance education courses. For example, one pioneer prepared video lectures and believed “students really enjoyed seeing their lecturer” and “actually like to have a personal relationship with their lecturer.” Another pioneer also perceived the recorded lectures allowed him to “personalise the instruction a little bit more” and emphasised that “for a significant number of students that seems to be an important motivator.”

Educational technology can be used to develop a social presence which is especially important in creating a sense of connectedness and reducing the feelings of isolation that distance education students often feel (Birch & Volkov, 2007; Oliver & Goerke, 2007). One early adopter explained “personalising information” allows an external student to feel “much more connected” and less “isolated.” Another early adopter explained “we’re giving a virtual presence somehow.” Having received favourable feedback from distance education students on hearing her voice, another early adopter “realised the importance of making that connection with the students.” One of the instructional designers also observed that audio can be used to create “a kind of social presence.”

One early adopter emphasised the value of developing a greater rapport with distance education students and breaking down perceived barriers. Another early adopter explained the value of recorded lecturers in creating a “lovely connection, where there was no ability to do that in any other mode.” Recorded elements were perceived as valuable by one of the non-adopters because students “know what your voice is like and they can see what you look like and the relationship is a bit closer.” One of the instructional designers perceived students “feel a bit more engaged with the materials, because they’re actually hearing there’s a person involved with the course, not just a name and a photo.”
4.6.4 Gaining greater interactivity

For educators to effectively adopt and integrate educational technology, they need to understand the relationship between learning, interactivity and technology (Mishra & Koehler, 2006; Rockwell et al., 1999). Discussions of interactivity in the distance education literature have focussed primarily on increasing interaction between students or with instructors via online discussion forums. However, interaction with the content itself is also an important educational goal. Interactivity was perceived by many of those interviewed to be a major benefit of the on-campus learning experience. Thus, the desire to achieve a higher level interactivity for distance students was a key motivator for these adopters. For example, one pioneer explained she had tried to “give off-campus students the same kind of interactivity” that she had achieved in her on-campus classes.

An interactive multimodal learning environment is defined by Moreno and Mayer (2007) as “one in which what happens, depends on the actions of the learner” with the goal of improved learning (p. 310). Interactive multimedia objects have been found to lead to greater retention of information and faster problem solving than non-interactive multimedia learning objects (Evans & Gibbons, 2007, p. 1156). Five common types of interactivity were identified by Moreno and Mayer (2007), namely “dialoguing, controlling, manipulating, searching and navigating” (p. 311). In line with the literature, pioneers and adopters of interactive multimodal technology-mediated distance education courses had sought to achieve greater interactivity with the course content itself by including interactive learning objects such as interactive diagrams, simulations, drag and drop diagrams, quizzes and crosswords, thus allowing students to control and manipulate the content and, in some cases, gain immediate feedback (dialoguing).

The instructional designers commented on the ability to include interactive elements and “more learner-centred activities” with students doing more “hands-on things” to provide “an added way to learn a particular concept,” “make the course more interesting” and achieve “active learning.” The interactive diagrams and recorded lecture presentations also encourage higher interactivity, as students are
able to control the learning environment by determining “the pace/and or order of presentation” of the material (Moreno & Mayer 2007, p. 311). Another strategy for increasing interactivity in the interactive multimodal technology-mediated course involves the use of embedded hyperlinked examples and activities which encourage students to search and navigate for relevant information.

Some of the pioneers and early adopters indicated that they had also used the online course homepage element of their course to encourage greater interactivity in terms of developing a dialogue. The literature revealed that online discussion boards encourage students to develop learning communities, collaborate and engage in active dialogue to construct knowledge through sharing and reflecting upon their experiences and perspectives, and provide feedback to one another (Wilson & Stacey, 2004). In line with these findings, early adopters observed that, since developing their interactive multimodal technology-mediated courses, “discussion groups have a higher level of interactivity and a much more sophisticated level of activity than what they’ve had before” and that “students are talking to one another about issues and coming up with solutions.”

When making recommendations for future adopters of interactive multimodal technology-mediated courses, one pioneer suggested that academics “go with interactivity, rather than content, because content is something you can always change and they [students] can access in different ways.” Likewise, an early adopter agreed distance education students “want more of an interactive environment and want to be stretched beyond just the lecture content,” which, in agreement with Cowan (2006), he argued, they “can get anywhere, anyway.” However, one of the instructional designers observed that some academics had “tried to build in a lot more interaction, but have been frustrated by either lack of student uptake or the time it takes then to maintain that online interaction.”

A continuum of interactivity within multimodal learning environments ranging from highly interactive to non-interactive was identified by Moreno and Mayer (2007). Indeed, an analysis of the examples of multimodal course materials provided to the researcher indicated that the degree of interactivity that pioneers and early adopters had built into their interactive multimodal technology-mediated
courses varied, ranging from high interactivity to low interactivity. Indeed, one pioneer confessed that “the term interactive is a bit of misnomer, especially on my CD.” However, this pioneer had made extensive use of his online course homepage to communicate with students and encourage interaction. A range of strategies are suggested by Moreno and Mayer (2007) to enhance interactivity in multimodal learning environments including interactive games and simulations, on-screen pedagogical agents, digital libraries, video cases, embedded authentic assessments. Some of these strategies were also identified by pioneers and early adopters as elements that they would consider including in the next iteration of their course.

Despite the promise of improved learning outcomes, academics need to be assured that educational technology and interactive learning elements represent perceived value for students in terms of improving their learning performance (Evans & Gibbons, 2007; McGee & Diaz, 2007; Moreno & Mayer, 2007; Jacobsen et al., 2002). Indeed, as discussed in Section 4.4, interviewees across all groups identified the need for further research on the impact of interactive multimodal technology-mediated courses on student learning outcomes.

4.6.5 Providing timely feedback

Provision of timely feedback is an important part of the learning sequence and has been linked to student satisfaction and improved learning outcomes (Gagne, 1977). One early adopter highlighted the importance of “instant feedback” for the younger generation whom he argued is seeking “instant gratification.” However, a major deficit of the traditional print-based distance education model is the inability to provide students with immediate and individualised feedback. Educational technology allows for the provision of individualised and more immediate feedback (Knowlton, 2002). In order to provide timely feedback, some adopters included interactive quizzes or crosswords in their interactive multimodal technology-mediated course, so that students “can test themselves and then if they don’t get it right, feedback comes up for them to show them where they went wrong.” One of the instructional designers also observed that interactive quizzes and crosswords can be effectively used by students “as a pacing device” and a means of encouraging students to undertake “self-assessment to gauge how they’re going.” Likewise, the
course homepage was used by pioneers and early adopters to provide regular and timely feedback to students’ inquiries and, in some instances, had been used for online submission of assessment items, thus allowing more timely feedback on performance.

4.7 Revitalising the curriculum

Previous studies on the adoption and integration of educational technology for distance education purposes has uncovered benefits associated with improved instructional design and curriculum and, in some cases, significantly changed the ways that teaching, learning and assessment occur (Dooley & Murphrey, 2000; Franklin et al., 2001; Waddoups & Howell, 2002). Educational technologies provide an opportunity for innovative instruction, new ideas, enhanced course quality and the application of new teaching techniques (Maguire, 2005; Mishra & Koehler, 2006; Rockwell et al., 1999; Weston, 2005). In line with these findings, pioneers and early adopters perceived an opportunity to revitalise the curriculum and change the way their course was currently delivered. For example, as a means of revitalising his course, one pioneer first made time to “talk to other people about the content of the course and new ideas and new concepts” and reconsidered whether he “was pitching it too high or too low.” On the advice of an instructional designer, one early adopter commenced the conversion process by developing a conceptual map of the course. Another early adopter explained she had taken the opportunity to redesign a course she had inherited and which had very little content.

However, Covington et al. (2005) found that non-adopters of educational technology may be “entrenched in traditional tools and pedagogies” (p. 9). Thus, shifting from a traditional teaching paradigm and established practices may take some time, with one early adopter suggesting “it’s going to take a long time to change people’s attitudes.” For example, one early adopter confessed he “was locked into teaching in the traditional way,” however, “negative student feedback” had motivated him to reconsider his approach to course design and delivery. Another early adopter discovered, only during the conversion process, that
substantial changes to her course were required. She reflected “I’ve got much more recent material in there. I just think a little bit more deeply about some things.”

When using educational technology, “simultaneous innovations in pedagogy, curriculum and assessment” may be required (Dede, 1997, p.13). Further, due to “the uniqueness of technology-based instruction,” there is a need “to adopt more rigorous course requirements and design, development, delivery and evaluation” (Valenta et al., 2001, p. 112). Indeed, while the opportunity to revitalise the curriculum was identified as an exciting prospect for some academics, instructional designers highlighted the need for careful planning and implementation. For example, one instructional designer emphasised “it’s got to be well planned, it’s got to be well thought through, and then it needs to be executed and implemented in a fairly careful way.” Another instructional designer recommended first, determining the “outcomes and the objectives planned for the course,” and then determining what multimedia and media mix will be used. Likewise, another instructional designer suggested identifying “what concepts in the materials we can represent in alternate ways” in order to “make it more meaningful to the students.” Hence, while the development of interactive multimodal technology-mediated distance education courses provides an opportunity to revitalise the curriculum and rethink the way the course is delivered, it also relies upon careful planning and implementation.

4.8 Engaging students

Engaging students in the learning is another major benefit of the on-campus experience which can be very difficult to achieve in the traditional print-based distance education approach. The opportunity to provide a more engaging learning environment for their students through the use of multimedia has encouraged some academics to adopt and integrate educational technology into their courses (Ebersole & Vorndam, 2003). This desire to engage distance education students in the learning has received limited attention in the literature, and yet was identified as a key motivation for developing interactive multimodal technology-mediated distance education courses.
Interactive multimodal technology-mediated distance education courses include multimedia to appeal to a range of senses and have been found to create a more enjoyable and engaging learning experience as well as improved student performance (Sankey & St Hill, 2005). Likewise, pioneers and early adopters expressed a desire to enhance the students’ learning experience by making learning fun and enjoyable and developing exciting and “enlivened” materials. Early adopters and instructional designers also perceived the opportunity to use technology to make courses “fun,” less “boring,” more “dynamic” and more “exciting for first years and the Y generation.”

Strategies for engaging students and making learning more enjoyable and exciting included the use of humour, variety and colour. While humour can be achieved in print-based materials through the use of examples or illustrations, some of the adopters observed the enhanced opportunity to include humour in the recorded lecture presentations. For example, one of the pioneers, who had always used cartoons in his on-campus lectures, included these cartoons in his video-recorded lectures for his interactive multimodal technology-mediated distance course. He discussed how these humorous elements made the course more enjoyable and assisted with retention of information. He explained:

my students used to roll in the aisles, because I’ve got these great cartoons of this little fellow, who looks just like me you know, and the students would crack up when I put that up. But see, they remember. They’ll remember that slide.

Likewise, one of the early adopters pointed out that recorded lecture presentations “allow you to do kind of voice-overs, add a bit of humour and a bit of that human element.” However, another early adopter acknowledged that humour may be less successful in a pre-recorded lecture, “because you haven’t got the dynamic interaction between people” which is present in a live lecture. She explained “I’m talking to a microphone, so it’s not quite the same, but I do try to make it sound as relaxed as I possibly can and try to use humour.” Moreover, one pioneer issued a word of caution on the use of humour and the need to be culturally sensitive. He
observed “because of my weird sense of humour, I have to be very, very careful not to add a flippant comment, because for some of the non-English speaking students they can be disconcerting.”

Inherent in the interactive multimodal technology-mediated course format is the capacity to make the course more engaging by providing greater variety. The pioneers and early adopters used different media as one means of providing greater variety. One early adopter also used “varied contextual information to make the content applicable and more meaningful to my audience.” Another early adopter used a variety of people for interview snippets on various topics, while another early adopter tried to “make it more attractive” to his target audience by putting a “bit of a ‘razzle-dazzle’ on things.” According to one non-adopter, the variety that can be built into an interactive multimodal technology-mediated course should “help keep student’s interest and keep them studying.”

Another benefit of interactive multimodal technology-mediated courses is the capacity to make them more engaging and provide variety through the use of colour. Compared with the high cost of using colour in printed materials, colour can be used cost-effectively in technology-mediated interactive multimodal technology-mediated courses. Pioneers and early adopters used colour in diagrams, tables, conceptual maps and illustrations to make their course more aesthetically or visually appealing. One pioneer gained a new appreciation of the value of colour when her black and white diagrams from her print-based package were converted into “pretty colours” and electronic “interactive” format. One of the early adopters used colour coding in the conceptual map for his course to assist students to identify different modules and determine how they are linked to other modules. Another early adopter commented “it sounds silly, but it really makes it much more visually appealing to have things like photographs or even cartoons and things like that, to just ‘jazz it up’ a little bit.” This use of illustrations as effective pedagogy is grounded in the literature, with Mayer (2003) contending that students learn more deeply from a combination of words and pictures than from words alone. Shah and Freedman (2003) expanded on the many benefits of using visualisations in e-learning contexts including maintaining learner attention by making information more attractive and motivating.
4.9 Providing a rich learning environment

Many educators strive to provide “rich, meaningful, realistic learning tasks as the driving force for learning” (Jochems et al., 2004, p. 3). The literature revealed that educational institutions have taken the opportunity to provide a richer learner environment and enhance the distance learning experience for their students by adopting and integrating educational technology (Bates, 2006; Buchan et al., 2005). In particular, the Web has provided a major source of rich global information (Dooley & Murphrey, 2000; O’Donoghue et al., 2001).

The ability to take advantage of this vast “wealth of materials available globally” and thus provide students with a value-added, rich learning environment, “which you just can’t do in the print environment,” was identified by many interviewees as another major motivation for developing interactive multimodal technology-mediated distance education courses. According to one early adopter, examples from the Web, web-based activities, electronic readings and articles, and informative websites deliver “dynamic learning materials, rather than just passive.” Indeed, an early adopter was particularly excited that his students were using the information accessed from the Web via external hyperlinks on his course to raise issues on the online discussion board. Non-adopters also recognised the possibility of providing external hyperlinks to industry-focussed resources. However, one of the pioneers warned that, while some websites are of great value, others lack “credibility”. Thus, one needs to be careful that students are accessing websites that provide accurate and useful information.

4.9.1 Providing current, relevant, meaningful and applicable information

The literature revealed that the development of technology-mediated courses may result in a more current and relevant curriculum (Smith, 2001). Multimedia applications such as video and audio segments or interactive simulations have facilitated situated learning, brought subject matter to life, and provided the basis of authentic assessment tasks based on real-life situations (Laurillard, 2002; Raider-Roth, 2004). In line with the literature, an important motivation for many of the interviewees was providing students with current, relevant, meaningful and
applicable content. For example, one pioneer wanted students to “relate to the material and be able to transfer that into where they are, what their values and attitudes are, what they’re planning to do with it,” while another pioneer wanted students to “relate it to their everyday experiences.”

According to one instructional designer, pioneer and early adopters “wanted to build in activities that would make students stop and think about what they’d learnt and apply it in practice.” For example, one early adopter sought to make her course content more meaningful “through lots of pictures, lots of anecdotes and lots of things that will inspire them.” She explained that “you can read it as much as you want in the textbook, but unless you actually hook it onto something that’s applicable and that’s meaningful to them out in the real world, it doesn’t become practice.” In line with the literature, this early adopter had also used educational technology for vicarious learning and modelling purposes by demonstrating processes, principles and concepts, for example, doing a baby massage or a finger play (Buchan et al., 2005).

One issue that does not appear to have been addressed adequately in the literature was the need for distance education materials to be prepared well in advance, thereby creating the potential for course content to become dated before the course is offered. However, links to the course homepage and useful websites in technology-mediated courses allow the provision of current and updated information. The pioneers and early adopters valued being able to upload up-to-date articles, particularly, in discipline areas where content is constantly changing. One non-adopter also recognised the potential of providing updated and relevant information, in order to “bring the subject more to life.”

4.10 Providing manageable content

Given the vast amounts of information available in the electronic environment, there may be a temptation for academics to add more content as well as various multimedia elements. Hence, some academics have expressed concerns about issues of limited working memory, split attention and cognitive overload arising from
multiple representations of content and the potential for the overuse of information and learning objects that may distract from the core content, thus leading to less learning (Jochems et al., 2004; Moreno & Mayer, 2007; Sankey, 2005). In line with these authors, many of the interviewees were concerned that the increased amounts of information that can be provided in technology-mediated course could be overwhelming and may lead to cognitive overload. Hence, there is a need to provide students with a manageable amount of content. A number of strategies were identified to address this need to manage the content including:

- rationalising and prioritising the course content;
- providing manageable chunks of content;
- avoiding cognitive overload while adding value;
- providing direction on use of the resources; and
- selling the multimodal course concept.

Each of these issues is now addressed, in turn, commencing with the need to rationalise and prioritise the course content.

4.10.1 Rationalising and prioritising the course content

Many pioneers and early adopters perceived that converting their print-based course had provided an opportunity to rationalise and prioritise the course content. In many courses, there had been a reduction of the textual content with it being replaced with alternative representations of the material. Pioneers had removed textual content to ensure students were not “swamped” with one pioneer removing “about thirty percent of the content.” He deemed this reduction of content to be necessary if you are “going to use multiple representations.” Another pioneer planned to “strip away even more content” in the next iteration. Likewise, one early adopter emphasised his converted course was “not a lot of verbiage;” rather he had focused on key issues accompanied by related activities. Another early adopter believed when dealing with “time-poor” adults, “we should not be wasting their valuable time” by asking them to do things that are not essential. Hence, if you want to “add something useful, you may then have remove something, so it may require a trade-off.” However, knowing what to cull and what to keep can cause a dilemma, with one pioneer and one early
adopter agreeing that one needed the “courage” to say “it’s not important or we could give a link to that.” In line with Cowan’s (2006) recommendation, this pioneer suggested we need to teach students “where to find the information, rather than give them all the information.”

4.10.2 Delivering manageable “chunks” of information

Effective instructional design involves dividing the material into logical and manageable units (Ausubel, 1963; Reigeluth, 1992). One of the early adopters suggested that when developing an interactive multimodal technology-mediated course, you “dissect, pull apart your content into small chunks of information and then see how those small chunks of information can be augmented by either visual or textual or audio examples.” This approach is more closely aligned to students needs as “students are after short, sharp bursts of information which is applicable rather than long passages of text that they have to read.” Indeed, research undertaken by one of the instructional designers revealed that students prefer to study in short periods at a time, “probably no more than 15 minutes or so.”

Some specific advice was given regarding the length of recorded lecture presentations and the need to keep these brief to avoid student boredom. For example, an instructional designer pointed out that most academics are unaware that an individual recorded presentation “shouldn’t go for more than 12 minutes.” One early adopter perceived that some academics are “not media savvy, and if you put them in front of a camera” the presentations can be “boring as anything.” Hence, he suggested using “people who actually trained in that area to actually present it.” For example, one of the pioneers confessed his voice is “a bit droney” and thus his recorded presentations are less “spontaneous” as compared with his face-to-face lectures. He explained that he found it more difficult to be dynamic when “sitting in front of the screen, with a headset on, with your diaphragm folded in half.” Another pioneer also advised keeping the video introduction brief to avoid student boredom because, as he admitted, “even I can’t stand to sit and listen to it and to watch it for three minutes.” He comically observed “to watch a talking head standing there with a head bobbing, hands waving for three minutes puts you to sleep, so I had that cut back down to 60 seconds.”
4.10.3 Avoiding cognitive overload while adding value

Learning problems associated with limited working memory, split attention and cognitive overload may arise from multiple representations of content and the temptation for academics to include too many “bells and whistle” (Jochems et al., 2004; Moreno & Mayer, 2000). The development of an interactive multimodal technology-mediated course allows academics to add a range of multimedia elements and provide multiple representations of content. These additions are valuable when they improve comprehension and create greater student engagement, however, they can lead to cognitive overload (Sweller, 1999). One early adopter observed that students “want to maximise the efficiency of what they’re doing,” therefore, “the bells and whistles have to be meaningful.” Another early adopter emphasised the need to only provide valuable content and thus retain the credibility of the course. One of the pioneers recommended “don’t just make it full of whistles and bells; stick with the basics and do those well.” Moreover, one of the instructional designers warned against getting “swept up in the enthusiasm of things.” However, she also cautioned academics against simply viewing the interactive multimodal technology-mediated approach “as adding just bells and whistles, rather than thinking what can be inherently a new and a good way of actually improving the learning environment.”

Indeed, the literature revealed that the extent of the use of educational technology for distance education, in some cases, has failed to embrace technological affordances and has been “limited to simple replication of existing distance education processes” (Butler & Blashki, 2003, p. 636). Kavanagh (2001) agrees that some attempts have simply been “an unreflective rebadging or repackaging of the more traditional modes of learning” (p. 511). For example, the simple “dumping” of print-based material onto a CD or online has been cynically referred to as “computer-supported page turning” (Lockwood, 2004, p. ix). In line with these findings, a clear message that came through in the interviews was the importance of adding value, with one pioneer arguing “if you’re not going to do it properly, you shouldn’t do it at all.” He perceived that simply dumping print-based content online or on a CD (which he called “shovelware”) was a “passive and clumsy way of delivering material”
which did not result in a “very pleasant learning experience.” One instructional designer agreed that “unless we put the effort into making some enhancements, there’s absolutely no point in doing it” and “you’re actually doing the students a disservice.” He believed that transferring the cost of printing the materials onto the students, “might be great for the university,” but “certainly is not good enough for the students.” Moreover, one early adopter emphasised the need to develop “a coherent strategy” to deliver consistent added value across courses and thus avoid “large swings in student experience,” which may lead to negative “word of mouth.”

4.10.4 Providing students with direction on using the course resources

Students need to be trained to use the technology if technology-mediated courses are to be accepted and valued (Carroll-Barefield et al., 2005; Solvie & Kloek, 2007). Procedural scaffolding should be provided to support students in using available technology-based tools and resources (Jafari et al., 2006; McLoughlin, 2002). Interactive multimodal technology-mediated courses represent a different way of learning for distance students who may be accustomed to print-based packages. In line with the literature, one clear lesson learnt by pioneers and early adopters was the need to provide students with direction or procedural scaffolding on how to use these interactive multimodal technology-mediated resources. One pioneer emphasised the need “to educate or prepare students on how to use the technology effectively.” Another pioneer explained that “you actually have to help them understand how they can use it, in order to improve their learning experience,” while another added that “basically, you’re educating them into a way of learning.” One instructional designer observed that students need to “get used to that new technology at the same time as learning the content.”

One of the early adopters agreed students “want a pathway”; a guide for working through the course materials and, to that end, another early adopter had regularly posted announcements on her online course homepage to draw students’ attention to some of the interactive elements on her multimodal course. One of the instructional designers advised that to provide students with “a pathway through the materials,” “an introductory ‘getting started’ teaching learning component” had been developed and placed on the course CD.
In order to gain the greatest benefit from interactive multimodal technology-mediated courses, students need to understand their own learning style. One pioneer found that “constant reminders to the students about how they learn, actually improves their assessment outcomes.” Hence, he communicated to students which elements on the interactive multimodal technology-mediated course would best suit their learning style or modal preference. Another pioneer perceived that “it was important to get through to them, early on, about establishing what modal preference they had,” because some students appear to gain most benefit from viewing the lecture presentations, while others may gain greatest benefit from the interactive diagrams and quizzes. Given the wealth of resources provided on interactive multimodal technology-mediated courses, students need to self-select those elements that will best assist them to learn. One pioneer explained that when students understand their learning modality they can use “the study materials to support that modality.” Hence, early in the semester, he encourages his students to access the VARK learning styles questionnaire online to determine their dominant learning style/(s) (Fleming, 2001).

Given the amount of information that can be accessed on interactive multimodal technology-mediated courses including multimedia elements and hyperlinks, one pioneer perceived the need to point out to students what is important. One early adopter and one pioneer explained that most students are “risk-averse” and thus believe they have to “go through everything,” resulting in “information overload.” Hence, it is important to provide students with information on how to approach the course materials. Due to language problems, one early adopter suggested that ESL students may need more direction, because they may not “recognise what is an important piece of information from a non-important piece of information.” In order to provide this scaffolding, one pioneer had used a layered approach whereby information was identified as being “critical, recommended or suggested” to assist students to determine what was essential, desirable or optional.
4.10.5 Selling the interactive multimodal technology-mediated course concept

One early adopter perceived the need to gain student acceptance and greater use of the resources provided in his interactive multimodal technology-mediated course by doing “a little bit of marketing.” One pioneer also highlighted the need to promote the concept, because students do not always respond as we may expect. She suggested that academics need to realise that students “won’t necessarily share your excitement.” Moreover, one of the Distance and e-Learning Centre (DeC) managers proposed the need to set and communicate student expectations. Another early adopter, who works in a teaching team, identified the need to “sell it to the tutors” and “get them to incorporate it into their classes.” In order to gain greater usage of her interactive multimodal technology-mediated resources, she perceived the need to conduct “a workshop with the tutors” and to “alert them each week to possible things that they can use from the disc.”

4.11 Summary

In the first part of this chapter, an overview of the data analysis was provided. A discussion of the interviewees’ understanding of the term “interactive multimodal technology-mediated distance education course” and what comprises these courses was then addressed. In the second part, a wide range of pedagogical factors that appear to influence academics’ development of interactive multimodal technology-mediated distance educations courses were addressed. These issues included the need to cater to the learning needs of different students including Generation Y, ESL and students with a disability, the desire to improve student learning outcomes, retention and progression rates, and the need to challenge students to become learner-centred, self-directed, resourceful and independent learners. A key pedagogical motivation was the desire to replicate, where possible, the on-campus experience including facilitating multimodal learning, providing an equitable student learning experience, personalising the course and developing closer relationships with students, encouraging greater interactivity and providing more timely feedback. Pioneers and early adopters also identified the opportunity to revitalise the
curriculum and reconceptualise their course. Other pedagogical motivations included the desire to engage students by making learning more enjoyable and providing a rich, current, relevant, meaningful and applicable learning environment.

Pedagogical concerns included the problems associated with cognitive overload and information overload. Interviewees addressed the need to manage the course content by rationalising and prioritising the content, providing manageable “chunks” of information, avoiding cognitive overload while adding value, providing students with direction on how to use the interactive multimodal technology-mediated course resource, and selling the concept to students and teaching team members. In the next chapter, individual factors that influence academics’ development of interactive multimodal technology-mediated distance education courses are discussed.
Chapter Five

INDIVIDUAL FACTORS

In this chapter, an analysis of individual factors including pragmatic, opportunistic and personal dimensions that motivate or inhibit academics’ development of interactive multimodal technology-mediated distance education courses is presented. An overview of the individual factors, raised during the interviews, is presented in Table 5.1 and then each factor is addressed in turn, commencing with pragmatic dimensions.

Table 5.1
Individual factors influencing academics’ development of interactive multimodal technology-mediated distance education courses

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Issues raised</th>
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<tbody>
<tr>
<td>Pragmatic</td>
<td>• providing flexible and convenient study options</td>
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<td></td>
<td>• catering for “new-age” and Generation Y students</td>
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<td></td>
<td>• concern about equitable student access</td>
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<td></td>
<td>• gaining copyright and protecting intellectual property</td>
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<tr>
<td></td>
<td>• lack of time and increased academic workloads</td>
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<tr>
<td></td>
<td>• improving efficiency and saving time in course delivery</td>
</tr>
<tr>
<td>Opportunistic</td>
<td>• exploring new ways of delivering distance education courses</td>
</tr>
<tr>
<td></td>
<td>• being seen to be progressive</td>
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<tr>
<td></td>
<td>• impact on research output</td>
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<td></td>
<td>• impact on academic promotion</td>
</tr>
</tbody>
</table>
Table 5.1 cont.

*Individual factors influencing academics’ development of interactive multimodal technology-mediated distance education courses*

<table>
<thead>
<tr>
<th>Personal</th>
<th></th>
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<tbody>
<tr>
<td>• the academic’s attitude toward teaching</td>
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<tr>
<td>• a renewed and re-energised approach to teaching</td>
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<tr>
<td>• self-improvement and personal challenge</td>
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<tr>
<td>• the academic’s personal characteristics</td>
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<tr>
<td>• the academic’s attitude toward change and technology</td>
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<tr>
<td>• lack of rewards and recognition from management and peers</td>
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<tr>
<td>• intrinsic rewards</td>
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<td>• recognition from students</td>
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5.1 **Pragmatic dimensions**

In Chapter Two, the literature revealed a range of pragmatic dimensions (motivators and inhibitors) which influence academics’ adoption and integration of educational technology, as summarised in Table 2.2. In this section, the findings from the interviews, related to individual pragmatic motivators and inhibitors that influence academics’ adoption and integration of educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses, are presented. The discussion commences with the desire to provide flexible and convenient options for students.

5.1.1 **Providing flexible and convenient study options**

The literature revealed that pragmatic motivations for the adoption and integration of educational technology include the desire of academics to respond to student needs for greater access, flexibility and convenience (Ebersole & Vorndam, 2003; Maguire, 2005; Schifter 2000; Smith, 2001). On their homepage, USQ states that “flexible delivery is about giving people what they want, where they want it, when they want
it, in their style, in their place, in their time” (USQ, 2007a, para 1). In line with the literature and the University’s stated objective, pioneers and early adopters expressed the desire to provide flexible, convenient and mobile study options for distance education students, particularly for students who are studying part-time and working to support a family. Pioneers and early adopters also perceived that technology-mediated courses allow students, across the globe, faster and easier access to their distance education materials.

The convenience of communicating effectively with students via electronic means, independent of time and place, was perceived to be a genuine advantage (Ebersole & Vorndam, 2003; McCorkle et al., 2001). For example, one pioneer provided an example of a student studying at a station in Antarctica who, with the enablement of technology, is able to communicate and submit assignments electronically and gain timely feedback. Interactive multimodal technology-mediated courses are flexible, convenient and mobile, as they can be viewed on a computer laptop while the student is using public transport or listened to while driving. One early adopter observed that students can “make use of lunch breaks, make use of time in the car, or whatever.” One of the pioneers concurred that students can study “at a time more of their choosing.”

5.1.2 Catering for “new-age” and Generation Y students

Due to technological and societal changes, traditional approaches to distance education may not meet the needs of today’s “new-age” distance learners (Jochems et al., 2004; Jona, 2000; Sankey, 2005; Taylor, 2004). Hence, a blended approach to course delivery which provides flexible options for distance education, may be more appealing to the “digital generation” (Buckingham & Willett, 2006; Hartman et al., 2005). Today’s students, particularly, younger students are technology literate and thus expect distance education courses to make use of modern technologies (McGee & Diaz, 2007; Oliver & Goerke, 2007). The literature also indicated that today’s learners do not require to be given extensive and detailed information as they can readily access this information via new technologies rather they need to develop skills in searching for, analysing and applying information (Cowan, 2006).
In line with the literature, early adopters perceived that today’s students are changing, have higher expectations, and are more discerning and sophisticated in “the way they take in and use information.” A number of those interviewed, including the non-adopters, perceived that Generation Y students learn differently and are not accustomed to extensive reading rather “younger people are more into seeing things done in an animated multimedia rich way.” Hence, according to one early adopter, “if USQ wants to stay viable and be seen as innovative and leaders in education,” academics should “be willing to change the product in order to suit our students” and meet the “requirements of today’s new-age students.”

5.1.3 Concern about equitable student access

Slow download times and bandwidth issues were identified by interviewees as factors inhibiting the development of technology-mediated learning resources (Eastman & Owens Swift, 2001; Jones & Kelley, 2003; Smith, 2001). Interviewees and DeC management acknowledged that delivering courses purely online would lead to inequities, due to limited and costly access to the Web and slow dial-in for some students. Due to these ongoing problems, DeC management and one of the instructional designers argued that the university needs to determine basic standard computing hardware and software requirements for students. However, until equitable access for all students can be assured, CD or DVD rather than pure online delivery was perceived to be a more viable and inclusive option. Moreover, due to student access issues and slow download, both pioneers and early adopters suggested housing the essential course content and information (including important policies) on the course CD, thus minimising the need for students to access and spend time on the Web and ensuring that students can readily access this important content.

5.1.4 Gaining copyright and protecting intellectual property

The literature identified concerns about security as a potential barrier to academics’ adoption and integration of educational technology (Eastman & Owens Swift, 2001). Previous studies have revealed concerns about intellectual property rights as well as compliance and copyright issues (Covington et al., 2005; O’Quinn & Corry, 2002; Jones & Kelley, 2003). Likewise, one early adopter expressed concern about the possible misuse of his intellectual property which he believed was easier to copy
from a CD or online. The current trend toward open content enabled by Web 2.0 interactivity may further exacerbate this problem. DeC management also identified that concerns about intellectual property and copyright need to be addressed. Two other early adopters raised concerns about the need to gain copyright permissions, and expressed their disappointment and frustration in not being able to gain copyright for material which they believed would have enhanced their technology-mediated course.

5.1.5 Lack of time and increased academic workloads

As predicted from the literature, lack of time and the subsequent negative impact on academic workloads were identified by all four interview groups as major inhibitors for academics’ development of interactive multimodal technology-mediated distance education courses (Betts, 1998; Moser, 2007; O’Quinn & Corry, 2002; Schifter, 2000). The pioneers perceived it had taken an “enormous amount of work” and “intense effort” to develop their interactive multimodal technology-mediated course, and one non-adopter believed it would require “a lot of effort and dedication.” As another non-adopter explained, “it’s not just time; its focus, being able to focus for a length of time on the project.” Moreover, the time it had taken for one pioneer to convert his first course had “acted as a deterrent” to converting other courses, while one of the early adopters expressed frustration at not finding time to convert his second course.

The time required for developing technology skills, implementing technology and maintaining the courseware is a major area of concern for academics (Bonk, 2001; Cuban et al., 2001; Jones & Kelley, 2003; Weston, 2005). However, while time is frequently mentioned in the literature as a major barrier to the adoption and integration of educational technology, the extent and nature of time-consuming activities is less well explored. Hence, the researcher asked interviewees to explain the time-consuming activities associated with the development of an interactive multimodal technology-mediated course. Interviewees revealed that time is required for thinking, researching, strategising, conceptualising, planning, learning about and coming to terms with the required technology, training, developing, editing, updating and maintenance. Early adopters and non-adopters expressed concerns about the lack
of time to experiment, share experiences with colleagues, adapt their content and attend the requisite training (Franklin et al., 2001). Moreover, an instructional designer explained that the development of multimedia elements involves trial and error and “takes quite a bit of a mindset leap, and that needs time.” For example, one non-adopter explained that “before embarking upon what should be a revolutionised package, I’d need to know a lot, so that would take some time.”

In particular, less technologically-competent academics may require more time to learn how to use technology with one non-adopter stating, “I would need much more time than the average person to get up to speed to do those things.” Moreover, due to the short life-cycle of technology and the need for constant updates, the development and maintenance of courses that involve educational technology may be more time-consuming, (Brogden & Couros, 2002; McCorkle et al., 2001; Weston, 2005). Indeed, the pioneers commented on the time it takes to update and “ensure currency” of technology-mediated courses. To mitigate this problem, both pioneers and early adopters advised against including “time-sensitive information” because, as one pioneer explained, “upgrading is an absolute nightmare.”

The time it takes to adopt and effectively integrate educational technology impacts negatively on academics workloads and interviewees perceived this to be a major inhibitor (Betts 1998). The problem is exacerbated by tertiary institutions being reluctant or financially unable to offer release time to develop and update materials and allow course development activity within prescribed workloads (Chizmar & Williams, 2001; Rockwell et al., 1999; Weston, 2005). With the exception of one pioneer, the other pioneers in this study converted their courses above load with one using his long service leave. Interviewees agreed that unless workload is allocated for this purpose, wide-scale development of interactive multimodal technology-mediated courses at USQ, as well as the realisation of the full potential of the use of multimedia and information technology within these courses, may not eventuate. Unfortunately, given the lack of workload allocation, one instructional designer argued that some academics will “make the call that it’s easier to just do the print update.” An early adopter cryptically observed “the reality is that, maybe, the smarter ones than me won’t do it until it’s all made possible for them to
do it.” Indeed, one non-adopter advised that “time release” would motivate him to convert his course. However, non-adopters confessed it may be an issue of priorities, with one stating she was busy doing more “important things” and another non-adopter admitting, “I’ve always got time for things that are important to me.”

As a result of these time and workload concerns, a key lesson that had been learnt by adopters was the need to allow adequate time for the development of interactive multimodal technology-mediated courses. Indeed, the high level of commitment required, given the implications for the academic’s workload and the time it takes to develop the multimedia elements, was emphasised by the instructional designers. Some pioneers and early adopters had underestimated the time it takes to achieve the desired product and thus had to revise their goals. The instructional designers warned if adequate time is not allowed for development, the first modules of the course will be effectively converted but there will be less or little value adding for later modules, resulting “in a less than ideal product.”

One early adopter suggested that being overly optimistic about what could be achieved, at least in the first iteration, could leave the academic “demoralised.” An instructional designer observed that some adopters became “really stretched and stressed” in trying to meet production deadlines. These deadlines are more critical with interactive multimodal technology-mediated courses where a number of multimedia elements need to be developed and carefully integrated into the course. Hence, she recommended that “working towards a year away is often far better than trying to do it in a small space of time.” However, the literature revealed that due to the learning curve effect that occurs as an organisation gains experience with a process, some of the past barriers to the adoption and use of educational technology are falling with adoption and integration now becoming easier and more systematic (Jones & Kelley, 2003). Indeed, Pachnowski and Jurczyk (2003) found that preparation time for courses involving educational technology decreases over time, with the main commitment of time being associated with the first semester of offer.

Given the time and resources it takes to successfully design and develop technology-mediated courses, a phased approach to implementation may lead to greater success (Carroll-Barefield et al., 2005). In particular, Kavanagh (2001)
proposes institutions with limited resources should start small, perhaps by relying in
the early stages on the development of transferable, generic learning objects and then
adding complexity over time (Daugherty & Funke, 1998). Indeed, a staged approach
to development whereby academics “gradually build up CD resources over time”
was recommended by a number of those interviewed as well as DeC management.
The most important elements, that is, those that are deemed to “build in the greatest
addition to the student’s learning” could be developed for the first offering and then
other elements can be added for subsequent offerings. Research conducted on two
interactive multimodal technology-mediated courses revealed that while students
rated all additional interactive multimedia elements as “valuable”, they most valued
the recorded lectures (PowerPoint with audio) and interactive diagrams (with visual,
textual and aural explanations) while the interactive quizzes were not as highly
valued (Birch & Gardiner, 2005).

According to one instructional designer, academics who are “willing to take a
staged approach and not try to do everything at once,” find the conversion of their
course “quite manageable.” Indeed, one early adopter referred to the conversion of
his course as an “evolving process”, while another advised “you don’t have to do it
all at once—do it step by step, so it doesn’t become this great big unachievable
mass.” Conversely, another early adopter who had not taken a staged approach,
admitted, “I pushed myself to do a hybrid CD, too fast and completely and utterly
drowned in it.”

In addition to taking a staged approach to development is the need to aim for
sustainable and scalable development. A number of those interviewed advised
against including information that was “time-sensitive,” thus reducing the need for
“constant updating.” One pioneer suggested “a shelf life of three or four years” and
emphasised the value of developing re-usable learning objects, particularly when one
is teaching both an undergraduate and a postgraduate course in a similar area.
Indeed, he argued that it is “incumbent on all of us to see if we’re able to do that, to
not sort of go and waste a heap of resources.” One early adopter agreed that more
costly and time-consuming elements such as video “should stand the test of time.”
Another pioneer issued a warning with respect to “the constantly changing nature” of
external websites and thus the need to “limit examples to fairly stable external URLs.”

5.1.6 Improving efficiency and time-saving in course delivery

While interviewees agreed the development of interactive multimodal technology-mediated courses was time-consuming and may have a negative impact on workload, some believed there were time-saving aspects and a capacity to deliver courses more efficiently without detracting from effectiveness. For example, one pioneer explained, “I tend to work in an electronic environment. I just think that it’s efficient and I have no reason to believe that it’s not more effective learning wise.” In order for her to embrace technology it had to yield benefits in terms of saving time and greater efficiency. She explained, “I’m very willing to use technology, but if I see that it’s going to give either me or someone else more work, then I will abandon it.”

One of the early adopters reported that he had received fewer student emails and enquiries after providing a clearer (aural) explanation of course content and assessment requirements. Likewise, one non-adopter believed she “could cut down on the amount of contact time with students by having clearer materials.”

5.1.7 Summary of pragmatic dimensions

In this section, a range of pragmatic dimensions and issues that were identified during the interviews and which either motivated or inhibited academics’ development of interactive multimodal technology-mediated distance education courses were discussed. Pragmatic motivators included the perceived need to provide flexible and convenient study options and cater for “new-age” and Generation Y students. However, pragmatic inhibitors included concerns about equitable student Web access and slow download times, gaining copyright and protecting their intellectual property as well as lack of time and increased academic workloads. Strategies for mitigating time and workload problems were identified including allowing adequate time for development, taking a staged approach to development, developing re-usable learning objects and avoiding time-sensitive content. However, some interviewees identified the opportunity to reduce their workload in terms of improving their efficiency and saving time in course delivery.
In the next section, findings related to opportunistic dimensions that influence academics’ development of interactive multimodal technology-mediated distance education courses are discussed.

5.2 Opportunistic dimensions

A number of opportunistic dimensions influencing academics’ adoption and integration of educational technology were identified from the literature, as summarised in Table 2.3. The interviews revealed similar opportunistic dimensions influence academics’ development of interactive multimodal technology-mediated distance education courses including:

- exploring new ways of delivering distance education courses;
- being seen to be progressive;
- the opportunity to improve and challenge one’s self; and
- impacts on research output and promotional opportunities.

However, in contrast to the literature, there were some different findings in this context, particularly with respect to perceived impacts on research and promotional opportunities. This section commences with a discussion of the opportunity to explore new ways of delivering distance education courses.

5.2.1 Exploring new ways of delivering distance education courses

The literature broadly revealed that the driving forces for the adoption and integration of educational technology included “the power and potential of new developments” (Earle, 2002, p. 10). In this context, pioneers and early adopters perceived that the move from a static print-based distance education package to a more dynamic and interactive set of multimodal technology-mediated learning materials provided them with an exciting opportunity to explore new ways of delivering distance education courses and “review the way they presented their materials.” One pioneer declared he had “jumped at that opportunity”, while another found the timing of the “hybrid program” to be opportune, because “as early adopters
of the stuff on VARK principles,” along with his instructional designer, he had already been conducting research on student learning modalities. The application of educational technology has also appealed to some academics in terms of the excitement or novelty of doing something new, different or innovative (Betts, 1998; Smith, 2001; Weston, 2005; Wolcott & Betts, 1999). Indeed, the danger of becoming “stale” had motivated one early adopter who had “waited for a long time to be able to explore new things in education practice.” Another early adopter perceived an opportunity to “contribute something” and “add another dimension,” hence, he “virtually pushed” himself into it.

5.2.2 Being seen to be progressive

The literature revealed that some academics are excited by the opportunity to access advanced technology and multimedia, are keen to be seen as innovative, “state of the art” and progressive, and are keen to embrace new technology as a means of enhancing their teaching profile (McCorkle et al., 2001). In particular, the need to acquire “cutting-edge” status and dissatisfaction with the status quo have been major driving forces for some academics (Ely, 1990). Likewise, one instructional designer observed that pioneers and early adopters were motivated by “using new technology, being innovative, keeping up with what’s out there and using leading-edge technology or new things.” A more senior early adopter admitted that he “wanted to be seen as progressive, more than innovative”; he “wanted to be seen, as not a ‘fuddy-duddy’, but someone who’s prepared to move along.” Likewise, one non-adopter was concerned she may appear to be less “progressive” if she did not convert her course.

5.2.3 Self-improvement and personal challenge

Previous studies concerning academics’ adoption and integration of educational technology have revealed that some academics feel personally motivated to use technology and enjoy the intellectual challenge (Bonk, 2001, Capobianco & Lehman, 2004; Jones & Kelley, 2003; McCorkle et al., 2001; Schifter, 2000). Likewise, involvement in the development of interactive multimodal technology-mediated distance education courses was perceived by some interviewees to be an opportunity to improve and challenge them. For example, one pioneer perceived an opportunity
to become an “excellent teacher”, while an early adopter explained, “I wanted to challenge myself: Could I do it?” When seeking to explain the lack of development of these courses at USQ, one early adopter acknowledged that “it would be a challenge, but I would think some of those people might find themselves a new dimension.” Indeed, one pioneer contended “university lecturers should be the most likely to respond to that kind of challenge.”

5.2.4 Impact on research output

Reduced time for research is perceived to be a major opportunity cost of investing time in the adoption and integration of educational technology (Bates, 2000; Rockwell et al., 1999; Smith, 2001). Hence, when faced with the opportunity to integrate educational technology into their courses, academics may consider the impact on career goals in terms of time spent on teaching versus research (Jones & Kelley, 2003; Swift et al., 1997). However, the interviews for this study revealed that involvement in the development of interactive multimodal technology-mediated distance education courses may have a positive impact in terms of providing an opportunity to undertake education-based research associated with the development and delivery of interactive multimodal technology-mediated courses themselves, as well as a negative impact in terms of limited time to undertake traditional discipline-based research.

Some of those interviewed agreed that reduced time for undertaking discipline-based research is a barrier to academics’ development of interactive multimodal technology-mediated distance education courses. For example, one of the pioneers and two of the early adopters admitted that their involvement had detracted from conducting discipline-based research. However, one early adopter acknowledged that “this says something about my priorities; where my priorities lie,” while one of the non-adopters simply observed that “everything detracts from research.”

In explaining the reluctance of academics to convert their courses from print to multimodal, one of the pioneers contended that most academics “would rather spend the time writing an ARC research grant application; they would rather spend
the time writing a paper about next to nothing; they would rather spend the time
doing research.” This was supported by one of the non-adopters who argued that if
the development of an interactive multimodal technology-mediated course “was on
top of my normal teaching load, then it would impinge on the time I’ve got to spend
doing research related activities.” She conceded she had “given research a higher
priority than some other people who are more passionate about embracing this
particular type of teaching technology.” Another non-adopter explained academics
“prioritise similar to what I’ve done, so instead of taking research out, they’ve taken
development of courses out.” Moreover, one of the pioneers explained, “when I get
my PhD out of the road, I will then go back and produce the next iteration of all these
materials and I’ll completely review it.”

However, in contradiction to the literature, a number of those interviewed had
taken the opportunity to conduct education-based research on the development of
interactive multimodal technology-mediated courses. For example, one pioneer
explained, “I tried to look at ways that I could exploit that in a research sort of way”
and, to that end, had surveyed her students to determine whether course delivery via
CD removed or increased “the idea of social presence.” Another pioneer explained
that his involvement in the development of an interactive multimodal technology-
mediated course had been an integral part of his PhD which explores “how to
achieve better learning outcomes for postgraduate students in a professional
environment.” Yet another pioneer perceived it was “legitimate to use your teaching
as a basis for research” and reported that he had published seven DEST recognised
research outputs from his research on interactive multimodal technology-mediated
courses.

One of the early adopters had conducted research with one of the
instructional designers on students’ perceptions of her interactive multimodal
technology-mediated course. Hence, when asked if her involvement in the
multimodal project had detracted from her research, she commented, “it’s sort of
been a real reversal in a way, because all this research has come out of it.” The other
early adopters also perceived that interactive multimodal technology-mediated
course development had not “detracted” from their research, with one stating, to the
contrary, “I think if anything it’s contributed.” Indeed, one of the instructional
designers had advised participating academics to “write up the process and get a conference paper or a publication.” This nexus between development of interactive multimodal technology-mediated courses and education-based research was also recognised by one non-adopter who was currently researching students’ learning styles.

5.2.5 Impact on academic promotion

Previous studies have indicated that some academics perceive adopting and integrating educational technology may leave them with less time to devote to research and other activities that lead to promotion and tenure (Howell et al., 2005; Hughes, 2002; Maguire, 2005). However, other studies have indicated that academics are undecided on this point (Wolcott & Betts, 1999). Likewise, the interviews revealed that some academics perceived a negative impact on promotional opportunities, while others perceived that development of an interactive multimodal technology-mediated course had enhanced their promotional prospects. For example, one pioneer reported, “I’ve made much of it in the times I’ve been promoted, so I’d have to say it probably has helped me to get promoted.” An early adopter also reported that her involvement had favourably influenced the promotion panel, because it demonstrated she was “willing to look at new ideas.” Another early adopter had included information on her interactive multimodal technology-mediated course in the teaching and customer service areas of her performance review. As one instructional designer observed “working on an innovative hybrid project would definitely be something you would include on your CV.”

Conversely, other interviewees were more sceptical about whether development of an interactive multimodal technology-mediated course would assist with academic promotion. One pioneer lamented, “none of the things that I spend my time on fit in with the promotion criteria,” while one of the early adopters deliberated, “I think it should, but in the current environment, I’m not convinced it will.” One non-adopter argued that promotion was biased toward academics that focussed on research and disagreed with the University’s current policy which means that academics who take a teaching only path cannot be promoted beyond Senior Lecturer. He argued that academics “who do innovative things with their teaching”
should be able to go further. One of the instructional designers believed that development of an interactive multimodal technology-mediated course could be written up as an integral part of a promotion application.” However, she also conceded, along with another instructional designer, that “research and other scholarship endeavour are seen as so much a part of promotion, over and above, the priority of the teaching.” However, a number of the pioneers and early adopters had not considered the impact on promotion, making comments such as, “I never do anything with my CV or promotion as a sort of motivation, that’s the last reason,” “I don’t care about promotion,” “promotion didn’t even enter my head,” and “I’ve always sort of done it for the profession, for the future of the profession.”

5.2.6 Summary of opportunistic dimensions

In this section, individual factors of an opportunistic nature which interviewees considered may influence academics’ development of interactive multimodal technology-mediated distance education courses were discussed. Opportunistic dimensions included the opportunity for academics to explore new ways of delivering distance education courses, be seen to be progressive or “state of the art”, and improve their teaching or challenge themself. Interviewees perceived that development of an interactive multimodal technology-mediated course may yield positive impacts on education-based research and negative impacts on discipline-based research as well as either positive, neutral or negative impacts on promotional prospects. In the next section, findings related to individual factors of a personal nature that appear to influence academics’ development of interactive multimodal technology-mediated distance education courses are addressed.

5.3 Personal dimensions

The literature revealed that a number of individual factors of a personal nature may influence academics’ adoption and integration of educational technology, as summarised in Table 2.4. In this section, the findings from the interviews are addressed, commencing with a discussion of the academics’ attitude toward teaching.
5.3.1 The academic’s attitude toward teaching

As discussed in Chapter Four, the literature revealed that a key motivating factor for participation in distance education is the opportunity for academics to improve their teaching and diversify the program offering (Schifter, 2000). The development of technology-mediated courses allows for innovation, the emergence of new ideas, enhanced course quality and diversification of academic programs (Maguire, 2005; Weston, 2005). However, what is less evident from the literature is the impact an academic’s attitude toward teaching and their personal philosophies about teaching may have on their adoption and integration of educational technology.

Interviewees revealed that the development of interactive multimodal technology-mediated distance education courses at USQ may depend upon the academics’ attitude toward teaching and particularly, the importance an academic places on teaching relative to other academic pursuits such as research. For example, one of the pioneers professed his love for teaching and declared, “I’m fairly passionate about the stuff, because I’m interested in it and I believe in it.” However, he perceived that other academics who consider their teaching to be “more of an inconvenience to their research” may not have “that same predisposition towards taking it up.” Another pioneer considered that “a lot of academics, I don’t think, care for their students very much, and teaching is a chore and students are a bit of a nuisance.” However, he pointed out that USQ “has a very high proportion of many caring, committed lecturers” and that the University does “recognise good teaching.”

The instructional designers agreed that academics who “are intrinsically motivated to give the most for the students,” have “a love of teaching,” are “dedicated to the learning outcomes of their students” and “have always gone the extra mile with their students” appear to be more likely to develop an interactive multimodal technology-mediated course. Conversely, one instructional designer observed that some academics have never shown much interest in creating a “quality experience” or a “quality environment” for their students, while another instructional designer explained that some academics are “more strategic in the way they manage
their time” and prefer to focus on what is “rewarded and recognised at USQ,” namely, research.

Personal philosophies about teaching have been found to influence the use of educational technology with teachers who hold a constructivist philosophy using technology in more student-centred ways and teachers who use a teacher-centred approach using “technology in ways that allow them to stay in their comfort zone” (Kurz-McDowell & Hannafin, 2004, p. 104). Moreover, the extent to which an academic considers technology to be “an integral part of the learning process” may determine the extent to which technology remains a “peripheral ancillary to his or her teaching” (Pierson, 2001, p. 427). Indeed, an understanding of the link between technology and education appears to influence academics’ development of interactive multimodal technology-mediated courses. As acknowledged by one of the instructional designers, shifting “from information-transmission to designing technology-enabled, constructivist learning environments” may require adaptation of one’s teaching style and the redesign of course content (Jacobsen et al., 2002, p. 4). Further, a lack of understanding of, or concern for, pedagogy may present a barrier to the development of interactive multimodal technology-mediated courses, with one pioneer proposing that “80 percent of the people in the Faculty of Business probably wouldn’t even know what pedagogy was, let alone be concerned about it.”

In addition to their attitude toward teaching and personal philosophies about teaching, an academic’s willingness to reflect on their practice and embrace modern teaching philosophies may also be an influencing or “triggering” factor. One of the instructional designers observed that “the innovators that are doing the hybrid multimodal things are constantly reflecting on their practices.” This involves “weighing up in their minds the learning teaching activities, the way students respond and the outcomes of their course; learning outcomes in terms of student results.” For example, one pioneer commented, “I would challenge the way I teach in a way it can be more effective for the learning,” while one of the early adopters pointed out “I actually like talking about my teaching and what I’m doing…reflecting on what I do and how I go about it.” While this link between reflective teaching and the adoption and integration of educational technology, which appears to be important in this context, has been considered by others (see, for
example, Mishra & Koehler, 2006), it was less evident in the literature examined for this study.

5.3.2 Renewed and reenergised approach to teaching

Previous studies indicate that the adoption and integration of educational technology allows renewal and regeneration with some academics reporting on the need to “energise” their teaching (Jones & Kelley, 2003). Likewise, a number of pioneers and adopters perceived that their involvement in the development of interactive multimodal technology-mediated courses had allowed them to re-energise and renew their interest in, and their approach to, teaching. One early adopter expressed being “revitalised” from the enjoyment of working with “creative people” who “have a certain sense of energy which they bring to you.” The pioneers and one of the early adopters confessed “teaching had become a little bit of a chore” and they were “getting stale” and “bored.” One pioneer explained that print-based materials are a “tired format” and it was “more fun doing things online or electronically.” Developing interactive multimodal technology-mediated courses had “revitalised” their interest in teaching, “renewed” their enthusiasm, and challenged them to teach in a more effective manner.

5.3.3 The academic’s personal characteristics

The literature revealed that the personal characteristics of the academic may influence the adoption and integration of educational technology, as summarised in Table 2.6. Rogers (1995) theory of the diffusion of innovations proposes that people associated with different adopter categories (pioneers, early adopters, late adopters, early majority, late majority and laggards) have different personal characteristics and thus adopt new technologies at a different rate (McGee & Diaz, 2007; Moser, 2007). Likewise, in seeking to explain why academics had not become involved in the development of interactive multimodal technology-mediated courses, one early adopter observed “not everybody moves at the same rate.”

The theory of the diffusion of innovations proposes that innovators and early adopters of technology tend to be more adventurous, less risk averse, more comfortable with change, and enjoy trying new and novel ideas (Rogers, 1995).
Innovators of educational technology tend to be venturesome, cosmopolitan and have a predisposition toward technology as well as the patience to deal with student problems that arise (Jones & Kelley, 2003; Moser, 2007). Innovators and early adopters of technology tend to be intrinsically motivated and enjoy experimenting with and teaching themselves to use technology (Jacobsen, 1998). Early adopters are respected opinion leaders with a positive attitude toward technology, while later adopters tend to be more sceptical and thus are more likely to adopt as a “consequence of peer pressure or economic necessity” (Moser, 2007, p. 68). In agreement with the literature, one instructional designer explained that some academics are more “risk-averse” and prefer to “wait for others to take the first step.” She explained there are “people who face a new challenge, face a new idea quite willingly and quite positively,” while “others that draw back from that and don’t want to do it until someone else has really proven that track.” For example, one early adopter explained that while he does not perceive himself to be risk-averse, he also does not “rush overboard into the first gimmick,” rather he waits for the technology “to settle down just a little” before embracing it. Some academics appear to experience a high level of anxiety when asked to adopt new technologies. One early adopter observed that “in many instances, people want to embrace it but are not quite sure how to embrace it.”

However, in contradiction to the literature, not all of the academics interviewed fitted neatly into their predicted category with some of the pioneers and early adopters perceiving themselves to be somewhat risk-averse and some of the non-adopters considering themselves to be early adopters of technology. For example, one early adopter explained, “I was really quite anxious about what I had to do,” yet she acknowledged that “it was the fear of the unknown.” She was concerned she would “look like a complete fool.” Another early adopter also expressed concerns about “saying something wrong.” She was worried her colleagues “would scrutinise” and say, “Ooh, this isn’t right and this isn’t right.” One of the instructional designers explained that early adoption of interactive multimodal technology-mediated courses has been risky and “puts each person out on a limb a little,” because innovative developments tend “to be commented on, and looked at, or observed a little more carefully than other things that are run of the mill.” She perceived, “you’re a bit vulnerable,” because “you’re really putting yourself out
there, to be perhaps criticised or commented on by your colleagues.” For example, some of the pioneers and early adopters expressed concerns about the way that they present visually and aurally in multimedia presentations, focusing on the way their voice sounds and whether they sound “a bit monotonous” or were boring to listen to. Hence, an “enabling environment” which “values experimentation” and a culture with a tolerance for making mistakes may be necessary for widespread adoption (Spodark, 2003, p. 2).

5.3.4 The academic’s attitude towards change and technology

The development of interactive multimodal technology-mediated distance education courses and moving away from established ways of delivering distance education courses via traditional print-based packages, requires a significant level of change. Hence, an academic’s attitude toward change and, particularly, technological change may impact on their involvement in the development of interactive multimodal technology-mediated distance education courses.

Resistance to change was identified in the literature to be a major impediment to technology adoption and integration (McCorkle et al., 2001; McGee & Diaz, 2007; Zhao & Frank, 2003). More specifically, fear of change, a lack of willingness to take risks and fear of deviating from “entrenched instructional practices” may deter academics from adoption (Berge, 1998; Hunt et al., 2004; Parisot, 1997; Weston, 2005). Indeed, the interviews revealed that willingness to change, move on, try new things and receptivity to new technologies appears to influence academics’ development of interactive multimodal technology-mediated distance education courses. For example, one pioneer explained, “I certainly don’t remain wedded to entrenched views,” while an early adopter, who viewed himself as “as a thinking person,” considered he is “fairly open to change,” preferring “the future more than the past.”

Some academics find change, particularly constant change, frustrating, difficult and time-consuming. According to the pioneers, the lack of adoption by academics may be partially attributed to “constant change” in technologies being introduced at USQ with one stating, “we’ve had so many changes to how we teach,
but we’ve never been given very much time to learn those new systems.” When asked if she would convert any more of her courses, one pioneer stated she would be discouraged from doing so “if the technologies keep changing.” According to one non-adopter, when it comes to new technologies being introduced at USQ, “there’s been a lot of resistance to change generally.” The proliferation of formats and technologies at USQ (viz. GOOD [generic offline/online delivery], ICE [integrated content environment], and EPIC editor as well as various learning management systems) have created confusion and frustration amongst some academics. For example, one instructional designer emphasised the “unfortunate timing” of the “hybrid delivery” initiative which had coincided with a “whole lot of angst about WebCT.”

One non-adopter articulated his level of concern about changing technologies and formats and lamented, “technological systems, like any system let you down.” Moreover, one of the pioneers perceived that, because of the general level of change across the university in recent times, academics were less willing to seek out “new challenges at the moment.” Additionally, one of the non-adopters highlighted the “increasing rate of evolution of organisational development” at USQ and observed, “things are coming faster and changes faster, you don’t have the time you think you’re going to have.”

In addition to their attitude toward change, an academic’s attitude toward technology in terms of its relative advantage over current methods, compatibility with current practices, perceived usefulness and perceived ease of use are primary determinants of whether a technology will be adopted (Davis, Bagozzi & Warshaw, 1989; McPhail & Birch, 2004; McPhail & McDonald, 2004; Rogers, 1995). In addition, technological capability including the required knowledge and skills, equips an academic to embrace educational technology, if they so choose (Ely, 1990; Moser, 2007).

A willingness to change and an interest in, and liking for, technology appear to be important for the development of interactive multimodal technology-mediated courses, but are not necessarily predictors. For example, one of the early adopters commented, “I have a fairly positive attitude to technology,” while two of the
pioneers expressed an interest in technology and enjoyment in experimenting with and exploring “gadgets.” An early adopter believed that technology had enabled him to put into place things he was seeking to achieve with his teaching. Conversely, one early adopter observed some academics are “scared” of new technology and “insecure” about trying new things. Another described some academics as “technophobe,” while other academics do not consider using technology to be “part of an academic’s role.” For example, one non-adopter saw his role as “facilitating learning” and “distributing knowledge,” rather than being “a specialist in development like this.” He admitted having a “negative attitude toward technology” and declared he was suffering from “information overload” and that he had fallen “way behind” with technology. Hence, according to one early adopter, for wide scale adoption of interactive multimodal technology-mediated courses at USQ to occur, some academics will need to “be dragged to their keyboards kicking and screaming.”

In particular, for older academics nearing retirement, it could all be “too hard” explained one of the pioneers. In line with the literature, one older non-adopter, having received “negative reporting” from one of the pioneers who had become frustrated and experienced “setbacks” with the technology, had been dissuaded from even attempting to adopt educational technology, stating, “it will ruin my life” (Moser, 2007, p. 67). This non-adopter considered that “technology is threatening” and explained “perhaps my age is showing and my generation is showing here, my culture was a culture of print.” He confessed that when it comes to technology, “I’ve been resistant … I wasn’t even sitting back and waiting, I was just avoiding it.” He acknowledged some academics are finding “better and better ways to instruct digitally” and he was “fast becoming a dinosaur in terms delivering instruction.” Likewise, an instructional designer observed that the “younger generation of lecturers” appear to be more willing to embrace new technology, but then pointed out that one of the early adopters, despite being close to retirement, had “been very happy to get into the technology.”

The interviews revealed that the adoption and non-adoption of interactive multimodal technology-mediated courses may not be predicated on an academic’s attitude toward technology. Some of the pioneers and early adopters indicated that
they do not consider themselves to be particularly technologically capable while some of the non-adopters indicated that they are both interested in, and very capable with, technology. For example, one non-adopter declared, “I love technology, it just makes life so much easier and I think provides a lot more opportunities.” Conversely, one of the pioneers admitted that he can be difficult to persuade when it comes to trying new technologies, because he does not “like technology for technology sake” and would need to “see the benefit it’s likely to produce for students.” One early adopter suggested some academics may be “hostile to it or are resistant to it, because they don’t see how it might improve what they’re doing.” Hence, one of the non-adopters advised against simply “imposing” new technologies on educators” and suggested the need to discuss with educators how the new technology could be used as well as implications for implementation.

Thus, the difference between adopters and non-adopters, with respect to the development of interactive multimodal technology-mediated courses, appears to depend more upon the academic’s personal understanding and appreciation of how technology could or should be used to improve student learning outcomes for distance students, than their attitude toward technology per se (Mishra & Koehler, 2006). Indeed, one of the instructional designers observed that most academics “are willing to give it a go and learn the technology; if they see; that it’s actually going to help their teaching; or help the students.”

5.3.5 Lack of rewards

Numerous studies have revealed that a lack of tangible incentives is a critical barrier to academics’ adoption of educational technology (e.g. Dooley & Murphrey, 2000; Hughes, 2002; McCorkle et al., 2001; Miller et al., 2000; Moser, 2007). Likewise, interviewees considered that a lack of extrinsic rewards may inhibit academics’ development of interactive multimodal technology-mediated distance education courses. For example, when asked about potential rewards for developing an interactive multimodal technology-mediated course, one non-adopter responded, “you might, but I wouldn’t hold my breath because you don’t get a lot of those.” Likewise, one early adopter perceived, “there’s really no reward systems, no compensation for you doing it,” while another observed, “from the Faculty point of
view it’s, well, that’s what you’re employed to do.” One instructional designer also perceived that there were “no external awards and there was no extra time.” One of the early adopters argued that if academics were encouraged and saw a “reward mechanism or something in it for themselves,” then they would be more likely to get involved. For example, one of the early adopters suggested possible rewards could include a “reduced marking load” or “some teaching relief.”

One of the instructional designers warned that if the University does not provide the “resources now to make that process mainstream, support those people, share all that knowledge” as well as reward and recognise the innovators, “it could all just kind of subside.” Hence, she called for more support and rewards on the one hand as well as some performance management on the other hand. She argued that “the institution has to have a will to support the people who want to do innovative things.” She used the analogy of the carrot and the stick, with the carrot being “funds to buy time out of other workload activities” and the stick being a regular review of courses to ensure they are of minimum quality and have at least “minimum components.”

One of the early adopters perceived that the lack of rewards indicated that the University did not place adequate value on such innovations, especially considering the positive impact such learning and teaching innovations may have on student retention and progression and subsequent revenues. He argued, “this is as important as an ARC Research Grant to the reputation of the University, and we should really reward these people as much as what we reward someone who brings in $100,000 or $200,000 in research.” One of the non-adopters agreed, “there should be ways of rewarding these people for extra efforts and going the extra mile and making it so great for the learners.”

An early adopter considered that teaching related activity is not rewarded at USQ and perceived that when an academic is “producing yards of research, there’s a high degree of tolerance of completely abhorrent behaviour in the classroom, you know, but not the other way around.” Due to the lack of extrinsic rewards, one of the instructional designers believed “a lot of academics will make the call that their time is better spent on research than devoting themselves to teaching.” However, as
discussed in Section 5.2.5, some of the pioneers and early adopters indicated that their involvement in the development of interactive multimodal technology-mediated distance education courses had assisted them in gaining a promotion, and this could be considered to be a valued reward for their efforts.

5.3.6 Lack of recognition

In addition to a lack of extrinsic rewards, lack of recognition by management and peers for the time and effort involved in adopting and integrating educational technology appears to be a major barrier (Betts, 1998; Lee, 2001; Maguire, 2005; Rockwell et al., 1999; Wilson, 1998). For example, when asked if he felt he had been rewarded or recognized for his efforts in developing his interactive multimodal technology-mediated course, one pioneer responded, “apart from the fact that you’re sitting here talking to me now, I don’t think anyone else in the faculty could give a damn about it.” One of the instructional designers perceived that developers “either haven’t felt the support or really haven’t felt that anyone in some way cares.” In addition to a lack of interest from his peers, one pioneer lamented, “I was not given any encouragement at all from my Head of Department or the Deputy Dean. I don’t think either of those has even looked at the materials. Neither of them would have any idea of what I’ve done.” One of the non-adopters cynically observed, “you can go to a lot of work for a package, and it’s not valued, and there’s no one looks at it, except the students.” One of the instructional designers also observed, “from the University perspective, there doesn’t seem to be anybody saying “well done, good faithful servant.” Hence, one of the non-adopters considered this lack of recognition was a good reason “not to engage in it, because why bother.”

In addition to the perceived lack of recognition from management and peers, it was also identified that there was a lack of university-wide recognition of the development of multimodal courseware. One of the instructional designers explained that, while there have occasionally been “showcases or examples” of interactive multimodal technology-mediated courses at USQ, “it’s not been done on a regular and expected round.” Moreover, while faculty and university teaching, design and delivery of materials awards were identified as a means of rewarding and recognising excellence, one of the instructional designers emphasised that the delay
between putting in the hard work for development and being recognised with such an award mitigated the potential motivational effects. Moreover, there are only a limited number of teaching awards that can be won.

5.3.7 Intrinsic rewards

As discussed in the previous section, there appears to be limited extrinsic rewards associated with developing interactive multimodal technology-mediated distance education courses. However, not all of those involved in the development of interactive multimodal technology-mediated courses expected to be rewarded or recognised for their efforts. For example, one early adopter stated, “I sort of don’t have that at the top of my priority list, whether I’m going to get anything personally from it.” While another early adopter believed that, as a senior lecturer, it was “incumbent” on him “to do something without having to expect another reward.”

Indeed, previous studies have revealed that many academics are personally motivated to use technology, enjoy the intellectual challenge, and gain personal satisfaction and self-gratification from so doing (Betts 1998; Bonk, 2001, Capobianco & Lehman, 2004; Jones & Kelley, 2003; McCorkle et al., 2001; Schifter, 2002). Indeed, a number of those interviewed indicated that they had found the experience to be intrinsically motivating and rewarding. One pioneer explained, “for me, it’s intrinsically rewarding, because I don’t seek kudos and sort of recognition for it. I’m more than happy to share my experiences,” while one of the early adopters simply stated developing his course had given him “a buzz.”

One of the pioneers acknowledged that developing his interactive multimodal technology-mediated course had been “a lot more work.” However, he declared, “the satisfaction that I’m getting with delivering material and also what appears to be the outcomes more than offsets that.” One early adopter had gained “self-satisfaction,” rather than “extraneous rewards” from “seeing something out there that’s new, it’s innovative, it’s different…and connecting better with the students.” He explained, “you get a real sense of achievement when you can see the way that you’ve applied technologies to do something or make something better.” Moreover, one of the instructional designers observed that, for academics, “there can be a sense of
The development of interactive multimodal technology-mediated courses appears to have been an enjoyable experience for the academics involved. Two pioneers described the experience as “more exciting really” and “really good fun.” Early adopters perceived it to be “very, very exciting” with one stating, “I’m pretty excited about this disc, this whole thing. I’m excited about it; it’s the biggest ‘buzz’ I’ve had for some time academically.” Likewise, one of the early adopters, who was originally reluctant to convert her course, reported, “it became a really enjoyable process for me.” Another early adopter agreed that “it was really fun, thinking of ideas and then seeing if they could possibly work.” Yet another early adopter declared, “it’s all good fun…I think it makes my job more satisfying.” The instructional designers also observed the excitement that academics experienced when “using media in a different way to try to bring the course alive and make it more interesting.”

5.3.8 Recognition from students

In addition to intrinsic rewards, recognition from students was also identified as a valued reward by pioneers and early adopters. One pioneer explained, “there are people out there who are placing a value on what I’m doing and they’re the important ones, they’re the students.” Another pioneer considered that the best recognition he could receive was to know “that an increased number of students have found the course engaging.” Early adopters also valued “the positive feedback that you get from the students.”

5.3.9 Summary of personal dimensions

The interviews revealed that a number of individual motivators of a personal nature appear to influence academics’ involvement in the development of interactive multimodal technology-mediated distance education courses. These factors include the academic’s attitude toward and approach to teaching and, in some cases, their desire for a renewed and reenergised interest in and approach to teaching. Moreover, the academic’s personal characteristics and their attitude toward change and
technology, particularly their understanding of how technology can be used to improve learning outcomes appear to influence their propensity to develop technology-mediated courses. While the apparent lack of recognition and rewards from management and peers may inhibit the development of interactive multimodal technology-mediated courses, pioneers and early adopters perceived that intrinsic rewards and recognition from students motivated them.

5.4 Summary of individual factors

In this chapter, the findings from the interviews related to individual factors that appear to influence academics’ development of interactive multimodal technology-mediated distance education courses were discussed. Individual factors included a number of pragmatic, opportunistic, and personal motivators and inhibitors. In the next chapter, institutional factors that appear to influence academics development of interactive multimodal technology-mediated distance education courses are addressed.
Chapter Six

INSTITUTIONAL FACTORS

In this chapter, the findings of the interviews related to institutional factors that enable or create barriers to academics’ development of interactive multimodal technology-mediated distance education courses are presented. The literature revealed that a number of institutional factors influence academics’ adoption and integration of educational technology, as summarised in Table 2.1. In this study, a similar range of institutional factors were found to either enable or create barriers to academics’ development of interactive multimodal technology-mediated distance education courses including:

- the need for clear institutional direction (Section 6.2)
- the need for technical and instructional design support (Section 6.3)
- the influence of mentors and peers (Section 6.4)
- the need for cost effective production and delivery of distance education courses (Section 6.5)
- the need to investigate advanced technologies and delivery formats (Section 6.6).

Each of these institutional factors is addressed, in turn. However, before discussing these institutional factors, a discussion of interviewees’ perceptions of the emergence, current status and future direction of interactive multimodal technology-mediated courses at USQ is provided.
6.1 Interactive multimodal technology-mediated distance education courses at USQ

Interviewees provided further insights on the emergence, current status and future of interactive multimodal technology-mediated distance education courses at the University of Southern Queensland. This section commences with a discussion of interviewees’ perspectives of how the interactive multimodal technology-mediated course initiative emerged at USQ. Next, academics’ attitudes towards interactive multimodal technology-mediated courses, the feedback they have received from students and the need for further research on students’ perceptions of interactive multimodal technology-mediated courses are addressed. Finally, what interviewees perceive the future of interactive multimodal technology-mediated distance education courses at USQ should be is addressed.

6.1.1 The emergence of interactive multimodal technology-mediated distance education courses at USQ

As explained in Section 1.1.3, the development of interactive multimodal technology-mediated courses commenced at USQ in 2003, with the DeC referring to these types of courses, at that time, as “hybrid delivery.” Pioneers, early adopters and instructional designers provided further insights into how the interactive multimodal technology-mediated course concept emerged. In the early stages of “hybrid delivery,” the Head of DeC developed a web page on the DeC website and conducted a number of staff development workshop which explained the hybrid delivery concept. One of the instructional designers explained that USQ conceived the “hybrid” model to “improve teaching learning outcomes, put USQ on the map as an innovative education provider, and cost-cutting was a major factor.” In an informal interview, Professor Alan Smith (Distance and e-Learning) explained that the key drivers of the “transmodal” delivery initiative at USQ were to reduce costs, standardise distance education materials across modes, campuses and partnership arrangements, and deliver USQ’s mission to be a leading transnational educator (personal communication, A. Smith, May 2006).
When the move to “hybrid” was first announced, one of the pioneers perceived, “it was dictated: I didn’t think we had any choice.” With the exception of one academic from the Faculty of Arts, the other pioneering “hybrid” projects took place in the Faculty of Business where management viewed “hybrid” delivery in CD format to be an opportunity to drive down the preparation and distribution costs associated with print-based study packages and reduce production deadlines. One of the instructional designers recalled that expressions of interest were sought from academics “with the offer of instructional design and DeC production process design and support.”

In the early stages of the “hybrid” initiative, management’s focus was perceived by the interviewees to be about cutting costs rather than pedagogical benefits and this may have deterred some academics from developing interactive multimodal technology-mediated distance education courses. Indeed, while pioneers and early adopters were aware of the potential cost savings to the University, they were more interested in the pedagogical benefits of “hybrid” delivery and the opportunity to provide a more flexible, enhanced, interactive and multimodal learning experience for their students. According to one pioneer, the “hybrid” initiative was purely about cost efficiencies and was “not driven by any pedagogical concerns whatsoever.” One early adopter agreed management was “looking at the cheaper factor more than with pedagogical factors or the customer service factor.” Likewise, an instructional designer explained that “management’s focus was fairly much on delivery, rather than learning and teaching.” Hence, “the debate about learning and teaching which could have been strongly triggered by this process really hasn’t happened.” However, under the guidance of instructional designers, academics involved in the development of “hybrid” courses have, at least for the most part, avoided simply dumping their print-based content onto a CD to reduce printing and distribution costs, and have developed interactive multimodal elements to provide a more inclusive and enhanced learning experience for their students.

### 6.1.2 Academics’ and students’ responses to interactive multimodal technology-mediated courses

Interviewees involved in the development of interactive multimodal technology-mediated distance education courses expressed very favourable attitudes towards
these courses. For example, one pioneer declared, “I’m an advocate and I would definitely do it again.” Yet another pioneer advised, “anyone who talks to me is going to get a positive spin on it,” and when asked if he would do it again, another pioneer stated, “nothing would discourage me.” One of the early adopters described the interactive multimodal technology-mediated course as a “tremendous instrument,” and based on positive student feedback, declared he could not go back to print-based materials. Another early adopter, who had been reluctant to participate at first, had also been encouraged by positive student feedback and was already thinking “what are we going to do next?” Another early adopter commented, “I’m an advocate of it now; I would support it to the hilt.” These pioneers and early adopters were also keen to encourage other academics to convert their courses, making statements such as, “I tell people it’s a good idea and encourage them,” “what are you waiting for?” and “I would certainly never discourage anyone. I have had no adverse outcomes.” When comparing his experience to updating print-based materials, one of the pioneers declared, “I just enjoyed it so much more, and that’s one reason why I heartily recommend to people to give it a go.” Indeed, one of the early adopters encouraged other academics to “take the plunge, enjoy it; see it as something fun and not as an arduous task.”

A major deterrent for some academics in adopting technology is the fear of negative impacts on student evaluations, for example, if the technology does not work or is not accepted by students (McCorkle et al., 2001; Moser, 2007). Previous studies revealed that some academics have reacted to student concerns about the shift from printed to electronically-delivered distance education materials (McPhail & Birch, 2004). Student resistance has arisen due to the costs associated with printing materials from the Web, lack of access to required hardware and software, and lack of computing skills (Jones & Kelley, 2003; Sheard et al., 2001). However, student feedback including both anecdotal and empirical evidence on interactive multimodal technology-mediated distance education courses has been mostly positive.

While in the early stages of the project, some students reacted negatively to not being provided with the traditional print-based package, it was perceived that these students were in the minority. Moreover, in some cases, attitudes changed across the semester. For example, one pioneer observed that some students “who
were a bit ambivalent about it at the outset,” commented later in the semester that “this was one of the most enjoyable courses they had done.” Another pioneer believed that students’ acceptance of CD-based delivery was growing over time. Likewise, an early adopter reported that, for her first offering, some students, who “just don’t like the technology, hated it,” however, the students she was teaching this semester “really like it.” Another early adopter had pro-actively sought feedback from a tutor with a Russian partner college, who reported that the CD-based course was going “very well” and, as she put it, the “students loved the lectures with noise [audio].”

According to one of the instructional designers, the mixed reaction from students to interactive multimodal technology-mediated courses in the early stages of the project was associated with established ways of learning. Having experienced traditional “print-based courses” in the past, some continuing students, who may be “read-write or that’s the way they’ve always learnt, find the media-based courses new and different and perhaps a bit difficult to deal with.” However, she believed this negative reaction is transitional, because students “coming through from first year hybrid courses, are now demanding and are expecting a much more interactive and very different learning experience.” Hence, these students would now be “dissatisfied with the traditional print-based” materials. One instructional designer observed that there are “one third of students that just want business as usual,” that is, the traditional print-based package, and then “one third of the students who really like the change and want that to continue through their learning experience.”

One of the pioneers pointed out that some students prefer to have a printed version of the study materials so that they do not need to read from the computer screen. Hence, some pioneers and early adopters have provided transcripts of audio elements and .PDF files for lecture presentations. Moreover, one pioneer made the decision to provide her students with the option of purchasing the printed study guide from the University Bookshop. However, she perceived that the number of students who want the printed version appears to be decreasing. Moreover, one of the early adopters, despite making the decision neither to provide any printed materials whatsoever with his CD nor provide students with the option to purchase the print,
observed, “I’ve had no adverse reaction from students about that. I’ve had no complaints.”

6.1.3 Need for further research on students’ perceptions of interactive multimodal technology-mediated courses

Limited research has been conducted on students’ perceptions of interactive multimodal technology-mediated courses (Birch & Gardiner, 2005; Gordon, 2005; Sankey & St Hill, 2005). However, one of the instructional designers revealed that he had conducted research on the interactive multimodal technology-mediated courses developed by two of the pioneers interviewed for this study. One of these pioneers explained, “I had the benefit of that really, really high quality feedback” which was drawn from a survey of the whole class as part of their assessment. However, another pioneer, unaware that research had been conducted on other “hybrid” courses, observed, there is “no research-based justification that my students are any better off owning a CD than when they had a book. It’s anecdotal.” However, in terms of the anecdotal feedback he had received, he reported, “for every complaint that we get about the course, I would probably get about 30 who say this is the best course we have done.” However, he considered that “lack of [formal] feedback from students represents a vast unknown about the true benefits of hybrid learning models.” Hence, he emphasised the need for more research on how interactive multimodal technology-mediated courses benefit students including impacts on learning outcomes.

One of the instructional designers also commented on the lack of formal research and noted that “innovators have worked away and probably done course specific evaluations,” however, “there haven’t been the funds to support that research and disseminate that research.” Research evidence appears to be critical to wider adoption, with two of the non-adopters indicating they would need more research evidence regarding the effectiveness of interactive multimodal technology-mediated courses to convince them to “put in the time” to convert their courses.
6.1.4 The future of interactive multimodal technology-mediated distance education courses at USQ

Interviewees, across all four groups, considered the continued shift away from traditional print-based distance education materials towards technology-mediated courses to be both inevitable and essential in order for USQ to maintain a competitive edge in the distance education market. This finding is in keeping with the literature which indicates that advances in educational and information communications technology have placed pressure on tertiary institutions to take advantage of these technologies to provide a rich learning environment and thus remain viable in an increasingly competitive global education market (Bates, 2006; Gill, 2004; O'Donoghue et al., 2001). Moreover, Butler and Blashki (2003) argue “the investigation of diverse ways in which these technologies might be used is imperative” in order “to provide a rich and rewarding learning experience for all students, regardless of mode of enrolment” (p. 635). Likewise, one of the pioneers suggested that the interactive multimodal technology-mediated course format would allow USQ “to explore and incorporate other technologies which are just constantly evolving.” Hence, interactive multimodal technology-mediated course design and delivery could be “a strategy for cementing a place for USQ” in the “very competitive [distance education] market in the future.”

Due to decreased government funding for education, the university sector has been keen to attract fee-paying students as well as non-traditional students, and this has created a major incentive for Australian educational institutions to adopt and integrate educational technology (Laurillard, 2002; Maguire, 2005). Indeed, one early adopter observed that the changing face of distance education with traditional “sandstone” universities now moving toward distance education has placed USQ under pressure to remain innovative. Despite being one of the largest distance education providers in Australia, he did not believe that USQ was particularly “innovative.” Moreover, he warned the distance education market is shrinking and “people are not being attracted to the same things anymore.” Hence, if USQ becomes complacent and simply relies upon its “reputation,” it may be in danger of losing its competitive advantage. However, one of the instructional designers argued that USQ still has the edge in some areas of distance education, such as “the GOOD (Generic
Online/Offline Delivery) stuff and the XML-based materials” which allow the delivery of courses in a range of formats including print, CD and online. However, he also acknowledged the precariousness of USQ’s position in the distance education market and observed that our major competitors “aren't that far behind us.”

The non-adopters also expressed concern about USQ’s competitive position in the distance education market. One non-adopter believed “USQ may have been well positioned in terms of its competitive position in the past, but many universities may have been coming very close and overtaking us.” Another non-adopter explained “commercial reality has hit,” while another, perceiving the urgency of the situation, stated, “I think we’d better move.” One of the DeC managers acknowledged that USQ may have been “reactive rather than proactive” and thus was “fast losing its competitive advantage in distance education.” One non-adopter proposed that by being “cutting edge,” USQ could attract more and better quality students and thus become “more financially viable,” while another considered interactive multimodal technology-mediated courses could be one way to improve student retention and progression. Student retention and progression is important to USQ, as it is one of the measures used as the basis for allocating funding from the Australian Government Learning and Teaching Fund (Department of Education Science and Training, 2007).

In summary, interactive multimodal technology-mediated course delivery at USQ is perceived to embrace advanced educational technology and maintain a competitive edge in the distance education market. In order to prioritise the development of interactive multimodal technology-mediated courses, one instructional designer emphasised the urgency of communicating to management findings of a “significant amount of research” that has indicated that these courses were effective. Moreover, the widespread development of interactive multimodal technology-mediated courses at USQ will be influenced by a number of institutional factors which will either enable academics or create barriers. These institutional factors are discussed next, commencing with the need for clear institutional direction.
6.2 Institutional direction

Despite the efforts of pioneers and early adopters, widespread development of interactive multimodal technology-mediated distance education courses at USQ has not yet eventuated. The literature revealed that clear institutional direction is required to encourage academics to adopt and integrate educational technology (McLean, 2005). In particular, a lack of clearly defined educational goals and a clear understanding or vision of how technology can be used to achieve those goals have been found to impede adoption (Ertmer, 1999; Franklin et al., 2001). In line with the literature, a key theme raised by the interviewees and DeC management concerned the perceived need for clear institutional direction, vision, policies, plans, procedures and processes with respect to the design and delivery of distance education materials at USQ. Interviewees called for greater direction, ownership and accountability as well as the development and communication of a clear policy on the design and delivery of distance education materials.

The literature revealed that administrative leadership is critical for effective integration of education technology in higher education (Surry et al., 2005). Some interviewees attributed the lack of widespread development of interactive multimodal technology-mediated distance education courses at USQ to a perceived lack of leadership. For example, one early adopter argued “direction needs to come from the top.” Moreover, according to one instructional designer, a lack of clear policy statements with respect to the direction that USQ was taking in the design and delivery of course materials may have resulted in a situation whereby academics “sit back, and say ‘well, no I won’t really dive into the water and do this until I have to’.” For example, three of the non-adopters (n=4) indicated that in order for them to convert their courses to multimodal format they would need to be directed by faculty management.

One of the early adopters advised that she had been directed by her Dean to convert her foundation course. The instructional designer who assisted this academic, and who was also one of the interviewees, discussed her situation and explained that “there would have been no motivation to do it otherwise; in fact, that person was
quite unwilling to do it initially.” However, other early adopters had not been
directed to convert their courses and one of them considered that academics would
“baulk” at being directed to do so. Indeed, perceived institutional pressure to adopt
and integrate educational technology has resulted in academic resistance, hence,
providing guidelines and principles may prove more acceptable (S. Dunn, 2000;
Howell et al., 2005). One of the DeC managers explained that the Vice Chancellor
is reluctant to be prescriptive and believes that academics “need to own the process.”
One non-adopter also preferred a softer approach whereby faculty management
asked academics for their support in order to “enhance what we’re doing here in the
Faculty.” One of the instructional designers observed that “in some faculty or
department areas, one or two people have been encouraged to be the leaders for their
area.” Another instructional designer explained that “learning and teaching
innovations [at USQ] are fairly much on an individual course leader wanting to try
things out.” Likewise, one early adopter also perceived that “it’s really just been up
to the individual to put their hand up.”

In terms of who should be ultimately responsible for determining USQ’s
direction on the design and delivery of distance education materials, one pioneer and
one of the instructional designers suggested top managers with teaching and distance
education related portfolios. Likewise, another instructional designer argued “top-
down direction” is required and suggested that academics need to be told interactive
multimodal technology-mediated delivery is part of USQ’s “vision statement for how
we teach, how we construct our learning and teaching.” However, one of the
instructional designers perceived that “leadership also needs to come from Faculty
management and Faculty Learning and Teaching Enhancement Committees.”
However, as explained by one of the DeC managers, faculty management is
overloaded and, in some cases, does not have the power to make these decisions.

Despite calls for institutional direction, interviewees also raised the issue of
academic autonomy and the desire of some academics to have greater control over
the design and delivery of their course materials. This finding is in line with the
literature which revealed that some academics have expressed anxiety and fear that
they will lose autonomy or control over the curriculum if they embrace
organisational initiatives regarding educational technology (Dede, 1990; Khan, 1995;
A relatively high level of academic autonomy at USQ is apparent. For example, one non-adopter who had only recently joined the tertiary sector from the private sector commented, “USQ is disconcerting, because you just go about and do your own thing,” while another non-adopter considered that managing academics at USQ was “like herding cats.” Likewise, one early adopter perceived that academics are generally difficult to manage because they “work in a very isolated, insular environment” and are “all off doing their own thing.” A desire for autonomy and control over the development of their distance education materials was raised by a number of interviewees. Frustration with long DeC production deadlines and the desire for greater flexibility and greater control over production timelines in terms of being able to include more timely information in their course materials was identified by a number of pioneers and early adopters. For example, one early adopter perceived she now had “more ownership” over her course package. However, one of the non-adopters observed that academic autonomy with respect to the design and development of course materials may impact negatively on the student experience “because if one individual academic does it and the other one doesn’t do it, there’s a mixed message sent out.”

### 6.2.1 Awareness of interactive multimodal technology-mediated course development

According to one of the instructional designers, an issue closely related to the perceived lack of institutional direction was that some of USQ’s newly-recruited top management may not know what interactive multimodal technology-mediated or “transmodal” delivery is, and in recent times, the concept “seems to have dropped off the radar.” Another instructional designer also believed that the “transmodal” delivery initiative had lost momentum. She believed it had been left to individual course leaders, program heads or associate deans “to move the initiative forward.” Moreover, it appears that many academics “don’t have a clear idea of what ‘hybrid’ is or what will it mean for their course.” Indeed, one non-adopter confessed he did
not know what a multimodal course was and believed that other academics may also not be “aware of it, or they just think it’s not important.” Another instructional designer explained that “communication of the whole initiative obviously hadn’t filtered down the course leader practitioner level.”

This current lack of awareness and dialogue regarding interactive multimodal technology-mediated course development may be explained by competing priorities. As explained by one instructional designer, from 2003 to 2006, “hybrid” or “transmodal” delivery was a priority for the DeC and the Head of DeC was an advocate. However, in recent times, there has been less emphasis as competing pressures including the establishment of a new campus at Springfield, the changing role of the DeC, the establishment of the LTSU and pressing issues concerning student retention and progression have become priorities. In particular, one pioneer identified the “fragmentation of the DeC” and the “unknown role of newly established LTSU in instructional design and facilitation of the development of new teaching approaches” to be “a risk to such initiatives.” Indeed, one of the DeC managers also agreed that changes in recent times such as organisational review, the USQ strategic planning process, the establishment of a new satellite campus, review of international partnerships, the establishment of LTSU and changes to DeC have meant that the debate concerning how we deliver our courses has been “put on the backburner.”

6.2.2 Strategic planning, procedures and processes

In addition to the perceived need for clear institutional direction and greater awareness of the interactive multimodal technology-mediated course concept, interviewees and DeC management identified the need for clear strategic planning, procedures and processes. This finding supports the literature which revealed that a major barrier to academics’ adoption and integration of educational technology arises from the perceived or actual failure by an institution to “establish and implement strategic plans” (Weston, 2005, p. 103). Moreover, previous studies have indicated that careful analysis of the curriculum to determine priorities and the development and implementation of an integration plan may encourage effective diffusion and
integration of educational technologies (Covington et al., 2005; Gulbahar, 2007; Maguire, 2005).

Indeed, the need for a program-wide strategic plan for interactive multimodal technology-mediated course development was raised by DeC management and two early adopters, with one of the early adopters commenting that “there’s no coherent strategy to see a particular degree or program or anything converted. We’re still out pioneering, with people doing different things.” DeC management explained that course development at USQ is being driven by individual academics rather than on a program or faculty-wide basis, hence, individual academics or discipline groups are influencing the way that materials are designed and delivered. A coherent, program-wide strategy was also deemed important by one of the non-adopters who argued that “a one size fits all approach” will not work, as what may work with one cohort of students may not work with another. One non-adopter emphasised that a clear strategic plan would also allow the development of effective staffing, workload and resource plans.

In addition to a clear strategic plan, the perceived need for clear policies, procedures and processes for the conversion of distance education courses is required (Surry et al., 2005). For example, one non-adopter proposed that “it’s just a question of getting the structural configurations right, how we want to do it; the policies, the process, the procedures, what we want to do.” Likewise, the lack of a clear process was perceived to be a considerable obstacle for one early adopter who discussed the anxiety she had experienced due to her lack of knowledge and understanding of the process and admitted, “it was just like a complete mystery to me.” Pioneers also pointed out that “there’s no induction into a process,” rather “it’s this vague thing out there that if you want to be part of it, just jump in the water and learn how to swim.” Hence, one pioneer suggested the need for a set of clear guidelines, outlining the specific steps involved including who will be involved, who academics can talk to, who might serve as a mentor, how long the conversion will take, what needs to be done and direction on “which parts of your materials lend themselves to multimedia form.” Likewise, one of the instructional designers agreed academic staff need to know “where do I start, who do I work with, how does this happen and what are the steps I need to move through to get to a final product?”
Clear guidelines, learning frameworks and templates are critical, because consistency in the format of courses and uniformity of appearance and navigation creates a consistent student experience across the program and assists students to adapt to the new learning environment (Buchan et al., 2005; Carroll-Barefield et al., 2005). Hence, one of the instructional designers suggested developing design templates to facilitate the process. Moreover, making processes and procedures readily accessible to academics is important with one instructional designer and one pioneer recommending that information on policies and procedures be provided on the DeC website as well as course pre-production forms.

Document analysis revealed that the process for developing an interactive multimodal technology-mediated course is explained on the course development page on the USQ website (USQ, 2007e) and multimedia examples are also provided (USQ, 2007f). However, one early adopter had experienced difficulty finding relevant information on the process of developing an interactive multimodal technology-mediated course and “making sense of it in a real applicable way.” Likewise, one of the pioneers knew that multimedia examples were available on the DeC website, but had also experienced difficulty locating them. While information on the CD-ROM development process which provides a step-by-step process and access to interactive multimodal technology-mediated examples is provided on the Faculty of Business intranet, this more detailed information on the process is not provided university-wide (USQ, 2006b).

6.2.3 Knowledge of possibilities and access to exemplars

In addition to the perceived need for clear procedures and processes, the development of interactive multimodal technology-mediated distance education courses appears to be influenced by the academic’s knowledge of the possibilities and the “full range of opportunities.” However, the lack of a formal mechanism for disseminating information on interactive multimodal technology-mediated course development activities at USQ was identified as a barrier by one early adopter. Another early adopter explained, “we sort of live in ivory towers; we isolate ourselves from other faculties and what they’re doing.” Indeed, most of the non-
adopters indicated they were not sure what was involved in the development of an interactive multimodal technology-mediated course or what the options were.

The literature indicates that academic showcases and observing exemplars of how others have integrated educational technology to enrich the learning environment are valuable (Chizmar & Williams, 2001; Franklin, et al., 2001; Wang et al., 2004). To avoid “re-inventing the wheel” early adopters called for seminars or “showcases” on the development of interactive multimodal technology-mediated courses which would include “brainstorming on tips, exploring possibilities” and “the path to follow.” One instructional designer advised that information sessions or showcase style presentations had been conducted when the “hybrid initiative was kind of ‘hot to trot’.” Indeed, an analysis of USQ’s staff development programs revealed that a number of staff development workshops or seminars on “hybrid”, “transmodal” and “multimodal” delivery have been conducted since 2003. However, these optional staff development sessions were not deemed to be enough with one instructional designer suggesting the need for regular reinforcement such as a “newsletter that goes around saying this is some of the good things that are happening.”

One pioneer emphasised the benefit of spending time looking at examples of other pioneering projects during the development process for the purpose of determining “good things and bad things.” Because she did not perceive herself to be very imaginative, she appreciated viewing these exemplars and unearthing possibilities. Moreover, one of the non-adopters, having “seen some examples that really related to their area,” was now enthused and motivated to convert her course. An instructional designer observed exemplars are valuable, because “it’s difficult for people to visualise exactly what they are wanting” and what “it’s going to look like.” Indeed, the lack of exemplars had added to the anxiety experienced by one early adopter. Document analysis revealed that the newly established LTSU is developing a teaching exemplars website and examples of interactive multimodal technology-mediated elements will be provided in the near future (USQ, 2007g).
6.3 Institutional support

The literature revealed that institutional and administrative support enables the adoption and integration of educational technology (Capobianco & Lehman, 2004; Gulbahar, 2007; Jones & Kelley, 2003; Moser, 2007). Financial, administrative and technical support as well as a supportive organisational structure with a culture of collaboration and cooperation and participative decision making has encouraged academics in development programs involving educational technology (Betts, 1998; Waddoups & Howell, 2002). The integration of educational technology also requires pedagogical support and training (Mishra & Koehler, 2006; Surry et al., 2005). In line with the literature, institutional support was identified by interviewees as a key enabler for academics’ development of interactive multimodal technology-mediated distance education courses at USQ. Institutional support, in the form of access to pre-requisite technology and resources, technical assistance, training and pedagogical assistance was identified as being important. Each of these issues is now addressed, in turn.

6.3.1 Access to technology and resources

Inadequate infrastructure to support the technology and lack of access to appropriate or adequate hardware and software have been found to create significant barriers to technology adoption and integration (Capobianco & Lehman, 2004; Gulbahar, 2007; Jones & Kelley, 2003; Weston, 2005). Surry et al.’s (2005) RIPPLES model for integrating educational technology into higher education proposes that “infrastructure is the single most important factor in integrating technology into the curriculum” (p. 328). However, while lack of infrastructure has been highlighted as problematic to technology adoption in many studies reported in the literature, interviewees in this study expressed very high praise for USQ in terms of the provision of the latest technology and technical assistance. For example, one early adopter declared, “one thing that’s always amazed me is how USQ always seemed to be up there with the technology.” Indeed, another early adopter professed that access to the necessary technology had been a driving factor in his decision to convert his distance education course from printed to technology-mediated format.
6.3.2 Access to technical assistance

The literature revealed that a lack of specialised technical support from instructional designers, technicians, graphic designers, media specialists, and librarians has been frequently cited as a reason for academics’ non-adoption of technology (Chizmar & Williams, 2001; Jones & Moller, 2002; McCorkle et al., 2001). In addition to technical support, ongoing and informal “hands-on” technical assistance may also be required (Capobianco & Lehman, 2004; Gulbahar, 2007; Willis, 1998). However, in contrast to many previous studies where the necessary support was lacking, one of the early adopters described the support at USQ as being “absolutely brilliant” and “truly, over and above, what I would have expected.” Indeed, the extent of the support received could not be faulted by the interviewees, with one early adopter stating emphatically that “without that really meaningful support, there’s no way I think I would have done it.” Another early adopter agreed that if “an academic was trying to do it on their own, they just couldn’t.”

Pioneers and early adopters both perceived that the expertise and technical assistance they had received from DeC had been indispensable in facilitating their course conversion. For example, one pioneer stated, “I had all the cooperation that I wanted.” Moreover, one of the early adopters had been encouraged to proceed with the conversion of his course due to “USQ’s big strength” in terms of its extensive “expertise with education and multimedia design.” One pioneer emphasised, particularly, the importance of the technical expertise provided by interactive multimedia staff in the Multimedia and Web Development Services section of DeC in developing interactive diagrams (produced with the proprietary software Flash®). The ease and seamlessness of the technical support provided by these multimedia experts was also praised by an early adopter. Likewise, the pioneers and early adopters valued the assistance of Media Services staff in the development of video and audio elements. One early adopter also commented on the assistance received from his faculty librarian who had prepared a series of multimedia presentations on searching the Web and using electronic library resources.

Hence, it appears that the development of an interactive multimodal technology-mediated course relies upon the cooperation of a team of academics,
administrators, technical specialists and instructional designers. This finding is in keeping with the literature which emphasises the essential role of people’s skills and experiences for “the integration of educational technology” (Surry et al. 2005, p. 328). Indeed, when providing advice to other academics considering conversion of their course, one early adopter recommended “talking to others and sitting down in a team approach.” Another early adopter who had experienced problems coming to terms with the technology advised that, next time, she would seek help from others earlier rather than allowing herself to get “so stressed about it.” Indeed, being part of a team with the energy, creativity and excitement generated by that team was valued by early adopters. One emphasised the “combined energy that comes from lots and lots of people within the University that’s channelled towards an outcome,” while another explained, “I really got a sense of being part of a team, all working together.” Yet another early adopter advised that “there’s a network surrounding this and you have to use that network.” He offered that “I don’t think I would have got this to where it has without having used to the greatest extent possible that advice.”

The instructional designers also acknowledged the importance of having specialists to assist academics and work as part of a team to facilitate the development of interactive multimodal technology-mediated courses. She observed that academics who “have the will, but not the technical ability, can work closely with DeC services and Media Services and ICT people” and thus “don’t need to be experts in the technology.” They can access the “expertise and knowledge” of instructional designers to identify the appropriate technology or teaching strategy to match “the idea they’re exploring in their head.”

Document analysis revealed a Web page on the DeC website which identifies and provides a brief description of the range of learning resource development services provided by DeC to support staff in the development of interactive multimodal technology-mediated course materials (USQ, 2007h). A hyperlink to each individual section provides detailed information on services and a point of contact which should prove very useful for staff involved in the development of interactive multimodal technology-mediated courses. However, some interviewees indicated that while they were aware that these services and expertise existed, they were unaware of the breadth and scope of possibilities and were unclear as to
whether, and how, they could request these services as well as how, and to whom, they would be costed.

### 6.3.3 Training

One aspect of institutional support that has been found to be critical to the integration of educational technology is specialised and tailored training in both the use of technology and understanding how to integrate the technology into the curriculum (Gulbahar, 2007; Mishra & Koehler, 2006; Surry et al., 2005). In line with the literature, staff development, training or workshops for academics were identified as essential for the development of interactive multimodal technology-mediated courses by both interviewees and DeC management. The possibility of developing one’s own skills and thus being less dependent on the experts in the DeC was identified as important by a number of interviewees. In particular, for interactive multimodal technology-mediated course development, training in the use of relevant software such as Breeze and developing interactive diagrams was deemed important. However, Bates (2000) argued that, once training had been undertaken, ongoing support is still required. Likewise, some level of “hand-holding” or coaching in the early stages was deemed necessary by interviewees for such a transition to self-efficiency to occur (Albion, 2001; Moser, 2007). Document analysis revealed that guidelines for using technology including preparing Breeze presentations which were not provided at the time of development by those interviewed, are now available on the DeC website (USQ, 2007i).

Due to personal differences, there may be no one best approach to encouraging and motivating academics to adopt and integrate educational technology (Surry, 2002). For example, Jacobsen (1998) proposed that when adopting and integrating educational technology, “a different support infrastructure is clearly needed for mainstream faculty from that which sufficed for early adopters of technology” (p. 7). Hence, institutions should recognise the different needs of different adopter groups and tailor both support and training initiatives accordingly. Moreover, the nature and pace of the training may need to be adapted to the level of the participant. For example, one non-adopter emphasised the need for training for academics who are “slow-learners” and those who experience difficulty with new
technology. Conversely, another more “technologically-savvy” non-adopter perceived that most training sessions were “a waste of time” and preferred to learn by herself at her desk.

While the institution may seek to adopt and integrate educational technology to achieve specific pedagogical goals, the extent to which individual academics are able or willing to participate in the adoption and integration of educational technology may vary (Harrsch, 2000; McLean, 2005). Indeed, the interviews revealed that not all academics are interested in learning how to use educational technology and some would prefer to leave the development of multimedia elements to others. For example, one less technologically-inclined non-adopter commented that “if I could have it my way, I would say let’s give that to someone else.” He would prefer to “team teach and say to someone ‘you do all the technology stuff, I’ll do all the face to face and interaction’.” Hence, he would prefer that his role be constrained to identifying content, while his more “technologically-minded” team member would determine how that content could be best delivered.

The literature also revealed that the timing and source of the training to support technological initiatives must be appropriate and the training must be relevant and specific to academics’ needs and interests (Irani & Telg, 2002; McLean, 2005). In line with the literature, one pioneer suggested training at a time that suits academics and closer to when the knowledge can be used (“just-in-time”). She advised “don’t do any training until you’re actually ready to do it, because the training will change or the technology will change.” One of the non-adopters explained that if he does not “have the time to play around with it” soon after the training, he quickly loses the knowledge he acquired.

6.3.4 Access to instructional design and advice

The literature has revealed that developing the skills to use technology is not sufficient as academics also need training in appropriate instructional design (Koehler et al., 2007; Mishra & Koehler, 2006; Moskal, Martin & Foshee, 1997; Waddoups & Howell, 2002). While the literature emphasises the need for training in instructional design, the need for one-on-one instructional design support is less
evident. The findings of this study revealed that pioneers and early adopters of interactive multimodal technology-mediated courses at USQ valued the support and assurance that they had received from the instructional designers, particularly in terms of pedagogical advice. As one instructional designer pointed out, knowing what could be done was one thing, but understanding the pedagogy behind it, in other words, why it should be done was also important. DeC management also emphasised the need for greater discussion of the pedagogy underlying the development of what they referred to as “resource based packages.”

The critical importance of the instructional designers in guiding the conversion process became evident during the interviews. Instructional designers brought to bear their instructional design knowledge to provide frameworks as well as to propose ideas. For example, one of the instructional designers advised that she used instructional design models and frameworks such as “Mayes model” (McDonald & Mayes, 2005) and “Goodyear’s process” (Goodyear, 2001) to help “structure the process.” Her approach, when working with an academic on their interactive multimodal technology-mediated course, was to “tease out their teaching learning philosophy, the kind of things they want the students to do and the kind of learning outcomes they want to achieve.” Another instructional designer explained that converting a course from print-based to interactive multimodal technology-mediated “involved quite a lot of changes and a huge transition for the lecturer concerned to think about what would make it a lot more valuable and a rich environment for students,” while another instructional designer observed that academics have “to think outside the box.”

Acknowledging their importance in the process, one of the non-adopters called for instructional designers to be more accessible and located within faculties, rather than centralised within the Learning Teaching Support Unit. He believed that the presence of instructional designers within the faculty would be motivating for academics and the instructional designers would be able to provide proactive pedagogical advice more closely aligned to the specific discipline. One instructional designer agreed that “working very hands-on with course leaders and … supporting that energy and initiative” had worked well in the past. However, another instructional designer pointed out the potential cost inefficiencies associated with
such a “one-to-one” strategy. Despite the expertise of the instructional designers in providing useful advice and direction, one early adopter also expressed the need for support staff who understood, more specifically, the pedagogy of the discipline and thus identified the need for a “peer support person within the faculty” such as a senior academic with expertise and experience in developing interactive multimodal technology-mediated courses.

While the general consensus of pioneers and adopters was that they had been provided with an excellent level of support, interviewees expressed concern that the level of support enjoyed in the past may not necessarily continue. Ongoing support across the adoption cycle is critical if the widespread adoption of interactive multimodal technology-mediated courses is to eventuate (Moser, 2007). Given the changing role of the DeC and the establishment of the LTSU, there appeared to be a lack of clarity from both academics and the instructional designers as to what the revised role of the instructional designer was. One pioneer commented that “I don’t know the role of LTSU anymore, I don’t know how much pedagogical advice we’re entitled to get, who’s going to pay for it and the process involved.”

Moreover, given budgetary constraints at the time of conducting the study, a number of the people interviewed believed that, in the future, the available support and resources for the development of interactive multimodal technology-mediated courses may be limited. Indeed, one of the DeC managers identified the need to consider budgetary implications and admitted that “DeC is not pushing people to CD delivery, as they would not have the staff and resources to sustain mass development at this time.” If too many academics convert their courses within a short period of time, the current level of infrastructure coupled with limited resources may not be able to support that level of activity.

6.4 Influence of mentors and peers

The literature revealed that rapid diffusion of educational technology relies upon the presence of mentors, role models and technology champions who are prepared to collaborate and share their experiences, conduct workshops, coach colleagues in the
use of technology and provide guidance during design and development (Bates, 2000; Covington et al., 2005; Ebersole & Vorndam, 2003; Franklin et al., 2001). In keeping with the literature, the influence of mentors and peers was identified by interviewees as important to the development of interactive multimodal technology-mediated courses at USQ. For example, one pioneer acknowledged the importance of those academics and instructional designers who had “paved the way,” “pushed the boundaries” and “established patterns” for the development of interactive multimodal technology-mediated courses. These established patterns had now been documented and formalised and this had made it “easy for others to follow” and “build on what others had done.” One early adopter had observed the success of one of pioneers and explained, “I was picking up the vibes that this was working for him.” Hence, while some of his colleagues “tried to dissuade” him, he declared, “the enthusiasm [of this mentor] overcame any doubts I might have had.” Another early adopter discussed how she actively gained the support of her peers by getting them involved with the development of her course, while another expressed her willingness to share her experiences with others and tried “to encourage others to see the possibilities.”

Mentors assist educators to envisage the uses and benefits of educational technology for enriching the learning environment (Franklin, et al., 2001). Indeed, the proactive approach taken by the instructional designers in encouraging academics to convert their courses was identified as a key motivating factor. One pioneer had spent time with a “like-minded” instructional designer discussing the development of materials with multiple representations of information which cater to different learning styles. This academic, in turn, had then encouraged other academics to consider developing an interactive multimodal technology-mediated course.

6.5 Cost effective production and delivery of distance education courses

As discussed in Section 6.1.1, one of USQ management’s key motivations for converting print-based courses to CD format was to reduce the costs of printing and distribution of distance education materials. These potential cost savings had proved
motivating for one early adopter, while another early adopter believed “in the long run, cost savings to the university will be substantial in terms of mail.” Hence, he believed that alternatives to paper-based delivery of distance education courses were inevitable. Another early adopter estimated the traditional printed package costs around “$60 compared to $2.50 for a CD or DVD.”

While reductions in printing and distribution costs were acknowledged, the up-front cost of development of interactive multimodal technology-mediated distance education courses may create a barrier for some academics with one pioneer acknowledging that the development of his interactive multimodal technology-mediated course “was an expensive exercise the first time around.” Moreover, the activity-based costing (ABC) system which had recently been implemented at USQ, whereby costs are directly allocated to individual courses, had proved a major inhibitor for some academics as well as a perceived institutional barrier to innovation. One pioneer declared that “I have been beaten over the head by the ABC costing system that we have at USQ.” The initial costs associated with developing multimedia elements for his course had made his interactive multimodal technology-mediated course appear relatively expensive compared with traditional print-based courses. The costs of development for his course were not amortized across the life of the course (normally 3 years between major revisions), rather, they were allocated entirely to one semester of offering. This failure to spread development costs across the life of a course offering was also raised as an inhibiting factor by DeC management.

Other pioneers and the instructional designers shared concerns that academics who had “done some innovative things” were being “penalised through the ABC.” Moreover, ABC costing was being used to “name and shame courses” with higher development costs. Further, according to one instructional designer, ABC and the need for financial accountability at the faculty level may have prevented faculty management from encouraging academics to convert their courses. Hence, one instructional designer was deeply concerned that USQ’s advantage in distance education is “at risk, as cost criteria are highlighted above quality and innovation and experimentation.” Indeed, one pioneer warned that USQ may be building into its
“financial or management practices, a disincentive for best practice when it comes to teaching.”

Academics’ concerns about the costs of development of interactive multimodal technology-mediated courses appear to be further exacerbated by the lack of a pre-determined budget for each course. One early adopter stated, “it would have been really useful to know how much it is going to cost.” She explained that she had been somewhat embarrassed by being unaware, until some time into the project, that there were financial limits. She confessed, “I thought it was an endless fund.” One of the pioneers also argued the need for a cost-benefit analysis of interactive multimodal technology-mediated course development in terms of the cost savings associated with reduced printing and distribution costs, the costs associated with the development of interactive multimodal technology-mediated courses and the benefits associated with improved student learning outcomes. He stressed that “unless USQ can identify some return on investment, why … would they spend all its resources on the hybrid or CD?”

6.6 Advanced delivery formats and other educational technologies

As discussed in Section 6.1.3, tertiary institutions need to investigate and take advantage of new and advanced educational technologies in order to remain competitive and provide a rich and rewarding learning environment across all modes of enrolment (Bates, 2006; Butler & Blashki, 2003; Gill, 2004; O'Donoghue et al., 2001). To date, interactive multimodal technology-mediated courses have primarily been delivered via CD or a combination of CD and online. However, a number of those interviewed discussed more advanced technologies for delivering technology-enhanced courses and content. Indeed, one non-adopter questioned whether the CD format would allow USQ “to be competitive in the market place or should we [USQ] be looking at DVD or some other kind of technology, so that we’re ahead of the game.” For example, one of the pioneers perceived the CD as being a “stepping stone” and thus intended changing to DVD for the next iteration of his course. One of the early adopters had received feedback from his students suggesting the CD is
“old hat” and they were seeking “something they can download to their IPods.” Likewise, one of the pioneers observed that “we’re into almost what they call m-Learning, that is, mobile learning.” Hence, he raised the possibility of “podcasting” whereby students could access a “weekly broadcast” via their iPod or mobile phone. Indeed, Jafari, McGee and Carmean (2006) identified a number of modern communication devices including instant messaging and podcasts, and pointed out that students “desire to see these tools integrated into the course experience” (p. 56).

One of the pioneers described the “brilliantly animated” 3D learning objects being developed by an academic in the Faculty of Science. He believed that incorporating this type of 3D technology into our distance education courses would give USQ a “competitive edge” because it would allow USQ “to create virtual tutorial and lecture environments for our external students.” An early adopter also believed that “as we move towards the virtual world, students will become more and more used to seeing virtual people rather than real people in lectures.”

Document analysis revealed that, since the interviews for this study were conducted, numerous workshops and trials of advanced educational technologies such as Camtasia, ALIVE, Elluminate Live, Wimba and virtual education tools such as Second Life have been conducted at USQ. In 2007, a Technology Enhanced Learning Reference Group was established by the LTSU to investigate what educational technologies are being used at USQ and whether these technologies should be adopted and supported on a wider basis. Moreover, in October 2007, the Learning Futures Innovation Institute (LFFI) was launched at USQ to “develop and apply innovative learning technologies to support student learning” (USQ, 2007)). A useful summary of communicative, collaborative, documentative, generative, and interactive Web 2.0 applications for emerging technologies that could be investigated by USQ for e-learning purposes and criteria for selecting emerging technologies is provided by McGee and Diaz (2007).
6.7 Summary of institutional factors

Despite favourable attitudes being expressed by academics and positive feedback from students regarding interactive multimodal technology-mediated distance education courses, and the seemingly pressing need for USQ to move away from print-based distance education materials and adopt educational technology in order to remain financially viable and compete in the distance education sector, a number of institutional factors appear to have created barriers to the development of interactive multimodal technology-mediated distance education courses, as discussed in this chapter. Institutional barriers include the perceived lack of institutional direction concerning the design and delivery of distance education courses including the lack of a clear program-wide strategic plan, policies, procedures and processes for interactive multimodal technology-mediated course design as well as limited knowledge of possibilities and lack of access to exemplars.

Conversely, a high level of ongoing technical and instructional design support for academics developing interactive multimodal technology-mediated courses has been evident and is perceived to be critical for enabling widespread adoption of interactive multimodal technology-mediated courses at USQ. However, some interviewees expressed concern that given budgetary constraints and the changing role of the instructional designers, this high level of support may not be able to be provided in the longer term. The important role of mentors and peers in influencing other academics to adopt and integrate educational technology was also addressed.

The need for cost effective production and delivery of distance education courses at USQ was acknowledged as a key motivator. However, the negative impact of up-front development costs and the activity-based costing (ABC) system on the development of interactive multimodal technology-mediated courses were discussed as major barriers to adoption. Finally, in order for USQ to retain a competitive advantage in innovative distance education, the need to continue to investigate advanced educational technologies and delivery formats for interactive multimodal technology-mediated courses was identified.
In the next chapter, managerial implications arising from pedagogical, individual and institutional factors that influence academics’ development of interactive multimodal technology-mediated distance education courses at USQ are addressed. Recommendations for motivating and enabling academics at USQ to convert their print-based distance education packages to an interactive multimodal technology-mediated course format are presented.
Chapter Seven

IMPLICATIONS AND RECOMMENDATIONS

In the previous three chapters, discussion of the findings of the research related to pedagogical (Chapter 4), individual (Chapter Five) and institutional (Chapter Six) factors that appear to influence academics’ development of interactive multimodal technology-mediated distance education courses at USQ was provided. In the first part of this final chapter, implications and recommendations arising from each of these three factors, for both USQ and individual academics, are addressed. While the implications and subsequent recommendations are directed toward USQ, many of these implications and recommendations would be equally applicable to other distance education providers and academics within those institutions.

In the second part of this chapter, the theoretical, managerial and practical contributions of the research are addressed, and then limitations of the research and directions for future research are identified. Finally, the reflections of the researcher are presented in a postscript. This final chapter commences with a discussion of pedagogical factors that appear to influence academics’ development of interactive multimodal technology-mediated distance education courses at USQ.

7.1 Implications and recommendations arising from pedagogical factors

A range of pedagogical factors were identified during the course of the research which have implications for both USQ and individual academics. These pedagogical issues relate to both the institution’s educational aims and individual academics’ pedagogical goals. Recommendations arising from implications related to pedagogical factors include:
• develop a clear definition and shared understanding of the term “interactive multimodal technology-mediated distance education course” (Section 7.1.1)
• develop inclusive learning packages that lead to improved learning outcomes (Section 7.1.2)
• encourage student-centred, independent and resourceful learning (Section 7.1.3)
• seek to replicate the on-campus experience (Section 7.1.4)
• revitalise the curriculum (Section 7.1.5)
• engage students in the learning (Section 7.1.6)
• create a rich learning environment (Section 7.1.7)
• manage the course content (Section 7.1.8)
• add value while avoiding cognitive overload (Section 7.1.9).

Each recommendation is now addressed, in turn, commencing with the need for USQ to develop a clear definition and shared understanding of the term “interactive multimodal technology-mediated distance education course.”

7.1.1 Develop a clear definition and shared understanding of the term “interactive multimodal technology-mediated distance education course”

The research revealed that there is a need for a clear definition so academics understand that the development of an interactive multimodal technology-mediated course involves the use of multimedia and ICT to develop engaging and interactive course resources which appeal to different sensory modes and a variety of learning styles and modal preferences. This will distinguish an interactive multimodal technology-mediated distance education courses from those where the printed materials have simply been “dumped” onto a CD or online, without any enhancements or changes to way the content is presented. Indeed, an analysis of examples of interactive multimodal technology-mediated course materials, provided to the researcher by the pioneers and early adopters, revealed that while every interactive multimodal technology-mediated course has a similar format and “look and feel,” the extent to which multimedia and hypermedia elements have been used to enhance or add value to the course varies greatly. Some courses have a much
greater degree of interactivity and multimedia and hypermedia enhancement than others. Hence, some degree of standardisation is necessary to ensure that students have a consistent experience across their program and this would involve developing some minimum requirements and standards in terms of levels of interactivity and multimedia enhancements.

### 7.1.2 Develop inclusive learning packages that lead to improved learning outcomes

Developers of interactive multimodal technology-mediated distance education courses perceive this approach delivers a more equitable and inclusive learning package, which caters for students with different learning styles and modal preferences (VARK) as well as different cohorts of students including Generation Y (born between 1981–1995), ESL and those with a disability. This is in line with Goal Five of the University’s Learning and Teaching Plan which states that USQ is “committed to access, equity and inclusivity for all in its educational community” (USQ, 2006a, para 1). Hence, USQ should encourage academics to convert their print-based distance education packages to an interactive multimodal technology-mediated format, and to include multimedia and hypermedia elements which appeal to a range of sensory modes and thus provide a more inclusive learning package for all students, regardless of mode of study.

Distance education materials at USQ have been traditionally presented in read/write format, however, this study revealed a perceived need to reduce the amount of reading material and use alternative modes of delivery in order to more closely match the learning styles of the younger generation who have grown up in an electronic and highly visual culture. In particular, aural explanations of more difficult concepts or assessment items appear to be valuable for students with an auditory modality. Video and audio elements within the interactive multimodal technology-mediated course as well as interactive diagrams provide a visual, textual and aural explanation of content and appear to assist students to understand and remember key concepts, leading to improved learning outcomes. To assist students with a hearing or visual disability, aural explanations for the visually impaired and transcripts of audio elements for the hearing impaired should be provided.
However, in order to develop effective interactive multimodal technology-mediated courses, academics require an understanding of different learning styles and modal preferences. Information on learning styles which is now provided on the LTSU website, as discussed in Section 4.3.1, will prove useful for educating academics in this respect. Moreover, academics need to be encouraged to become more aware of their own learning styles and consider how their learning style and modal preference impacts on the way in which they teach as well as how they design their distance education materials.

Multiple representations of content allow dual-coding, provide repetition and redundancy to maximise the message and have been found to lead to improved retention and comprehension. In particular, ESL students appear to comprehend content more successfully from hearing and seeing the content and also appear to benefit from hearing how more difficult words are pronounced and used within the discipline. However, due to the time it takes to develop multiple representations of content and the potential for cognitive overload, academics need to be selective in the use of multiple representations and focus on key concepts which are fundamental to the course.

The findings revealed that some academics have developed interactive multimodal technology-mediated courses to encourage higher order thinking and reflective learning. Moreover, by appealing to various learning styles and sensory modes and providing multiple representations of content, interactive multimodal technology-mediated distance education courses appear to be particularly beneficial for lower achieving students and have lead to improved learning outcomes, retention and progression rates. However, in order to encourage widespread adoption of interactive multimodal technology-mediated distance education course, further research on the benefits of interactive multimodal technology-mediated courses for distance education students in terms of improved learning performance, retention and progression is required. Moreover, the favourable findings of research conducted, thus far, on students’ perceptions of interactive multimodal technology-mediated courses and the impact on learning performance needs to be disseminated to both management and individual course leaders.
7.1.3 Encourage student-centred, independent and resourceful learning

The findings of this study indicate that interactive multimodal technology-mediated courses can be used to challenge distance education students to become more learner-centred, self-directed, resourceful and independent learners. This has involved the academic adopting a more participative education model with less “spoon-feeding” and encouraging students to take greater ownership of their learning. Academics need to consider more carefully the potential affordances of technology and be informed on how to use technology in ways that encourage student-centred, independent learning. Interactive multimodal technology-mediated courses require students to become more proficient in the use of technology and thus become more comfortable and competent operating, searching for information and communicating in an electronic environment. This is considered to be an important graduate skill and thus should be encouraged.

7.1.4 Seek to replicate the on-campus experience

A major finding of this research is that interactive multimodal technology-mediated distance education courses have presented academics with an opportunity to overcome the limitations of the traditional print-based distance education package and use educational technology and ICT to provide a more equitable learning experience for distance education students. Well-designed interactive multimodal technology-mediated distance education courses replicate, at least to some extent, valuable aspects of the on-campus experience including multimodal learning, social presence, interactivity and timely feedback. In addition to presenting content in multiple modes, academics have greater opportunities to personalise their course, break down barriers, develop a social presence, greater rapport and closer relationships with their distance students who often feel isolated and disconnected.

In order to gain greater student interaction with the course content, instructors and other students, academics should focus on interactivity more so than content. This would involve including interactive learning objects, hyperlinked examples and activities and encouraging interaction on the course discussion board. Strategies for increasing interactivity (viz., dialoguing, controlling, manipulating, searching and navigating) as a means of improving learning should be explored including, for
example, interactive games and simulations, on-screen pedagogical agents, digital libraries, video cases and embedded authentic assessments (Moreno & Mayer, 2007).

In order to provide individualised and timely feedback, academics could include interactive quizzes or crosswords which allow students to undertake some self-assessment and gain instant feedback on their progress. Moreover, the use of the discussion forum to provide timely and individualised responses to students’ questions as well as online assessment submission to allow timely feedback on assignment work can be incorporated into the interactive multimodal technology-mediated course through integration with the online course homepage.

7.1.5 Revitalise the curriculum

The development of an interactive multimodal technology-mediated course has provided academics at USQ with an opportunity to review the way they design and deliver their distance education courses and thus revitalise the curriculum. However, for future adopters, this may involve a significant shift from traditional teaching paradigms and established practices and thus may take some time. Effective interactive multimodal technology-mediated course development requires careful planning and implementation. In particular, the findings revealed that when developing an interactive multimodal technology-mediated course academics need to consider what student learning objectives and outcomes they wish to achieve and then what multimedia mix will be most effective in achieving those learning objectives and desired outcomes. Academics need to identify the most important concepts within the course and then consider whether and how those concepts could be represented in a different way to cater more effectively to different learning styles.

7.1.6 Engage students in the learning

Interactive multimodal technology-mediated distance education courses appear to provide academics with an opportunity to create a more enjoyable and engaging learning experience for their students by developing dynamic, exciting and interesting materials, leading to improved student performance. Strategies for engaging students and making learning more enjoyable and exciting have included the use of humour, variety and colour.
For example, humour has been used by some academics in recorded lecture presentations to make the course more enjoyable and assist with information retention. However, academics are advised of the need to be culturally sensitive when using humour. Variety is another strategy for engaging students and has been achieved by developers of interactive multimodal technology-mediated courses by using different media, finding different ways of representing content and including a variety of activities. Moreover, colour has been used in diagrams, tables, conceptual maps and illustrations to make the course more aesthetically or visually appealing and motivating to students and thus maintain learner attention, leading to improved learning. While the recorded lecture presentations should make the materials more engaging, the research revealed that some academics have limited media presentation skills which can inadvertently lead to student boredom. Hence, due to the limited media presentation skills of some academics as well as the limited attention span of students, it is recommended to keep recorded lecture presentations brief (about 12–15 minutes) by breaking the module material down into smaller chunks (topics) and thus presenting material in ways which are more in line with students’ study habits.

7.1.7 Create a rich learning environment

Interactive multimodal technology-mediated courses present academics with an opportunity to create a dynamic and rich learning environment by accessing a vast wealth of current, relevant, applicable and meaningful information from the Web. However, the research revealed that academics need to be careful that students are accessing websites which provide credible, accurate and useful information. The findings also revealed that multimedia applications such as video and audio segments or interactive simulations can be used to develop engaging and interesting learning elements to facilitate situated learning, bring the subject matter to life and provide the basis of authentic assessment tasks, based on real-life situations.

7.1.8 Manage the course content

The research revealed that the increased amounts of information and multiple representations of content which can be included in an interactive multimodal technology-mediated course may be overwhelming for some students, leading to
cognitive overload. Hence, strategies for managing the course content of an interactive multimodal technology-mediated course are required and include:

- rationalising and prioritising the content;
- providing manageable chunks of content;
- avoiding cognitive overload; and
- providing students with direction in how to effectively use the course resources.

The findings revealed that textual content should be reduced in an interactive multimodal technology-mediated course and, where appropriate, replaced with alternative representations of the material (visual or aural) which cater for different learning styles or modal preferences. To reduce the likelihood of information overload, the research revealed there is a need to cull information that is not as important or which students could easily access via a hyperlink to a credible site. Indeed, the research indicated that it is important to teach students to find relevant information, rather than giving them everything. Moreover, to retain student attention, reduce cognitive overload and improve learning outcomes, content should be divided into logical and manageable chunks.

7.1.9 Add value while avoiding cognitive overload

The development of an interactive multimodal technology-mediated course has allowed academics to add a range of multimedia elements and provide multiple representations of content. These additions have been found to be valuable when they improve comprehension and create greater student engagement. However, the findings of this research revealed that too many “bells and whistles” can lead to cognitive overload due to the learning problems associated with limited working memory, split attention and cognitive overload. Nevertheless, academics should not be too hasty in rejecting innovations that may improve the learning environment.

To overcome any resistance from continuing students due to not receiving the traditional printed study package, it is essential that a technology-mediated course is not simply a “dump” of the printed materials and that value is added by enhancing
the study guide with multimodal learning elements and objects which cater for different learning styles and modal preferences. Further, during the transitional period and while students become accustomed to the technology-mediated format, students could be provided with the option to purchase a printed version of the study guide from the University Bookshop.

7.1.10 Provide students with direction on using interactive multimodal resources

Interactive multimodal technology-mediated courses represent a different way of learning for some distance education students, particularly for continuing students who are more accustomed to using traditional print-based packages. Hence, the findings revealed the need to educate students on how to use the pre-requisite technology and provide them with direction (“procedural scaffolding”) on how to most effectively use the interactive multimodal technology-mediated resources in order to improve learning outcomes (McLoughlin, 2002). Moreover, it may be beneficial for educators to email students and to regularly post announcements on the course homepage to draw students’ attention to some of the useful elements provided in the interactive multimodal technology-mediated courseware. A discussion topic on the course homepage could also be established where students can ask questions or post comments about the course resources.

Further, in order to gain the greatest benefit from interactive multimodal technology-mediated courses, the research revealed that students should be encouraged to identify and understand their own learning style or modal preference and thus determine which of the multimodal elements will best suit their learning style and assist them to learn. Hence, early in the semester, students should be encouraged to access the online VARK learning styles questionnaire (Fleming, 2001) to determine their dominant learning styles. Moreover, given the considerable amount of content that can be housed in interactive multimodal technology-mediated courses, students need direction to determine essential, desirable or optional information.
7.1.11 Sell the interactive multimodal technology-mediated course concept

In order to gain student acceptance of the interactive multimodal technology-mediated format and encourage more effective use of the resources, the findings revealed that it may be beneficial to “sell” the concept to students by explaining the pedagogical rationale underpinning the approach and promoting the benefits for students. Moreover, if the course is being taught by a team, it may be necessary to gain support by explaining the approach to teaching team members and drawing their attention to the various multimodal elements included in the course.

In this section, recommendations arising from implications related to pedagogical factors that appear to influence academics’ development of interactive multimodal technology-mediated distance education courses were presented. In the next section, implications and subsequent recommendations arising from individual factors are addressed.

7.2 Implications and recommendations arising from individual factors

The findings revealed that a range of individual factors appear to influence academics’ development of interactive multimodal technology-mediated distance education courses. In order to provide greater insight into academic motivators and inhibitors, individual factors were further categorised as being primarily pragmatic, opportunistic or personal in nature. In this chapter, implications arising from these and subsequent recommendations are presented, commencing with a discussion of individual factors that are primarily pragmatic in nature.

7.2.1 Implications and recommendations related to individual factors of a pragmatic nature

A number of the individual factors that appear to influence the academics’ development of interactive multimodal technology-mediated distance education
courses relate to pragmatic motivators or inhibitors. Academics’ pragmatic motivators include the desire to:

• provide flexible and convenient study options;
• cater for “new-age” and Generation Y students; and
• improve efficiency and save time in course delivery.

Academics’ pragmatic inhibitors include:

• concerns about equitable student Web access and slow download times;
• gaining copyright and protecting intellectual property; and
• lack of time and increased workloads.

Recommendations related to implications arising from individual factors of a pragmatic nature are now discussed in turn, commencing with the academic’s desire to provide flexible and convenient study options for their students.

The findings revealed that interactive multimodal technology-mediated courses provide flexible, convenient and mobile study options for distance education students. Hence, USQ should encourage and support academics to develop interactive multimodal technology-mediated courses in order to provide its distance students with faster and easier access to materials and the convenience of communicating effectively, independent of time and place. Moreover, interactive multimodal technology-mediated courses have been found to cater more effectively for “new-age” and Generation Y students. Hence, if USQ is to remain viable and retain a reputation as being an innovative leader in distance education, academics need to be encouraged and supported to develop interactive multimodal technology-mediated courses that more closely match the requirements of today’s students.

The findings revealed that some students still have limited access to the Web and slow dial-in and therefore, delivering courses exclusively online, at least in the short-term, may lead to inequities. To address this problem, USQ needs to specify some basic standard computing hardware and software requirements for students. However, until equitable and cost-effective access can be assured, CD or DVD format rather than pure online delivery is a more equitable option. Essential content
and information including important policies should be housed on the CD or DVD, thus minimising the requirement for students to access the online course homepage via the Web.

The findings also revealed that there is a need to overcome or minimise problems associated with academics gaining copyright permissions for material that could be used to enhance their interactive multimodal technology-mediated course. Moreover, there is a need to consider ways to protect the academic’s intellectual property which is easier to copy from courses delivered electronically.

The literature and the findings of this study revealed that a major inhibitor to academics’ development of interactive multimodal technology-mediated distance education courses is the perceived lack of time and the subsequent negative impact on the academic’s workload. The research revealed that when developing an interactive multimodal technology-mediated course, time is required for a wide range of activities including thinking, researching, strategising, conceptualising, planning, learning about and coming to terms with the required technology, training, developing, editing, updating and maintenance. In particular, less technologically-competent academics, who may be more prevalent in later adopter categories, may require even more time to learn how to use technology.

Given the time it takes to develop an interactive multimodal technology-mediated course, unless workload is allocated for this purpose or teaching relief is provided, widespread development of interactive multimodal technology-mediated courses at USQ as well as the realisation of the full potential of the use of multimedia and information technology within interactive multimodal technology-mediated distance education courses will not eventuate. However, due to learning effects and the development of established processes, future development of interactive multimodal technology-mediated courses should not be as time-consuming as it was for earlier adopters. Moreover, there are time-saving aspects associated with the delivery of interactive multimodal technology-mediated courses including the reduced need for unnecessary enquiries from students regarding difficulties understanding the course content or assessment requirements, resulting from the provision of clearer (aural) explanations.
Due to the time required to maintain and update interactive multimodal technology-mediated courses, it is important to avoid including information that is time-sensitive such as mentioning semesters of offer or making references to page and figure numbers in study modules and lecture presentations which may then need to be changed for a new edition of the text. Further, due to the constantly changing nature of some external websites, it is best to limit examples to fairly stable external URLs. Moreover, where possible, academics should aim for sustainable development, for example, by developing generic or re-usable learning objects, particularly, when undergraduate and postgraduate courses are offered in a similar area. Learning objects of a generic nature such as library presentations on Web searching or Harvard referencing can be used across a number of courses.

The research also revealed that a staged approach to development should be adopted. The most important elements in terms of adding value and impacting on student learning performances such as recorded lectures and interactive diagrams should be developed for the first offering and then other elements such as interactive quizzes added for subsequent offerings.

7.2.2 Implications and recommendations related to individual factors of an opportunistic nature

Some of the individual factors identified in this study that influence academics’ development of interactive multimodal technology-mediated distance education courses appear to be of an opportunistic nature. Opportunistic motivators and inhibitors include:

- exploring new ways of delivering distance educations courses;
- being seen to be progressive;
- improving and challenging one’s self; and
- impacts on research and promotion.

Each opportunistic factor is now addressed, in turn, commencing with the opportunity to explore new ways of delivering education courses.
The findings revealed that the development of interactive multimodal technology-mediated distance education courses provide academics with an opportunity to review the way they present their distance education materials and explore new and exciting ways of delivering distance education courses. In particular, the development of interactive multimodal technology-mediated courses appear to be appealing or challenging to academics who are keen to use “leading-edge” educational technologies in order to be seen as innovative, “state of the art” or progressive in their approach to teaching and course design. Hence, USQ should encourage and support academics to convert their static print-based packages to a more innovative, dynamic interactive multimodal technology-mediated format as a means of revitalising the curriculum and improving course delivery.

While the literature indicated that a major opportunity cost for academics of investing time in the adoption and integration of educational technology is reduced time for research, the findings of this research revealed that involvement in the development of interactive multimodal technology-mediated distance education courses has provided an opportunity for some academics and instructional designers to undertake education-based research. Given the focus USQ has on excellence in teaching, academics should be encouraged to conduct research and report on their learning and teaching practices including how they design and deliver their distance education courses. Moreover, education-based research needs to be seen as a legitimate avenue of research for academics at the University of Southern Queensland and should be supported, valued and rewarded. However, the time it takes to develop an interactive multimodal technology-mediated distance education course reduces the time available for traditional discipline-based research and thus needs to be taken into consideration in participating academics’ performance reviews and promotion interviews.

Previous studies indicated that some academics perceive that adopting and integrating educational technology may leave them with less time to devote to research and other activities that lead to promotion. However, in this study, many academics perceived that development of an interactive multimodal technology-mediated course had been viewed favourably by promotion panels at USQ and had
enhanced their promotional prospects. However, some academics perceived that promotion at USQ is overly biased toward research and thus were more sceptical about whether development of an interactive multimodal technology-mediated course would assist with academic promotion. Hence, USQ promotional policies and panels may need to place greater value on effective teaching practice and the design and delivery of innovative distance education resources.

In this section, implications arising from individual factors of an opportunistic nature which appear to influence academics’ development of interactive multimodal technology-mediated distance education courses were addressed and recommendations were provided. In the next section, implications and subsequent recommendations arising from individual factors of a personal nature are discussed.

7.2.3 Implications and recommendations related to individual factors of a personal nature

The findings revealed that individual factors of a personal nature which appear to influence academics’ likelihood to develop interactive multimodal technology-mediated distance education courses include the academic’s:

- attitude toward and approach to teaching;
- desire for a renewed and reenergised interest in and approach to teaching;
- personal characteristics;
- attitude toward change and technology; and
- understanding of how technology can be used to improve learning outcomes.

Conversely, lack of recognition and extrinsic rewards from management and peers are individual factors of a personal nature that may inhibit or discourage academics from developing interactive multimodal technology-mediated distance education courses. However, some pioneers and early adopters perceived that intrinsic rewards and recognition from students has motivated and encouraged them. Implications and subsequent recommendations related to each of these personal dimensions is now discussed, in turn, commencing with the influence of the academic’s attitude toward
teaching on their propensity to develop interactive multimodal technology-mediated distance education courses.

The relative importance that an academic places on teaching and providing students with a quality learning experience, as compared to other academic pursuits such as research appears to influence academics’ development of interactive multimodal technology-mediated distance education courses. Involvement in the development of interactive multimodal technology-mediated courses appears to benefit both the individual academic and the institution, as the research revealed that interactive multimodal technology-mediated course development has provided academics with an opportunity to re-energise and renew their interest in teaching and has challenged academics to teach in a more effective manner. However, a lack of understanding of, or concern for, pedagogy appears to present a barrier to the development of interactive multimodal technology-mediated distance education courses. Hence, the widespread adoption of interactive multimodal technology-mediated courses will rely upon USQ recognising, valuing, supporting and rewarding teaching.

The literature and this research indicated that academics adopt new educational technologies at different rates. Unlike pioneers and early adopters who tend to enjoy experimenting with technology, later adopters may be less interested in technology and more “risk-averse” and thus may need to be actively encouraged and supported to convert their print-based courses to interactive multimodal technology-mediated format.

In particular, an academic’s willingness to change appears to be important for the development of interactive multimodal technology-mediated courses. However, some academics find change, particularly constant change, frustrating, difficult and time-consuming. Indeed, this study revealed that in recent years, the amount and pace of change in technologies (and the proliferation of formats, technologies and learning management systems) adopted at USQ has created resistance amongst some academics and particularly older and techno-phobic academics who feel overwhelmed with the constant change. However, some of the more “techno-savvy” pioneers and earlier adopters of interactive multimodal technology-mediated courses
also expressed frustration about the way in which new technologies are introduced at the University and indicated some reluctance to undertake future interactive multimodal technology-mediated course development until some level of stability and greater consultation with users is evident. Hence, USQ needs to more carefully consider the impact of technological change and the way in which technologies are implemented on academics’ willingness to embrace those technologies and integrate them into their teaching practice and, in this case, their willingness to develop interactive multimodal technology-mediated distance education courses.

In contrast to some previous studies, the findings revealed that adoption or non-adoption of interactive multimodal technology-mediated courses may not be solely predicated on an academic’s attitude toward technology. Rather, the difference between adopters and non-adopters with respect to the development of interactive multimodal technology-mediated courses appears to depend upon the academic’s personal understanding and appreciation of how educational technology can be used to improve student learning outcomes. Indeed, a lack of understanding or appreciation of how educational technology can be effectively used to assist distance students to learn may inhibit academics’ development of interactive multimodal technology-mediated courses, particularly those with entrenched traditional teaching practices. Hence, in line with Goal Four of the Learning and Teaching Plan, USQ should seek to “challenge teacher preconceptions and traditional methodologies” (USQA, 2006, para 2).

Moreover, there is an apparent need to educate academics at USQ in the effective use of educational technologies and thus increase technological pedagogical content knowledge amongst academics at USQ (Mishra & Koehler, 2006). This should be a key role of both the Learning and Teaching Support Unit (LTSU) and the newly established Learning Futures Innovations Institute (LFII). Further, an academic’s willingness to reflect on their teaching practice and embrace modern teaching philosophies appears to be another important influencing factor. Hence, USQ should:
• ensure that academic staff understand the nexus between technology, content and pedagogy;
• explore how educational technology can be used more effectively to improve student learning outcomes; and
• encourage and support academics to be reflective about their teaching practice.

A lack of extrinsic rewards and recognition for innovative teaching practice at USQ may inhibit academics’ development of interactive multimodal technology-mediated distance education courses. The findings of this research indicate that extrinsic rewards such as a reduced marking load or teaching may motivate academics to develop interactive multimodal technology-mediated courses by overcoming time and workload barriers. In addition to tangible extrinsic rewards, many pioneers and adopters did not feel that they had gained adequate recognition by management and peers given the time and effort involved in developing an interactive multimodal technology-mediated course. Hence, future adopters of interactive multimodal technology-mediated distance courses need to be recognised and appreciated by management and peers.

Moreover, pioneers and early adopters could be recognised for their efforts via University showcases or design and delivery awards. However, the time-lag between development and being recognised with an award may mitigate the potential motivational effects. Moreover, only a limited number of teaching, design and delivery awards are available at USQ and hence, many academics who are “innovative” in the development of their distance education courses may not be adequately recognised or rewarded. Given the positive impact interactive multimodal technology-mediated distance education courses appear to have on student learning outcomes, retention and progression and subsequent revenues, USQ should consider placing much greater value on the development of these courses.

Despite limited extrinsic rewards, the research revealed that some academics found the development of an interactive multimodal technology-mediated course to be intrinsically motivating in terms of providing a sense of self-satisfaction, achievement and self-gratification. Indeed, many adopters found the development of
their interactive multimodal technology-mediated course to be an enjoyable and exciting experience leading to higher job-satisfaction. Moreover, recognition from students was a valued reward for developers of interactive multimodal technology-mediated distance education courses. However, while pioneers and early adopters of interactive multimodal technology-mediated courses may have been motivated by intrinsic rewards and recognition from students, later adopters may be less intrinsically motivated and thus may need to be encouraged by extrinsic rewards.

In this section, implications arising from individual factors of a personal nature which appear to influence academics’ development of interactive multimodal technology-mediated distance education courses were addressed and recommendations were provided. In the next section, implications and subsequent recommendations arising from institutional factors that appear to influence academics’ development of interactive multimodal technology-mediated distance education courses are provided.

7.3 Implications and recommendations arising from institutional factors

In Chapter Six, a discussion of the findings of this study revealed a number of institutional factors which influence academics’ development of interactive multimodal technology-mediated courses and these have implications for USQ. Recommendations to address these implications include the need for:

- USQ to remain competitive in a shrinking distance education market (Section 7.3.1)
- clear institutional direction, vision and policies (Section 7.3.2)
- clear strategic plans, procedures and processes (Section 7.3.3)
- ongoing investigation of advanced distance education delivery formats (Section 7.3.4)
- increased awareness of an interactive multimodal technology-mediated approach to course design (Section 7.3.5)
ongoing institutional support for developers of interactive multimodal technology-mediated courses (Section 7.3.6)
• specialised and tailored staff development and training (Section 7.3.7)
• instructional design and pedagogical advice (Section 7.3.8)
• mentors, role models and technology champions (Section 7.3.9)
• a trade-off between costs, pedagogy and innovation (Section 7.3.10).

Each recommendation is now addressed, in turn, commencing with the need for USQ to remain competitive in a shrinking distance education market.

7.3.1 Need for USQ to remain competitive in a shrinking distance education market

The findings of this study revealed that traditional approaches to distance education will not meet the needs of distance learners in the future. A shift away from traditional static print-based distance education materials towards more dynamic interactive multimodal technology-mediated courses is essential for USQ to retain market share, remain viable and maintain a competitive edge in an increasingly competitive global distance education market. Interactive multimodal technology-mediated course development can be used by USQ to develop a differential and sustainable competitive advantage in the delivery of distance education programs and thus retain its international reputation as a leading innovator in distance education.

The research revealed that academics involved in the development of interactive multimodal technology-mediated distance education courses at USQ hold very favourable attitudes towards these courses and would not hesitate to encourage other academics to convert their traditional print-based course to interactive multimodal technology-mediated format. In recent years, student feedback (anecdotal and empirical) on interactive multimodal technology-mediated distance courses has been very positive with limited negative reactions being mainly associated with continuing students complaining about not being provided, free of charge, the traditional print-based study package. However, according to adopters, these negative comments are decreasing as continuing students have become accustomed to the new format. Moreover, students coming through from first year
interactive multimodal technology-mediated courses are now demanding and expecting a much more interactive learning experience and thus expect to continue with the interactive multimodal technology-mediated format through their program. Hence, feedback from both academics and students indicate that an interactive multimodal technology-mediated approach to distance education courses should be more widely adopted at USQ.

7.3.2 Need for clear institutional direction, vision and policies

The findings of this study revealed that for widespread adoption of interactive multimodal technology-mediated distance education courses to occur, there needs to be a clear institutional direction, vision and policy statements with respect to the design and delivery of distance education courses at USQ. Formal direction and leadership needs to come from top management and, in particular, from managers with relevant learning and teaching portfolios. Moreover, in order for the next category of adopters (the early majority) to develop interactive multimodal technology-mediated courseware, there needs to be clear direction, leadership and accountability from the management at the faculty level, as well as faculty learning and teaching enhancement committees (LTEC). However, both the literature and the findings of this study indicate that undue institutional pressure to adopt and integrate educational technology may result in academic resistance. Hence, encouraging academics to enhance the students’ learning experience and providing guidelines and principles on interactive multimodal technology-mediated course development may prove more acceptable than a top-down directive without commensurate support.

Moreover, many academics wish to retain some level of autonomy and control over the development of their course offering and desire more flexible production deadlines, particularly for courses where content is constantly changing. Nevertheless, some level of standardisation or minimum standard for how USQ’s distance education courses are designed and delivered is required to ensure that the student experience is consistent across their program.
7.3.3 Need for clear strategic plans, procedures and processes

In addition to the need for clear institutional direction, there is a need for clear strategic planning, procedures and processes with respect to interactive multimodal technology-mediated distance education course development. In order to deliver a consistent student experience, the research indicated that a coherent program-wide plan which acknowledges that what may work for one program may not work for another is required for the development of interactive multimodal technology-mediated distance education courses at USQ. Strategic planning is also required to allow effective staffing, workload and resource planning.

Moreover, clear processes and procedures are required to facilitate academics’ development of interactive multimodal technology-mediated courses and allay the concerns some academics experience when converting from print-based to interactive multimodal technology-mediated format. In particular, there is a need for clear guidelines outlining the specific steps involved in developing an interactive multimodal technology-mediated course including who will be involved, who academics can talk to, who might serve as a mentor, how long the conversion will take, and what needs to be done as well as direction on how content could be more effectively represented in an alternative mode.

Clear guidelines and design templates are critical to ensure consistency in the format of courses and uniformity of appearance and navigation. These processes and procedures should be readily accessible to academics on the DeC website and on course pre-production forms. Information on the services provided by DeC for developing multimedia learning objects for interactive multimodal technology-mediated courses is available on the DeC website (USQ 2007c). However, the research revealed that academics need to be better informed of the breadth and scope of services and possibilities, how they can request these services, and how and to whom, they would be costed.
7.3.4 Ongoing investigation of advanced distance education delivery formats

Reduced government funding for education and the opportunity to access non-traditional students and fee-paying global education markets has created a major incentive for USQ to investigate emerging educational technologies in order to provide a rich and rewarding learning experience for all students, across all modes of enrolment. To date, interactive multimodal technology-mediated distance education courses have been delivered via CD or a combination of CD and online. To retain a leading edge, new and advanced technologies (DVD, iPods [podcasting], mobile phones, etc.) and Web 2.0 applications (blogs, wikis, etc.) for delivering distance education courses and content should be investigated. The mobile learning (m-learning) concept needs to be fully evaluated as a potential means of more effectively reaching “new-age” students (Jafari et al., 2006; Oliver & Goerke, 2007).

Moreover, recent developments in advanced virtual learning environments including, amongst others, 3D learning objects, Elluminate Live, Wimba and Second Life are being investigated and need to continue to be evaluated in terms of their potential for inclusion in interactive multimodal technology-mediated distance education courses, and for developing more connected, relevant and meaningful learning experience for students. A useful summary of communicative, collaborative, documentative, generative, and interactive Web 2.0 applications for emerging technologies that could be investigated for e-learning purposes as well as criteria for selecting emerging technologies is provided by McGee and Diaz (2007). The newly established Learning Futures Innovation Institute (LFII) will play an important role in ensuring that USQ is adopting and implementing appropriate educational technologies. Moreover, the Technology Enhanced Learning Reference Group, which was established by the LTSU in 2007, will also play an important role in determining what educational technologies are being used at USQ and whether these technologies should be adopted and supported on a wider basis.

7.3.5 Need for increased awareness of the interactive multimodal technology-mediated approach

The findings of the study indicated that greater awareness of the interactive multimodal technology-mediated approach to course development is required at the
top management level as well as at the individual course practitioner level. There is a need to prioritise interactive multimodal technology-mediated course development and put the discussion back on the university management’s agenda. Moreover, the findings revealed that academics lack knowledge of possibilities and options and thus there needs to be a formal mechanism for disseminating information on interactive multimodal technology-mediated course development activities.

The findings of this study revealed that instructional designers play a very important role in informing academics about interactive multimodal technology-mediated courses and the processes and possibilities. Staff development workshops or showcases on the development of interactive multimodal technology-mediated courses would be valuable, however, there also needs to be reinforcement in USQ communications. Moreover, exemplars of interactive multimodal technology-mediated courses are valuable for allowing academics to visualise the interactive multimodal technology-mediated course, unearthing possibilities and determining what works. The exemplars website which has been recently developed by the LTSU will provide academics with examples of multimodal learning objects.

7.3.6 Need for ongoing institutional support for developers of interactive multimodal technology-mediated courses

In contrast to existing literature, the findings revealed a high level of institutional support and expertise including assistance from interactive multimedia and media services staff, instructional designers and librarians who have enabled pioneers and adopters to develop interactive multimodal technology-mediated courses and have provided access to required technologies, technical assistance and instructional design assistance. However, the research revealed that there is concern as to whether widespread adoption of interactive multimodal technology-mediated courses is possible given the changing role of instructional designers and current budgetary constraints at USQ.

Access to ongoing support and resources is essential for the future development of interactive multimodal technology-mediated courses at USQ. Many academics, particularly later adopters, lack the technological capability to develop multimedia elements and will require substantial levels of technological support to
do so (Moser, 2007). However, given budgetary constraints and staffing cuts, USQ needs to determine if resources and the current level of infrastructure as well as the ABC costing model support and encourage or inhibit widespread development of interactive multimodal technology-mediated distance education courses.

### 7.3.7 Need for specialised and tailored staff development and training

In addition to technical support, the widespread development of interactive multimodal technology-mediated distance education courses at USQ will rely upon the availability of specialised and tailored training in understanding how to integrate the technology into the curriculum. This training would allow academics to develop their own skills and become less dependent on the provision of expertise and specialised services provided by DeC. In particular, training is required in the use of relevant software and programs used to develop recorded lecture presentations (e.g. Breeze, Camtasia) and interactive diagrams (e.g. the proprietary software Flash®). Moreover, ongoing technical support in terms of some level of “hand-holding” or coaching on the one-to-one level will be necessary, at least in the early stages, for this transition to self-efficiency to occur.

However, due to personal differences, there may be no one best approach to training and support. In particular, USQ should recognise the needs of later adopters of technology and tailor support and training initiatives accordingly so that the nature and pace of the training is relevant to the level of the participant. Moreover, the timing of the training needs to be appropriate in terms of when academics can find time to attend training and, to reduce information loss, the training should be conducted near to the time the knowledge will be used (“just-in-time”). However, the findings revealed that some academics are not interested in the adoption and integration of educational technology and would be reluctant to undertake any training. Hence, it could be possible to consider a team approach to course development whereby the role of the academic would be to identify content, while a more “technologically-minded” team member determines how best to deliver that content.
7.3.8 Need for instructional design support and pedagogical advice

The literature and the findings informing this study indicate that developing the skills to use technology required to develop an interactive multimodal technology-mediated course may not be sufficient. Academics also need to understand the relationship between learning, interactivity and technology and may need to adjust their pedagogy to reflect the technology. Hence, academics need training in appropriate instructional design and an understanding of the pedagogy underpinning interactive multimodal technology-mediated course development. Ongoing support, assurance and pedagogical advice from instructional designers are required. Instructional designers bring to bear their knowledge of instructional design principles and models which provide learning and teaching frameworks to structure the process and encourage academics to consider what they want to achieve in terms of learning outcomes. However, the findings revealed a need for clarification of the roles and responsibilities of the recently established LTSU and DeC with respect to instructional design support and the development of new approaches to course delivery.

Moreover, the findings revealed that in order to motivate academics and provide proactive pedagogical advice more closely aligned with a specific discipline, instructional designers need to be more accessible, and if possible, located within the faculty rather than centralised within the LTSU. However, the cost of such a “one-to-one” strategy would need to be analysed in light of potential benefits. Further, support from senior academics with expertise and experience in developing interactive multimodal technology-mediated courses who understand, more specifically, the pedagogy of the discipline may be required. The findings indicate that the successful development of an interactive multimodal technology-mediated distance education course requires a team approach and thus academics need to be able to call upon a network of experts, technical specialists and instructional designers.
7.3.9 The need for mentors, role models and technology champions

In addition to the support provided by instructional designers and technical specialists, the findings revealed that the widespread adoption of interactive multimodal technology-mediated courses at USQ will rely upon the presence of mentors, role models and technology champions. Mentors, who are prepared to take a proactive approach by collaborating and sharing their experiences in the development of interactive multimodal technology-mediated courses, assisting academics to envisage the uses and benefits for enriching the learning environment, conducting workshops, coaching colleagues in the use of pre-requisite technology, and providing guidance during design and development will greatly enable and facilitate the process.

7.3.10 A trade-off between costs, pedagogy and innovation

The potential cost-savings associated with converting print-based distance education courses to interactive multimodal technology-mediated format in terms of reducing the costs of printing and distribution of distance education materials may motivate some academics. However, the findings revealed that academics are more interested in the potential pedagogical benefits of interactive multimodal technology-mediated courses in terms of providing a more flexible and enhanced learning experience for their students, rather than any potential cost benefits. Indeed, many academics are uncomfortable about transferring the cost of printing materials to students.

Moreover, the way in which the up-front development cost of interactive multimodal technology-mediated distance education courses are dealt with in the activity-based costing (ABC) system needs to be reconsidered as the findings revealed that the ABC system has discouraged academics and stifled innovation. The costs of development of an interactive multimodal technology-mediated course should be amortized across the life of the course (normally three years between major revisions), rather than being allocated entirely to one semester of offering. Moreover, ABC costing should not be used by management to “name and shame” courses that have higher costs for development as a result of innovation or to
discourage other academics from converting their distance education courses from print to interactive multimodal technology-mediated format.

There is a need for a cost-benefit analysis in terms of the cost savings associated with reduced printing and distribution costs, the costs associated with the development of interactive multimodal technology-mediated courses, and the effectiveness of learning outcomes from a student perspective. Moreover, in order that academics are aware of the cost of development of various multimedia elements, and thus can make informed decisions on their development activities, a pre-determined development and maintenance budget for each course is required.

In this section, recommendations based on implications arising from institutional factors that appear to influence academics’ development of interactive multimodal technology-mediated courses have been provided. In the next section, the theoretical and managerial contributions of this research are discussed.

7.4 Contributions of the research

This study has developed a framework for investigating factors that influence academics’ adoption and integration of educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses. While numerous studies have addressed academics’ adoption and integration of educational technology across various educational contexts, most of the studies on the distance education context have focussed on academics’ participation in online education.

Indeed, much of the literature on the adoption and integration of educational technology has concerned the shift away from face-to-face on-campus teaching to online teaching or some combination of the two (“blended” or “hybrid” delivery) (Betts, 1998; Chizmar & Williams, 2001; Schifter, 2000; Maguire, 2005). This study focuses on the shift from a static “correspondence” (read/write) distance education model to a more dynamic and interactive multimodal technology-mediated distance education model. Moreover, previous studies have focussed primarily on
institutional enablers and barriers to the adoption of educational technology with less emphasis being placed on individual factors and limited focus on pedagogical issues. Likewise, while numerous studies have addressed the impact of multimedia on learning performance, limited emphasis has been placed on how multimedia and hypermedia can be used to replicate aspects of the on-campus experience for distance education students.

The institutional factors which are perceived to influence academics’ development of interactive multimodal technology-mediated distance education courses appear to be similar to factors identified in other technology-mediated distance education contexts. However, the need for one-to-one instructional design advice, ongoing technical support and specialised training in the development of interactive multimodal technology-mediated course elements such as interactive diagrams is essential in this context.

Likewise, individual factors that influence the development of interactive multimodal technology-mediated courses do not appear to substantially different from other technology-mediated distance education contexts. However, this study has provided a deeper understanding of academics’ individual motivations for adopting and integrating educational technology than that which has been provided in previous studies by providing a categorisation of individual factors including pragmatic, opportunistic, and personal motivators and inhibitors. This categorisation may be useful for individual academics in understanding and evaluating the nature of the motivators and inhibitors that influence their adoption and integration of educational technologies. Moreover, this categorisation may be valuable for institutions in understanding why academics differ with respect to the adoption and integration of educational technologies and determining how best to motivate different adopter groups as well understanding personal differences across individual academics. Interestingly, this study revealed that a major barrier to adoption and integration of educational technology in other contexts, namely, less time for research, was less relevant in this context with many of the pioneers and adopters as well as instructional designers, taking the opportunity to undertake research on the development of these courses.
Finally, this study provides a comprehensive discussion of the pedagogical issues that underpin the effective development of interactive multimodal technology-mediated distance education courses. The research presents a defensible educational rationale for why USQ should encourage, support and reward academics to develop interactive multimodal technology-mediated distance education courses which cater more effectively to different learning styles and modal preferences of students and thus are more effective than traditional print-based courses in achieving desired student learning outcomes including improved student learning experiences, improved performance, retention and progression.

Through a case study, this study has attempted to provide insights for both distance education providers and individual academics on the development of interactive multimodal technology-mediated distance higher education courses which use educational technology, multimedia and ICT to develop engaging and interactive course resources that appeal to different sensory modes and a variety of learning styles and modal preferences. Hence, this study has provided theoretical, managerial and practical contributions to the field of interactive multimodal technology-mediated distance education in the tertiary sector.

7.5 Limitations and future research directions

This study addressed the pedagogical, individual and institutional factors that influence academics’ development of interactive multimodal technology-mediated distance education courses. This case study was confined to the USQ which, while being a major provider, is only one of many providers of distance education across the globe. Due to contextual issues, factors that influence academics’ adoption and integration of educational technology for the purpose of developing interactive multimodal technology-mediated distance education courses at USQ may differ from other distance education providers. Hence, other distance education providers who are developing or intend to develop interactive multimodal technology-mediated distance education courses may need to conduct a similar study to determine if the factors that impact on academics at USQ differ for their institution.
Indeed, given USQ’s extensive experience and expertise in distance education and more recently in e-Learning, other institutions with less experience in distance education may not have established the same level of expertise and infrastructure support as is evident at USQ and thus may face different challenges. Conversely, tertiary institutions who are receiving higher levels of government funding than USQ may not be experiencing the same resource constraints and may be able to provide higher levels of support to academics. Moreover, they may not be under the same financial pressure to compete effectively in the distance education market.

The interviewees for this study were primarily attached to the faculties of Arts and the Business, with only one early adopter interviewed from the Faculty of Education (Appendix C). This was because the pioneering projects in interactive multimodal technology-mediated distance education courses at USQ were confined to those two well-represented faculties and, at the time of interviewing, only one lecturer in the Faculty of Education had converted their course from print to interactive multimodal technology-mediated format. Hence, only three of the five faculties at USQ are represented in this study and reasons for non-adoption may differ in other faculties. Moreover, while every effort was made to select participants who represented their adopter category, the large number of non-adopters may mean that the views of the non-adopter group are less generalisable than the other adopter categories, hence, further research on this group may be required.

The qualitative nature of this research has provided a rich explanation of factors that influence academics’ adoption or non-adoption of multi-modal distance education courses. The limitations of the qualitative method used for this study and the need to manage both the interviewer and the interviewees were addressed, in detail, in Chapter Three. While the researcher has made every attempt to be objective and used multiple sources of evidence to gain multiple perspectives and determine whether the findings from each source corroborated the findings from other sources, the subjectivity of the researcher and her influence in the dialogue cannot be ignored, given her high level of involvement in and commitment to the development of interactive multimodal technology-mediated distance education courses at USQ. Indeed, at times, it was difficult for the researcher not to project her
own values, perspectives, views and experiences during the interviews. Hence, the findings of this study reflect the co-constructed, shared meanings and perspectives of the researcher and the interviewees. Thus, when interpreting these findings, the lens through which the researcher interpreted the data should be acknowledged. Nevertheless, the researcher tried to avoid over-directing the conversation during the interviews and sought to be as scrupulous as possible when interpreting the data while recognising the presence of multiple realities and that the knowledge generated from interviews was situated.

7.6 A postscript: The researcher's reflections

In this postscript, the researcher provides some of her reflections on the topic of the research. These reflections were captured by writing a self-reflective personal narrative of the interview questions and further reflections gathered during the interviewing and analysis process. The role of the researcher in this study was explained in Section 1.5. These reflections assist to make more explicit the lens through which the researcher has viewed the development of interactive multimodal technology-mediated distance education courses and thus how she has approached the research and interpreted the interview data. This postscript is presented in the first person, as it represents the perspectives of the researcher based on her own personal experiences. In line with the analysis of the interviews, the reflections concern pedagogical, individual and institutional factors. Reflections related to pedagogical motivations and concerns are addressed first.

7.6.1 Reflections related to pedagogical factors

I shared with my fellow pioneers and early adopters many of the same pedagogical motivations and concerns, for example, the desire to cater more effectively to the learning styles and modal preferences of my students (Section 4.2.1). My experience in teaching students face-to-face had taught me that some students understand content better, particularly, difficult concepts, if it is presented in a range of visual (verbal and non-verbal) and aural forms. Hence, when I converted my distance education courses and to encourage students to interact with the course content, I
developed a number of interactive diagrams of more complex concepts and assessment items and included visual, textual and aural explanations. I found it was easier for me to explain these concepts in spoken words than in text. I was able to emphasise important words or phrases which I hoped would allay the anxiety or concerns that some of my distance education students had experienced, particularly with assessment items.

The need to personalise my course and develop a social presence and closer relationships with my students was another key motivation that I shared with my colleagues (Section 4.5.3). I had been struggling with the issue that most of my teaching efforts and innovations were focussed on on-campus students and yet, they only represented one third of my total student group. Having undertaken my undergraduate studies in distance mode, I could emphasise with the “loneliness of the long distance student.” With the interactive multimodal technology-mediated format, I saw the opportunity to personalise the course, develop closer relationships with my students and encourage greater interactivity and thus, hopefully, reduce the feelings of isolation that distance education students sometimes experience.

Moreover, in line with my fellow pioneers and early adopters, the lack of interactivity in the traditional distance education experience concerned me (Section 4.5.4). I wanted my distance education students to be more engaged with the course content and other students. In addition to providing interactive diagrams of important models, processes and diagrams, I encourage students to interact with one another and share their experiences and perspectives on the course discussion board. I also shared the desire to engage my students in the learning experience by making learning fun, but also challenging (Section 4.7). I saw the interactive multimodal technology-mediated format as an opportunity to develop more interesting and exciting study resources. For example, the capacity to provide direct links within my course materials to abundant and rich examples on the Web was exciting to me, because “real-world” examples are a great way to help students apply theory to practice (Section 4.8). There are lots of excellent marketing examples to be found on the Web and I believe these rich examples allow my students to see the relevance and currency of what they are studying.
In one of my courses (Marketing Channels), I produced a retailing video, so that the information for that topic could be presented to students in a more dynamic, visually exciting and interesting way. In line with my fellow early adopter from the field of early childhood, I love colour, pictures and movement, and I saw the interactive multimodal technology-mediated course format as an opportunity to provide a more aesthetically pleasing, dynamic and interesting learning package.

Despite these motivations and my enthusiasm, I experienced times where I doubted the efficacy of what I was doing, particularly the value of the various multimodal learning objects I was developing (Section 4.9.3). In the presence of derisive comments from other colleagues about “bells and whistles” and “fun and games,” I began to question the value of these various multimedia elements in terms of whether they would assist students to learn. Would they be useful? Along with my fellow pioneers and early adopters, I was concerned about issues of cognitive overload and whether students would have the necessary ability, resources, time or motivation to use all of the learning objects. Would students become overwhelmed? Would they be able to determine which bits were most important, relevant or useful? I was conscious not to develop objects that had no real pedagogical value to students in terms of learning outcomes. However, many of these concerns were alleviated when subsequent student evaluations indicated that all of the various multimedia elements I had included in my course were considered valuable.

An issue that was raised during the interviews concerned the need to educate students to use the technology and the need to provide procedural scaffolding (Section 4.9.5). This was also a key lesson that I learnt early in the delivery of my interactive multimodal technology-mediated courses. I was concerned that students may not use the multimodal course materials in the way that I had intended and in a way that would most benefit their learning. So, early in the semester, I emailed students to explain the interactive multimodal technology-mediated course and the pedagogical rationale behind its development. I asked students to do the VARK learning styles inventory and provided the online link so they could determine their learning style. I also provided directions in the introductory materials on how to approach and use the course resources effectively. Finally, I established a discussion
forum about the course resources on the course homepage and encouraged students to post comments or questions.

7.6.2 Reflections related to individual factors

In line with my fellow pioneers and early adopters, I was very concerned about the time and cost of developing the resources and meeting production deadlines (Section 5.1.5). However, while the original course conversion was very time-consuming, I found that each subsequent conversion has taken less time as the learning curve has kicked in (Jones & Kelley, 2003; Pachnowski & Jurezyk, 2003). To my knowledge, I was the only academic at USQ that had converted more than one course at the time the interviews were conducted, and hence, this may explain why the issue of the learning curve was not raised by my fellow pioneers and adopters.

In line with the advice provided by my fellow pioneers and early adopters, I have learnt that it is important to consider the time it takes to develop and maintain content which may date. So now, I try to avoid making references that date learning objects too quickly, for example, mentioning semesters of offering or making references to page and figure numbers in study modules and lecture presentations that may need to be changed for a new edition of the text. Moreover, the content of some websites changes on a regular basis, so instead of giving students the URL for a specific webpage on a site, I give them the website URL and then encourage them to explore the website to find the relevant information for themselves. For example, in my Promotion Management course, I ask students to visit the Coca-Cola website and analyse the latest television advertising campaign. Of course, the campaign changes on a regular basis, but students can always access the latest one.

When listening to my colleagues discussing how an academic’s attitude toward teaching may explain their participation in the development of multimodal courses, it struck me that most of the academics I know are concerned about and take pride in their teaching (Section 5.3.1). However, in agreement with a fellow pioneer, I realised that many of my colleagues who are discipline experts rather than trained educators really have very little understanding of pedagogy and they just don’t think or talk much about it. For example, most business academics I know would not have
a clue what is meant by the “socio-constructivist paradigm” and yet, they may well operate, at least at times, within that paradigm by encouraging discussion, group activities and teamwork.

A number of the pioneers and early adopters indicated that development of interactive multimodal technology-mediated courses had provided them with an opportunity to revise the way they were delivering their distance education materials (Section 5.3.2). I have to confess I was also finding the printed study materials to be very boring to prepare and update: I had become stale. So, I was excited to explore this new “hybrid” concept. In line with some of my fellow pioneers and early adopters, my personal satisfaction and enjoyment with my job has increased quite dramatically since I have become involved with the development of interactive multimodal technology-mediated courses (Section 5.3.7). I feel I have had a chance to use my “limited” creativity and develop an innovative and beneficial set of learning resources for my students. Overall, it has been an interesting, exciting and, for the most part, a very rewarding journey for me.

During the interviews, I had asked pioneers and early adopters if they considered they were different in any way from non-adopters (Section 5.3.3). In reflecting on whether I was different in any way from non-adopters, I considered that I like variety and creativity, and I am willing to try new things. However, in line with some of my fellow pioneers, I would not necessarily consider myself to be a risk-taker when it comes to technology and I am reluctant to throw out what works just because something more exciting or novel comes along. Indeed, I would need to be persuaded that it was better in some way. On the other hand, I don’t need to wait for every clinical trial to be completed before I am willing to try something new, if I think it may be beneficial. What strikes me as interesting is that while I am very interested in educational technology, I am not very interested in new technology at home or for personal use and I would not consider myself to be technologically competent. So, I guess as the end of the day, along with a number of my fellow pioneers and early adopters, perceived benefits for my students, convenience and ease of use are primarily what drive my adoption of technology.
It saddened, but did not surprise me, that my fellow pioneers and early adopters had not been rewarded or recognised for their efforts in developing their interactive multimodal technology-mediated courses (Section 5.3.6). I too felt this way. Perhaps what disappointed me most was the lack of support I gained from some of my colleagues. In fact, some of them were quite derisive about what I was doing, considering it to be about “bells and whistles” and “fun and games” and lacking in academic rigour. The negative comments and vibes that I received from some of my colleagues, particularly in the early stages and before we had gathered student feedback, were quite disconcerting. Indeed, at one point, I remember feeling quite ostracised by some members of my department. I surmised that the attitude of some of these colleagues had arisen because they felt threatened by the need to adopt this new technology, they were resisting change, they preferred to focus their energies on research rather than developing course resources, and in the absence of evidence to the contrary, they were not convinced about the benefits for students. Moreover, some of my colleagues had a fear of negative reaction from students and they were concerned about the costs of development and what that might mean for the viability of their course.

7.6.2 Reflections related to institutional factors

When I converted my first course, I shared my fellow pioneers and early adopters concerns about negative reactions from students (Section 6.1.3). In particular, I was concerned that some students would reject the new format and that some of the mature-aged students might find some elements to be somewhat childish. I think this was a reaction to some of my colleagues belittling the academic value of elements, such as visuals, interactive quizzes and diagrams. However, in the four years I have been delivering interactive multimodal technology-mediated courses (I have converted five courses now), I have never received any negative comments about these elements from students. To the contrary, the research I have conducted indicated that these elements are valued. The only negative comments I have received, from a relatively small proportion of students, is that they miss getting the free printed study guide to take with them on the train or bus and some students don’t like reading from a computer screen. To overcome this problem, I have provided students with the option to purchase the printed version from the USQ Bookshop and
I communicate this option to my students. Moreover, I remind students that the primary learning resource for the course is the printed textbook and this is what they should be reading on the train.

The feedback I have received from students indicates that students particularly value regular emails, discussion on assessment items, the interactive diagrams and the recorded lectures (both the pre-recorded breeze presentations and the recordings of live lectures which I post each week to the course homepage). So they seem to value the personal and visual/aural elements. As might be expected, due to the different learning styles, different students value different elements and a small proportion of students (I estimate somewhere between 10-20%) prefer just to read and be left alone. This positive student feedback, across a number of offerings and courses, encouraged me to convert all of my courses to interactive multimodal format. Approval ratings were about 75 percent, with only 10 percent of students indicating dissatisfaction (mainly, due to not receiving the free printed materials) and 15 percent being ambivalent. Anecdotal feedback has also been very encouraging, with students making comments along the lines of “this is the best study package I have used,” “thank you so much for all you are doing for external students” and “I hope other courses use the same format.”

A number of the interviewees raised the need for clearer processes and procedures for the development of interactive multimodal distance education courses (Section 6.2.2). When I started to convert my first course, I was unsure about the process and I was not sure what was possible or what was allowed and supported by management. At that time, there was no university or faculty policy, guidelines for development of interactive multimodal technology-mediated (“hybrid”) courses or established processes or templates. So, I had problems getting a mental fix on what the end product would look like and I was concerned that I would leave out some essential elements. As a result of my experience, I worked with the Web Development Officer in the Faculty of Business (USQ, 2006b) to develop a webpage on the process, so that my colleagues would be able to use this to assist them when converting their courses.
The importance of technical and instructional design support was emphasised by a number of the interviewees (Section 6.3.4). During the conversion of my courses from print to technology-mediated format, my instructional designer was very supportive and helpful. In particular, in the absence of a formal one, she provided me with a framework and a template. She knew what needed to be done and how to get it done, including who could do it. She took a holistic approach to the course resources and prepared a storyboard which indicated how the various elements in the course would fit together. She took a student perspective in terms of considering how students would approach the resources and navigate between the elements. She also alerted me to the possibilities in terms of what sorts of elements could be developed such as simulations and interactive diagrams. Indeed, her advice, support and patience were invaluable and, without it, I would not have been able to achieve what I did.

A major institutional barrier raised in the interviews concerned the activity-based costing (ABC) system used at USQ (Section 6.5). ABC costing indicated that in the first semester of offering, my courses were relatively expensive, as compared to print-based courses. This resulted in them being listed in the top 20 most expensive courses and subject to scrutiny, which caused me quite a deal of angst at the time and forced me to vigorously defend the “hybrid” initiative. However, my courses were less expensive in subsequent semester offerings and discussion on the cost of these courses has now subsided. However, along with my fellow pioneers, ABC costing and the way it was being interpreted, really bothered me. I knew that other academics would not be prepared to convert courses if the costs associated with conversion were assigned to one offering of their course (rather than amortised across the life of the course offering) and, therefore, in an era of program and course rationalisation may threaten the viability of their course. Moreover, I shared my fellow early adopters concern about lack of information on costs. When converting my courses, I was hindered by a lack of information on the costs of development and distribution. I constantly asked for, but did not receive, information on the cost of developing various multimedia elements. I needed this information to make more informed decisions on which elements would be more cost-effective to develop.
The interviews for this research were conducted in the first half of 2006 and, since that time, some of the recommendations arising from the research have already been, at least partially, addressed. For example, the evolving role of the newly established LTSU in providing pedagogical support for academics including the provision of information on learning styles and a site for exemplars. More detailed information on the process of developing interactive multimodal technology mediated course and guidelines on using technology is now provided on the DeC website. The LFII and the Technology Enhanced Learning Reference Group have been established to encourage, support and investigate the use of advanced educational technologies at USQ. Finally, in recent times, there has been a much greater emphasis on recognising and rewarding teaching. Nevertheless, the widespread development of interactive multimodal technology-mediated distance education courses will rely upon USQ putting into place other key recommendations presented in this chapter.

7.7 Summary

In this chapter, implications and recommendations for both the institution and individual academics arising from pedagogical, individual and institutional factors that appear to influence academics’ development of interactive multimodal technology-mediated distance education courses at USQ were addressed. The theoretical and managerial contributions of the research were discussed and limitations of the research and directions for future research were identified. Finally, a postscript presenting the researcher’s reflections on some of the issues raised in the research was presented.
APPENDIX A: Examples of Elements on an Interactive Multimodal Technology-Mediated Distance Education Course

Entry screen for the course

Students are provided with all the necessary information for “getting started” as well as links to the USQ Handbook, USQ Library and USQConnect which provides a link to the course homepage. A linked table of contents is provided on the left hand side.
Video introduction

A video introduction from the course leader allows for greater personalisation of the course materials. A printable transcript is provided.
Interview Snippets

Interviews with experts can be recorded and presented in the course as a video element. A transcript of the interview is provided.
**Assessment instructions**

Each assessment item has an audio explanation for those students with an aural or multimodal modality. Links to useful resources for the assessment are also provided.
Hyperlinked study schedule

A hyperlinked study schedule with links to study modules and assessment items is provided for easy navigation.
Module introductions

Each study module commences with a set of learning objectives and an audio introduction which provides an overview of the module.
Interactive diagrams

Interactive diagrams provide both visual and verbal (text and audio) explanations, thus appealing to a wide range of modal preferences and providing multiple representations of important concepts.
Recorded lecture presentations (Breeze software)

The recorded lecture includes an audio explanation of the PowerPoint slides. The table of contents in the left hand column allows students to navigate back and forward through the presentation. This is especially useful for students with an aural modality and ESL students who appear to benefit from both listening and reading the content and can repeat the slide if required. Interactive hyperlinks can be inserted on the slide to allow students to view “real-world” examples.
Interactive crosswords

Interactive crosswords are used to allow students to undertake self-assessment of key terms and concepts.
Interactive quizzes

Interactive quizzes are used for self-testing of key concepts. Immediate feedback is provided. In addition to filling in missing words, other question types include multiple choice, multiple categories (more than one right answer), true/false and matching pairs of terms.
Interactive graphs and simulations

These are examples of interactive graphs. An audio explanation of the graph is provided and students can interact with the diagram itself.

Graph 1 has a changing slope. The right side end point of line ZZ can be moved in a vertical plane to change the slope.

Graph 2 has a fixed slope. The left side end point of line ZZ can be moved in a vertical plane.

Click on either the 'Graph 1' or the 'Graph 2' button to see each example.

The simulation below illustrates this concept. Click on the blue dot and drop.
Example of the use of graphics

Illustrations and animated graphics can be used to support the cognitive domain and make the material more engaging and aesthetically pleasing, especially for visual learners.
Example of the use of photographs etc.

Colourful imagery, and in this case, advertising examples can be presented (copyright may be required and was granted in this case).
Example of a hyperlinked activity

In addition to hyperlinked examples which are useful for providing current “real-world” examples, hyperlinked activities can be provided to allow students to see the relevance of the content and encourage students to apply their knowledge.
Homepage for the assignment website

This assignment website is linked to the course and was developed to assist students with the assessment. The site provides a link to the teamwork website and useful resources.
Teamwork website

This teamwork website was developed to help students operate more effectively in both face to face and virtual teams.
Interactive exercise

This Harvard referencing exercise is an example of an interactive drag and drop activity which is particularly useful for kinaesthetic learners.
APPENDIX B: Examples of Elements on the Online Course Homepage

Course homepage

The online course homepage can be linked to the CD to supplement the technology-mediated course by providing current and updated information including announcements from the teaching team, discussion topics and updated lecture slides.
Discussion topics

Each week a discussion topic is posted to encourage students to interact with one another and share their experiences and perspectives. From time to time the teaching team provide feedback, but their main role is to facilitate and moderate the discussion.
APPENDIX C: Related Publications by the Candidate


## APPENDIX D: A Profile of the Interviewees

*Interview subjects (N=17) by category, faculty, discipline and gender*

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<thead>
<tr>
<th>Category</th>
<th>Faculty</th>
<th>Discipline</th>
<th>Gender</th>
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APPENDIX E: USQ Documents Related to the Development of Interactive Multimodal Technology-Mediated Distance Education Courses

Overview of USQ
http://www.usq.edu.au/aboutusq/overview/default.htm

“We believe that flexible delivery is about giving people what they want, where they want it, when they want it, in their style, in their place, in their time.”

University Vision Statement

“The Vision of the University of Southern Queensland is to be Australia’s leading transnational1 educator”

1 Transnational: operating on a nation-wide basis; extending or going beyond national boundaries; operating in more than one country; involving persons of many nationalities

January 2005
USQ Learning and Teaching Plan

Goal 4: A Flexible and Responsive Learning Environment

USQ is committed to enhance and maintain a learning environment that has the structural ability to be flexible and responsive, in order to adapt to the diversity of student needs. Our goals are thus to create and maintain a flexible and responsive learning environment that offers choice in modes of educational delivery to its students, incorporates a range of teaching and learning strategies to accommodate the diverse needs of students and offers diversity of educational experiences.

Relevant strategies include

- Develop a hybrid delivery mechanism, as a core educational resource for all courses as practicable that accommodates different learning styles and opportunities.
- Enhance the learning experience with a hybrid delivery mode, without detracting from the inherent advantages of any single mode of delivery.
- Ensure equity of educational experience across modes of delivery, so that selection is made according to individual choice and circumstances.
- Ensure that course design accommodates the many legitimate educational routes by which a student will learn and arrive at required outcomes.
- Recognize different discipline perspectives and cultures.
- Challenge teacher preconceptions and traditional methodologies.

Goal 5: An Inclusive Environment

The University, as an institution dedicated to higher education and learning, is committed to access, equity and inclusivity for all in its educational community. The University is conscious that it brings the talents and experiences of staff and students from many educational, social and cultural backgrounds, and that these different experiences should be incorporated in the educational dynamic for the benefit of the learning process. The goal is to create and maintain an inclusive environment in order to foster involvement by all staff and students in the learning process. The University thus aims to implement practices that are inclusive and ensure that all students have equal learning opportunities and maintain access to higher education for all students with an ability and commitment to learn.

Relevant strategies include

- Encourage an interactive style of teaching and learning.
- Encourage the inclusion of student experience in the ‘class’ dynamic.
- Ensure that teaching and learning styles and practices fully observe the University’s anti-discrimination policy, and that no student is in any way affected by discrimination.
- Produce educational materials that employ inclusive non-discriminatory language.
- Consider alternative teaching styles that accommodate those with special needs.
Transmodal Delivery

This policy document is housed in a webpage under the research area of the Distance Education Centre website. It has been developed by Associate Professor Alan Smith, Executive Director, Division of Academic Information Services and Acting Assistant Deputy Vice-Chancellor.

Transmodal delivery involves the provision of course content through a resource-based learning package, supplemented by selected interactive teaching support activities using communication technologies or face-to-face sessions.

Transmodal delivery enables all students to access core content in a variety of formats consolidated onto a single CD and supplemented with teaching support activities specifically designed for the particular course, program or discipline, and delivery context.

Key Components of Transmodal Delivery

A common resource-based learning package on CD for all students
The resource-based learning package on CD is the same for all students whether enrolled on campus or off campus. It can include any or all of the following: introductory materials, study guide, essential readings, power point presentations, audio and video files, other multimedia applications and simulations, software, reference lists and links to online systems via USQConnect.

Student access to interactive teaching support activities
In addition to receiving the CD of resource materials, what varies for students is their access to a combination of interactive teaching support activities available. For example:

- On-campus students can access face-to-face sessions (lectures, tutorials, workshops, laboratories etc) and online discussion forums.
- Remotely located off campus students can access support activities such as online discussion forums and teleconferences.
- Selected groups of international students could receive various combinations of teaching support as listed above, possibility supplemented by local face-to-face tutoring through licensed agents etc.

Flexibility between courses and programs according to discipline
There is no single form of transmodal delivery for all programs and delivery contexts. In fact, there can be various forms of transmodal delivery for courses and programs within different disciplines, but the core content of the resource-based learning package on CD remains the same for all students within a course offering.

Extended use of the features available on learning management systems
The resource-based learning package on CD becomes more powerful when used in conjunction with USQ online systems. All learning management systems used by USQ provide for online discussion forums and USQ teaching staff now has the option to utilise this functionality in their courses. Additional content and resources can also be released to students throughout the semester if using WebCT Vista.

Systematic phased development
Naturally, the move to transmodal delivery will take place gradually over a number of years, entailing systematic phased implementation based on collaborative planning with ongoing opportunities for input from all staff involved as the concept continues to develop.

November 2007
Information flyers – Learning and Teaching Support Unit

This site has been developed by the Learning and Teaching Support Unit and provides an information flyer on Learning Styles: Responding to Diversity
(http://www.usq.edu.au/resources/infoflyerlearningstylesfinal.pdf), as well as three recorded presentations on learning styles
(http://www.usq.edu.au/extrafiles/ltsu/Tas%20presentation/Learnng%20styles%20Part%201_flash/)

Exemplars – Learning and Teaching Support Unit
http://www.usq.edu.au/ltsu/teach/design/default.htm

This site provides exemplars and includes exemplars of interactive multimodal technology mediated course elements.

Distance and e-Learning Centre
http://www.usq.edu.au/dec/default.htm

This site provides information on the Distance and e-Learning Centre and the various services provided to assist with the development of distance education materials.

Course Preparation Resources
http://www.usq.edu.au/dec/courseprep/default.htm

This site provides very useful information for staff developing an interactive multimodal technology mediated course, including services available and useful information and guidelines on using technologies, developing Breeze presentations, as well as exemplars of multi-media elements, etc.

Process for Transmodal Delivery
http://www.usq.edu.au/dec/courseprep/coursemat/a-tmprocess.htm

This site provides detailed information on the process of developing a course for transmodal delivery.

Multimedia
http://www.usq.edu.au/dec/courseprep/mmmedia/a-mmexamples.htm

This site provides information on the services provided by the multimedia staff in the Distance and e-Learning Centre and examples of multimedia learning objects.
CD ROM Development Process

This site was prepared by the researcher in conjunction with the Faculty of Business Web Development Officer to provide information on the process of converting a print-based distance education package to interactive multimodal technology-mediated format. The site provides information on the process, as well as examples of various interactive multimodal learning objects.

Learning Futures Innovation Institute
http://www.usq.edu.au/lfii/

The primary mission of LFII is to advance the science, technology and practice of advanced distributed learning systems, both academic and administrative. The objectives of LFII are to:

- foster innovative student learning approaches through research and development into new technologies and their learning applications;
- develop innovative systems and pedagogical approaches to assist the University in meeting the individual needs of students in an increasingly diverse range of locations and personal circumstances;
- increase the University’s capacity to produce high quality research outputs within LFII’s focus areas;
- develop the business case and associated business models to guide the sustainable implementation of new technologies and their learning applications;
- expand commercial research opportunities through partnerships with industry;
- provide a forum for sharing knowledge, skills and resources within the University and at national and international levels.

Professional Development Program – 2007
http://www.usq.edu.au/ltsu/develop/pdplan.htm

An analysis of the 2007 staff development plan indicates that two sessions relevant to the development of interactive multimodal technology-mediated distance education courses were conducted including a session on learning styles and another on learning technologies. An analysis of the professional development plans indicates that there has been a good deal of focus winning Carrick Institute Teaching and Learning Grants.
APPENDIX F: Semi-Structured In-Depth Interview Questions

QUESTIONS FOR PIONEERS AND EARLY ADOPTERS

Q1. Can you describe one course that you have converted to CD?
   Ask for a copy of course CD.

Q2. How would you describe your approach to teaching in this course?
   • How do think that your approach to teaching influences the
development of your distance education course resources? Can you
describe or show me some examples?

Q3. How confident were you with your technological ability during this conversion?
   How willing were you to adopt new educational technology?
   • To what extent did you include educational technology into your
courseware?
   • What sorts of multimedia did you include into your course program
   and resources, and why?
   • What did you do that has worked really well in terms of student
   learning outcomes – why do you think it worked? (examples)

Q4. Why did you decide to convert your print-based distance education package to a
   CD-based resource?
   Prompts
   • institutional and individual factors
   • opportunistic, pragmatic, psychological and pedagogical
   motivations
   • Did your motivations vary across the process from conception (idea)
to realisation (final product)?
   • What were/are your concerns (de-motivations)?
Q5. Do you think your willingness to adopt and integrate educational technology for the development of your course resources has anything to do with your personal characteristics? Do you consider yourself to be different in any way from those who are less willing to adopt and integrate educational technology into their courses, at least until others have paved the way?

Q6. What and/or who facilitated the conversion process?
   • What enabled the process? Institutional and individual factors?
   • Who influenced the process?

Q7. What restrained the conversion process?
   • What barriers arose during the conversion process, and how did you respond to those barriers? Institutional and individual factors?

Q8. What lessons have you learnt?
   • Given your experience, what factors would now either encourage or discourage you from converting other courses or making further changes to already converted courses?
   • If you are intending to convert other courses or make changes to already converted courses, have your motivations for doing so changed?
   • What advice would you give other academics who are considering conversion?

Q9. Do you have any further comments that you would like to make about this topic, or do you have any questions about this study?
QUESTIONS FOR NON-ADOPTERS

Q1. What are your thoughts about converting print-based course to CD or an online course?

Q2. To what extent and how does your teaching influence the development of your course resources?

Q3. How confident are you in your technological ability? How willing are you to adopt new educational technology?
   - To what extent have you included or are you intending to include educational technology into your course?

Q4. What are your reasons for not converting your print-based distance education package to a CD-based resource, either at this time or in the future?
   - What would you consider to be de-motivating factors?
     Prompts
     o institutional and individual factors
     o opportunistic, pragmatic, psychological and pedagogical de-motivations

Q5. In what ways, if any, do you think you might differ from those academics that have converted their courses or are considering conversion in the near future?

Q6. What do you perceive to be the main barriers or obstacles to converting courses to CD? Do you think these barriers/obstacles can be overcome?

Q7. What situational factors (if any) would need to be in place for you to consider converting your courses from print to CD? What or who (if anything or anyone) might encourage you to consider converting your courses to CD?

Q8. Have you discussed the conversion of print-based courses to CD with academics who have converted their courses to CD? If so, what (if anything) have you learnt from their experiences?
Q9. Do you have any further comments that you would like to make about this topic, or do you have any questions about this study?
QUESTIONS FOR INSTRUCTIONAL DESIGNERS

Q1. Can you describe one CD course that you have developed with an academic?

Q2. Do you think that the academic’s approach to teaching influenced their approach to the development of their distance education course resources? If so, how? (Ask for examples)

Q3. What level of ability and willingness do you believe academics at USQ had to have to adopt and integrate educational technology into their courses?

Q4. To what extent did academics at USQ integrate educational technology into their courseware?
   • What sorts of multimedia have been integrated into course programs and resources, and why has this been done?
   • What appears to have worked really well and what are the features of the success? (ask for artefacts/concrete examples)

Q5. What do you believe motivates academics to convert print-based distance materials to a CD-based resource?
   Prompts
   • institutional and individual factors
   • opportunistic, pragmatic, psychological and pedagogical motivations

Q6. For those academics who have already converted their courses, how do you think their motivations may have varied across the process from conception (idea) to realisation (final product)?

Q7. What were/are the concerns of academics who have been involved in the conversion process – what might they find de-motivating?
Q8. Do you think an academics’ willingness to adopt and integrate educational technology for the development of their course resources has anything to do with their personal characteristics? Do you think that the academics who have converted their courses differ in any way from those academics who have not indicated an interest in converting their courses?

Q9. What facilitates the conversion process?
   - What enables the process?
   - Who influences the process?

Q10. What restrains the conversion process?
   - What barriers have arisen during the conversion process, and how have the academics involved responded to those barriers?

Q11. What lessons do you think have been learnt by academics?
   - Given academics’ experiences, what factors do you think would now either encourage or discourage academics from converting other courses or making further changes to already converted courses?
   - If an academic is intending to convert other courses or make changes to already converted courses, do you know if their motivations for doing so have changed? If so, how?

Q12. What advice would you give academics who are considering converting their courses to CD?

Q13. Do you have any further comments that you would like to make about this topic, or do you have any questions about this study?
APPENDIX G: Preamble for Interviews

PIONEERS AND EARLY ADOPTERS

Thank you for agreeing to be interviewed for this study. This study is being undertaken for my Doctorate in Education through the QUT. The study concerns the conversion of print-based distance education courses at USQ to CD-based courses. The focus of this study is on academics’ motivations or de-motivations, rather than students’ perceptions. In order for academics to convert their course to CD, they need to adopt and integrate educational technology. The purpose of the study is to determine what factors influenced your decision to convert your print-based courses to CD-based courses. The study focuses on both driving and restraining forces and addresses both institutional and individual factors. The purpose of this interview is to identify what factors motivated and enabled you to convert your course, and how. Also, I am interested in factors that were de-motivating, and those that created barriers or obstacles to the conversion process, and how you dealt with those barriers.

Once the study has been completed, I will be providing a report to USQ management that I hope will provide them with a clearer understanding of the perceptions of academics regarding what motivates or de-motivates them to convert their courses and what factors enable or hinder the process. Hopefully, this will lead to a more strategic approach to the conversion process, and allow the necessary infrastructure and support required by academics to be put in place. Moreover, I believe that the findings of this study may assist academics, who have not converted their courses, to make more informed decisions concerning their future course development plans. If you would like to receive a summary of the results of this study, I would be happy to provide that for you.

Would you mind if I recorded the interview both for ease of analysis, and so that I can focus more closely on what you are saying? What you say today will remain confidential and your anonymity is assured. Transcriptions of the interviews will be de-identified and, for the most part, only summaries of themes and issues will be reported. If I do use a quote to illustrate a point, I will ensure that the quote does not
contain anything that might identify the respondent. Do you have any questions that you would like to ask?

Before we commence, could you please sign this informed consent form? Please be aware that you may withdraw from this study at any time without any fear of the consequences.
NON-ADOPTERS

Thank you for agreeing to be interviewed for this study. This study is being undertaken for my Doctorate in Education through QUT. The study concerns the conversion of print-based distance education courses at USQ to CD-based courses. The focus of this study is on academics’ motivations and/or de-motivations, rather than students’ perceptions. The study focuses on both driving and restraining forces for CD development and addresses both institutional and individual factors.

I will be interviewing instructional designers and a number of academics who have already converted their courses to CD. However, I am very keen to speak to other academics who have not converted their courses to CD. This will allow me to gain a range of perspectives.

Once the study has been completed, I will be providing a report to USQ management which I hope will provide them with a clearer understanding of the perceptions of academics regarding what motivates or de-motivates them to convert their courses and what factors enable and hinder the process. Hopefully, this will lead to a more strategic approach to the hybrid initiative and allow the necessary infrastructure and support required by academics to be put in place. Moreover, I believe that the findings of this study may assist academics to make more informed decisions concerning their future course development plans. If you would like to receive a summary of the results of this study, I would be happy to provide that for you.

Would you mind if I recorded the interview both for ease of analysis and also so that I can focus more closely on what you are saying? What you say today will remain confidential and your anonymity is assured. Transcriptions of the interviews will be de-identified and, for the most part, only summaries of themes and issues will be reported. If I do use a quote to illustrate a point, I will ensure that the quote does not contain anything that might identify the respondent. Do you have any questions that you would like to ask?
Before we commence, could you please sign this informed consent form? Please be aware that you may withdraw from this study at any time without any fear of the consequences.
INSTRUCTIONAL DESIGNERS

Thank you for agreeing to be interviewed for this study. This study is being undertaken for my Doctorate in Education through the QUT. The study concerns the conversion of print-based distance education courses at USQ to CD-based courses. The focus of this study is on academics’ motivations or de-motivations, rather than students’ perceptions. The purpose of the study is to determine what factors influence an academic’s decision to convert their print-based courses to CD-based courses. The study focuses on both driving and restraining forces and addresses both institutional and individual factors. In your role as instructional designers, you have been working closely with academics who have converted their courses, and therefore, I believe you are in an excellent position to provide insight on what motivates academics to convert their courses, as well as what factors enable and hinder that process.

Once the study has been completed, I will be providing a report to USQ management which I hope will provide them with a clearer understanding of the perceptions of academics regarding what motivates or de-motivates them to convert their courses and what factors enable and hinder the process. Hopefully, this will lead to a more strategic approach to the conversion process and allow the necessary infrastructure and support required by academics to be put in place. Moreover, I believe that the findings of this study may assist academics, who have not converted their courses, to make more informed decisions concerning their future course development plans. If you would like to receive a summary of the results of this study, I would be happy to provide that for you.

Would you mind if I recorded the interview both for ease of analysis and so that I can focus more closely on what you are saying? What you say today will remain confidential and your anonymity is assured. Transcriptions of the interviews will be de-identified and, for the most part, only summaries of themes and issues will be reported. If I do use a quote to illustrate a point, I will ensure that the quote does not contain anything that might identify the respondent. Do you have any questions that you would like to ask?
Before we commence, could you please sign this informed consent form? Please be aware that you may withdraw from this study at any time without any fear of the consequences.
APPENDIX H: Informed Consent Form

Participant Information Sheet

Research topic: Factors influencing academics’ adoption and integration of educational technology for the design and delivery of interactive multimodal technology-mediated distance education courses

Doctoral student: Dawn Birch, USQ 0746 311233
Pro-tem supervisor: Dr Wendy Morgan, Queensland University of Technology
Teaching team member: Dr Susan Danby, Queensland University of Technology

Description
This project is being undertaken as part of a Doctorate of Education program for Dawn Birch. The purpose of this project is to investigate institutional and individual factors that influence the ability and willingness of academics at USQ to adopt and integrate educational technology for the purpose of designing and delivering interactive multimodal technology-mediated distance education courses.

Participation
Your participation will involve an interview lasting about ¾ to 1 hour. A summary of the findings of the study will be made available to interviewees on request.

Expected benefits
This research will seek to uncover managerial and educational implications for both USQ and individual academics. Before embarking on a full-scale conversion of traditional print-based materials to interactive multimodal technology-mediated
course resources, USQ management and individual academics need to be more informed of the key institutional and individual factors that influence the change process and learn from the experiences of the innovators and early adopters. Moreover, an understanding of enabling and restraining factors will allow the university to provide the necessary resources and infrastructure to support or enable academics in the conversion process and, where possible reduce the barriers to adoption and integration of educational technology. Further, the findings of this study will allow individual academics to more critically consider their own motivations for undertaking a conversion, given the resources and time that are involved.

Risks
There are no anticipated risks associated with your participation in this project.

Confidentiality
All comments and responses are anonymous and will be treated confidentially. The names of individual persons are not required in any of the responses.

Voluntary participation
Your participation in this project is voluntary. If you do agree to participate, you can withdraw from participation at any time during the project without comment or penalty. Your decision to participate will in no way impact upon your current or future relationship with QUT or the researcher.

Questions / further information
Please contact the researchers if you require further information about the project, or to have any questions answered.

Concerns / complaints
Please contact the QUT Research Ethics Officer on 3864 2340 or ethicscontact@qut.edu.au if you have any concerns or complaints about the ethical conduct of the project.
Participant Information Sheet

Research topic: Factors influencing academics’ adoption and integration of educational technology for the design and delivery of interactive multimodal technology-mediated distance education courses

Doctoral student: Dawn Birch, USQ 0746 311233
Pro-tem supervisor: Dr Wendy Morgan, Queensland University of Technology
Teaching team member: Dr Susan Danby, Queensland University of Technology

Statement of consent

By signing below, you are indicating that you:

- have read and understood the information sheet about this project;
- have had any questions answered to your satisfaction;
- understand that if you have any additional questions you can contact the research team;
- understand that you are free to withdraw at any time, without comment or penalty;
- understand that you can contact the research team if you have any questions about the project, or the QUT Research Ethics Officer on 3864 2340 or ethicscontact@qut.edu.au if you have concerns about the ethical conduct of the project;
- agree to participate in the project.

Name

Signature

Date _____ / _____ / _____
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