UNIVERSITY OF SOUTHAMPTON

FACULTY OF ENGINEERING, SCIENCES AND MATHEMATICS

School of Electronics and Computer Science

THE CHALLENGE OF ELEARNING FOR HEALTHCARE PROFESSIONALS; AN EXPLORATION IN RURAL THAILAND

By

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Thesis for the degree of Doctor of Philosophy

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ABSTRACT

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This research investigates the barriers and drivers of eLearning for healthcare professional students in rural Thailand. An initial desk study was undertaken to investigate the factors that had an impact on eLearning within a professional healthcare environment. This was followed by a pilot study in a university in rural areas of Thailand. The results from the investigation led to a model being created to identify the barriers and drivers for implementing eLearning programmes in rural Thailand. This research explores the challenges of eLearning within four domains (IFPC); infrastructure (I), financing eLearning courses (F), university policy (P), and cultural diversity (C). The research utilised mixed research methods to identify the impacts of eLearning; employing both quantitative and qualitative methods. The participants of this research included healthcare professionals associated with the eLearning environment within rural areas in Thailand. The fieldwork data from both quantitative and qualitative methods were analysed assisting by SPSS software and Nvivo software. The results and findings demonstrated that the IFPC domains impact on the uptake of eLearning for healthcare professionals and healthcare professional students. The results of statistical testing corroborated that healthcare professional students with their own computers perceived that eLearning was useful to their professional development. In addition, it showed that universities' policies on eLearning affected the use of the

eLearning infrastructure, the participants' motivation to undertake eLearning courses and that eLearning course-uptake was affected by both healthcare professionals' motivation and their ability to use a computer. The subject of the financing of eLearning course was directly correlated to the level of computer skills held by the healthcare professional students and their attitude towards their own use of computers. The results identified how the elements of the IFPC model were related to each other and affected the implementation of eLearning programmes. It is hoped that these findings will make a significant contribution by informing lecturers about online teaching material, course delivery and design. They will also inform policymakers when considering budgets, plans and requirements for supporting healthcare professional students undertaking eLearning in rural Thailand. In particular the results will provide useful lessons for healthcare professionals undertaking similar programmes in other developing countries.

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Declaration of Authorship

I, NIRUWAN TURNBULL (neè OPRACHAI), declare that the thesis entitled "The challenge of eLearning for healthcare professionals; an exploration in rural Thailand" and work presented in the thesis are both my own, and have been generated by me as the result of my own original research. I confirm that:

- this work was done wholly or mainly while in candidature for a research degree at this University;
- where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- where I have consulted the published work of others, this is always clearly attributed;
- where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
- I have acknowledged all main sources of help;
- where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
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Abbreviations

ICT	Information Communication Technology
IDLD	Instructional Development Learning System
IFPC	Infrastructure, Finance, Policies and Culture
ISD	Instructional System Design
MSU	Maha Sarakham University
NECTEC	National Electronics and Computer Technology Centre (Thailand)
TAM	Technology Acceptance Model

Symbols

P	P-Value
ρ	Spearman's rho Coefficient
r	Pearson Correlation

Chapter 1

Introduction

This chapter introduces a research study of the challenges of implementing eLearning for healthcare professionals in rural areas of Thailand. The purpose of this research is to investigate the barriers and drivers of eLearning within the healthcare learning environment.

To understand the exact impact of eLearning, particularly for healthcare professionals in Thailand, this study divides its research investigation into four areas: infrastructure for the eLearning environment; financing eLearning courses; University Policies on eLearning courses; and the affect of cultural diversity on the eLearning environment (IFPC). Investigating these four aspects will allow us to explore the challenges of eLearning, especially for healthcare professionals in rural areas of Thailand.

1.1 Statement of the Research Problem

Providing eLearning support for healthcare professionals and healthcare students poses further challenges. Most healthcare professionals work in remote areas of Thailand with a lack of facilities for accessing online learning. There is a certain cultural resistance in rural areas to learning with the computer. Set-up costs for university eLearning programmes are high and so is the risk that changes in government policies may affect the eLearning environment. The healthcare professional is typically the only one in the local area, and so needs continuous training to update their knowledge and advance their professional development.

Furthermore, many healthcare professionals who are working in rural Thailand and who are attempting to gain qualifications unfortunately live too far away from the larger, better-resourced universities to be able to participate in the face-to-face courses, as the journey time would be too long. In particular, the North, North East, and the South of Thailand have only a few universities, with some locations being approximately 400 kilometres from the nearest university. For some healthcare professionals, it would be difficult to go to study full time at a university because this would leave the local area with no healthcare support.

Therefore, investigating the barriers and drivers of eLearning for healthcare professionals seems to be an important area to explore. Although several researchers have shown the impact of eLearning within the learning environment (Ali & Magalhaes, 2008; Angehrn, Schönwald, Euler, & Seufert, 2005; Arami & Wild, 2006; Berge, 1998; Childs, Blenkinsopp, Hall, & Walton, 2005), there have been no studies answering the four part division of the main areas of barriers and drivers of eLearning: infrastructure; finance; policies; and culture (IFPC), especially for healthcare professionals in rural settings in developing countries. Thus, it would be useful to use the four areas to study how to support healthcare professional students in rural Thailand with eLearning. Then we will be able to better support healthcare in the rural communities of Thailand.

1.2 Aim and Research Questions of the Research

The main aim of the research is to investigate the barriers and drivers of eLearning for healthcare professionals in rural Thailand. The research explores challenges of eLearning in four areas: infrastructure within the eLearning environment; financing eLearning courses; university policy on eLearning courses; and cultural diversity within the eLearning environment (IFPC).

In order to achieve the results in assessing the challenge of eLearning for healthcare professionals, particularly from the rural areas of Thailand, the following research question is the focus of attention.

'How do the barriers and drivers of eLearning affect uptake and use for healthcare professionals in rural Thailand?'

The research question was formulated following a literature review and a pilot study which shed light on the main problems that arose in investigating the barriers and drivers of eLearning. To give an answer to the root research question, five sub-research questions were identified.

(Q1) What are the barriers and the drivers to eLearning for healthcare professionals in rural Thailand?

(Q2) How is the attitude to the use of computers affected by the IFPC factors?

(Q3) How is the attitude to the use of computers affected by the motivation for eLearning?

(Q4) How is the motivation for eLearning affected by the IFPC factors?

(Q5) What is the relationship between the IFPC factors within the eLearning environment?

1.3 Report Structure

The research has been inspired by the need to encourage effective uptake of eLearning by healthcare professionals in rural areas of Thailand. Summaries of the chapters that follow are provided below.

Chapter 2: eLearning in Context

This describes the conceptualisation of eLearning and introduces the main features of the instructional system, and the design of the main pedagogies for eLearning, including the principles of eLearning and eLearning platforms. This also includes discussion of learning management systems (LMS).

Chapter 3: eLearning for Healthcare Professionals in Context of Thailand

This chapter deals with eLearning around the world and the present background of eLearning in Thailand. Also discussed is the current situation in regard to eLearning for healthcare professionals, such as, the extent of adoption of existing programmes in rural areas.

Chapter 4: Barriers and Drivers in eLearning

This chapter analyses the literature on the barriers and drivers in eLearning. It is evident that relatively few articles in the academic literature examine the risks

associated with eLearning developments. This chapter also provides a summary diagram of the four main areas of the drivers to the uptake of eLearning, which are infrastructure, finance, policies and culture which is called the IFPC model.

Chapter 5: eLearning at work: A pilot study

In this chapter the results of a pilot study are presented. eLearning at work looks at a university in rural North-eastern Thailand which has established an eLearning course for healthcare professionals. This chapter reports the research in six sections, the background to MSU (Maha Sarakham University) eLearning, research questions, research method, the results and a summary.

Chapter 6: The IFPC's model of eLearning for Healthcare Professionals

This chapter discusses the underlying factors and develops ideas first introduced in Chapter 4 (Barriers and drivers in eLearning) and Chapter 5 (eLearning at work). Change management and eMedicine, including the proposed use of the IFPC research model, are also discussed in this chapter.

Chapter 7: Research Methodology

This chapter presents the research methodology used in this research, including the research questions, research design, ethical issues and government data protection.

Chapter 8: Fieldwork

This chapter presents the details of the fieldwork. It describes the regions of Thailand and the ICT's infrastructure mapped across the different geographical areas. This includes the distribution of healthcare professionals in Thailand and their characteristics; the travelling involved for the study (which includes details of the participant institutions). The chapter also considers issues of culture; including social values; the weather and religion in these regions.

Chapter 9: Overview: The Results of Quantitative Data

This chapter illustrates the results of the data analysis from the quantitative investigation, as described in Chapter 7. The chapter describes the quantitative findings from the questionnaires and the IT facilities check. This includes statistical analysis of the relationships between the variables within the four domains (infrastructure, finance, policies, and culture within the IFPC model).

Chapter 10: Encounters with Participants

This chapter discusses the results from the interviews and group discussion which were analysed with QSRNvivo8 programme. The results are presented in terms of the four main domains from the IFPC model, and the impact of the key factors identified. This is based on data from both the interviews and group discussions.

Chapter 11: Discussion

This chapter discusses both the quantitative results and qualitative results in relation to the research questions identified in Chapter 1. It considers the main barriers and drivers of eLearning for healthcare professionals in Thailand.

Chapter 12: Conclusions and Future Work

This draws conclusions from the research undertaken, and offers a final assessment of the adequacy of the answers to the research questions provided, the contribution of the thesis and possible areas for future research.

Chapter 2

eLearning in Context

2.1 Introduction

This chapter presents a critical review of the eLearning conceptual system, covering eLearning pedagogies and the Learning Management System. Section 2.2 illustrates the conceptualisation of eLearning and discusses the considerations shaping instructional system design. Section 2.3 classifies the main pedagogies for eLearning, based on the principles of eLearning and eLearning platforms. Section 2.4 debates the eLearning management systems that are concerned with the design of eLearning tools.

2.2 Conceptualization of eLearning

A number of literature reviews have shown that the definition of eLearning includes instruction delivered through all electronic media, viz. the internet, intranets, extranets, satellite broadcasts, audio/video tape, interactive TV, CD-ROM and mobile phones. (Bates & Bates, 2005; Graham, 2006; Khan, 2005a; Lehner & Nösekabel, 2002). In the twenty-first century, one important goal for scholarship in this field is to provide a framework for understanding the application of eLearning in higher education (Garrison & Anderson, 2003). With the ever-accelerating product and service lifecycles of information and communication technologies, students need to update and expand their knowledge at a pace with which the traditional human resource development methods can no longer cope (Schmidt, 2005).

As several studies indicate, the barriers to eLearning depend upon the learning environment. Childs et al. (2005) found that the main barriers to eLearning for healthcare professionals in developed countries that need to be changed are:

- costs
- poorly designed computer software packages
- inadequate technology
- lack of skills
- need for a component of face-to-face teaching
- the time-intensive nature of eLearning
- computer anxiety.

Gagnon et al. (2007) argue that time constraints, personal discipline and unfamiliarity with the computer are also important barriers for healthcare professional students when undertaking eLearning. Yu et al. (2007) came to a similar conclusion when looking at eLearning in a developing country. They also discussed some of the positives and negatives. The negatives were:

- poor computer competence
- lack of a personal computer or no internet access
- heavy work load
- heavy family duties
- conflict with personal preferences
- heavy economic burden
- lack of motivation
- low self-control.

All of these might lead to eLearning being rejected. However, Yu et al. (2007) found that the positive reasons for adopting eLearning included:

- achieving life-long learning
- fulfilling personal interests
- time-saving based on job needs
- information diversity
- flexibility in time and space
- self-regulated learning
- cost-effectiveness

- less impact on family life and duties.

This implies that eLearning might have to be readjusted from a traditional western conception for rural Thailand, if it is to be implemented successfully in what is a very different social and cultural context.

Gulati (2008) discussed the question '*Can technology-enhanced learning help address the poverty, literacy, social, and political problems in developing countries?*' He states that learning using technologies in developing countries has become a challenge. It is clear that universities (or institutions) need to change to accommodate the impact of technology on learning.

However, to ensure the successful implementation of the eLearning process, it is necessary to examine some of the weaknesses of existing approaches. Several researchers have published critiques of the concepts and applications of eLearning, which provide a basis for further research (Banks, Lally, & McConnell, 2003; Jonassen, 1997; MacDonald, Stodel, & Coulson, 2004; Mehlenbacher et al., 2005; Reynolds, 2005; Rosenberg, 2001; Spector, 2000). Some of the key concerns raised are as follows.

1. Design and network collaboration

This is discussed by MacDonald et al. (2004). A missing element in the provision of eLearning is a proper concern with the design of eLearning events and courses, including a thorough understanding of the approaches to design that sustain eLearning in a way that leads to quality learning processes and outcomes. In particular, when students interact with each other and available resources, they may change in unanticipated ways.

Indeed, Banks et al. (2003) suggest that one of the main ideas underpinning network collaboration in eLearning is that the interactions between students constitute a significant element of their planned development. Spector (2000) has argued that significant changes may occur in students' abilities, attitudes, beliefs, capabilities, knowledge and understanding, mental models and skills as eLearning proceeds.

Successful implementation depends on anticipating such changes and making provision to adapt educational programmes accordingly. (Jonassen, 1997) stressed that clearly identified, well-structured problems are constrained problems with convergent solutions that engage the application of a limited number of rules and principles within

well-defined parameters. Poorly defined, ill-structured problems possess multiple solutions, multiple solution paths, and fewer parameters, contain uncertainty about which concepts, rules, and principles are necessary for the solution, or how they are organized, and which solution is best.

2. Cultural differences

There are many emerging ideas to implement in eLearning, with cultural differences in approaches to learning and teaching in a global eLearning context being one of them. Hodgson and Reynolds (2005) argued that:

- A degree of certainty is needed to begin to provide a vision for network eLearning that works towards inclusion of people from different traditions and cultures which needs to be based on a pedagogy that supports the differences
- The eLearning environments that facilitate learning must balance a complex set of learner-as-student and learner-as instructor goals and activities.

eLearning is a challenge that is very much interconnected to the other social and cultural challenges, particularly in Thai universities. It needs to be a part of the overall institutional strategy and the technology needed should be an integral part of the ICT infrastructure and usage policy. Thai universities must rapidly move from their traditional ways of delivering education or face crushing competition from those that have already embraced the new technology-based eLearning paradigm.

3. Programme efficiently managed

It has been argued that the successful implementation of eLearning also depends on establishing an effective knowledge management system. Such a management system is key in creating a culture for eLearning (Rosenberg, 2001). He identified that "*support to move in the learning-through-technology direction must be championed by management; especially front-line managers must be on board for success to be realized. Building intellectual capital and investing early on, not only in the job performance of each student, but also in the potential of that student through learning opportunities, is tantamount*." (Rosenberg, 2001). A similar point is made by Mehlenbacher et al. (2005), who indicated that the eLearning environment must be:

- Efficient (in terms of resources, task support, and time)
- Ergonomically effective (have the capacity for producing desired results)

- Economical (in terms of time and resources for learners, instructors, and tertiary users)
- Educational (in facilitating and promoting learning)
- Equitable (equally usable by all learners).

An effective knowledge management system provides not only a vehicle to share information, but also builds a community of learners. These are vital consequences for the learning outcomes of the students taking the courses.

Further discussions of learning management systems (LMS) has led many researchers and teachers to identify that approaching eLearning from the viewpoint of instructional system design (ISD) means that common models are used to create instructional materials, (Dick, Carey, & Carey, 2000; Lebow, 1993; Molenda, 2003). One example of this approach is provided by the ADDIE's process, an acronym standing for the 5 phases contained in the model. These are:

- Analyse – analyse learner characteristics, the task to be learned, etc.
- Design – develop learning objectives, choose an instructional approach
- Develop – create instructional or training materials
- Implement – deliver or distribute the instructional materials
- Evaluate – make sure the materials achieved the desired goals.

A second example is the Dick and Carey Systems Approach Model. This incorporates a view of instruction as a unified whole, as opposed to seeing instruction as the sum of its isolated parts. The model addresses instruction as an entire system (see Figure 2.1 (Dick, 1996)), focusing on the inter-relationship between context, content, learning and instruction. The elements of the model are: (a) Identify Instructional Goal(s), (b) Conduct Instructional Analysis, (c) Analyse Learners and Contexts, (d) Write Performance Objectives, (e) Develop Assessment Instruments, (f) Develop Instructional Strategy, (g) Develop and Select Instructional Materials, (h) Design and Conduct Formative Evaluation of Instruction, (i) Revise Instruction, and (j) Design and Conduct Summative Evaluation.

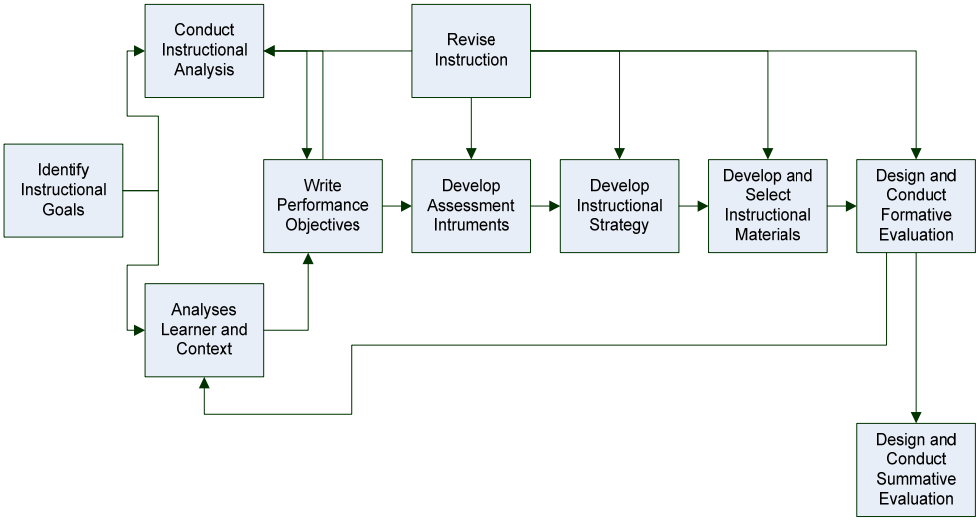


Figure 2.1 The Dick and Carey Systems Approach Model

A third example is the Instructional Development Learning System (IDLS), described by Tseng et al. (2008). The components of the IDLS Model are: Design a Task Analysis, Develop Criterion Tests and Performance Measures, Develop Interactive Instructional Materials, and Validate the Interactive Instructional Materials.

2.3 Pedagogies for eLearning

Pedagogy can be defined as the art of teaching. It refers to the strategies, methods and styles of instruction utilised (Jochems, van Merriënboer, & Koper, 2004). The adoption of technology adds another element to be considered in course design. However, usually the term ‘course design’ indicates a variety of coherent measures at pedagogical, organisational and technical levels for the successful implementation of eLearning in combination with more conventional methods (see Figure 2.2, Jochems et al. (2004)).

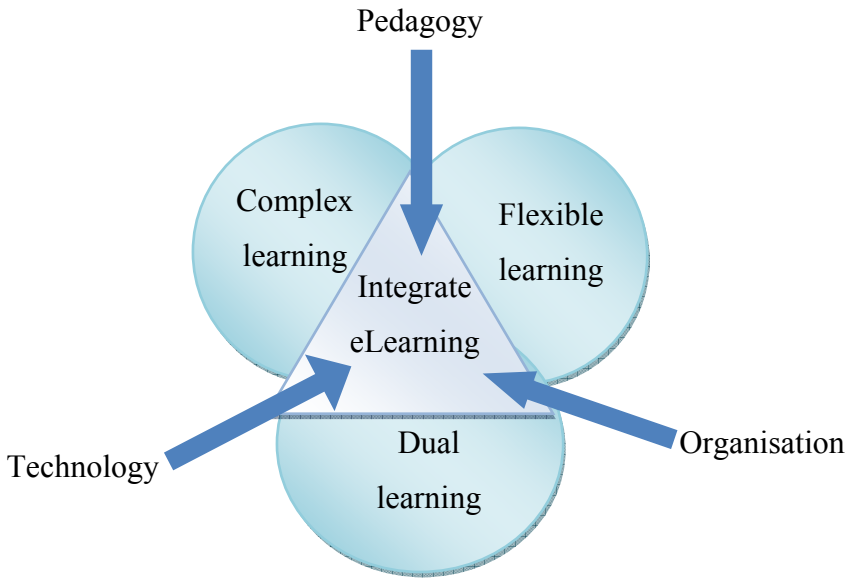


Figure 2.2 An Educational System Approach to Integrated eLearning

ELearning options can be applied in different ways to suit each type of learning outcome. Consequently, when Bullen (2006) and Keeton (2004) discussed eLearning platforms, they were concerned with not only the growth of eLearning but also proposed a set of conceptual categories to aid understanding of eLearning.

Bullen suggested a continuum of forms of learning (see Figure 2.3, Bullen (2006)) which describes the potential uses of eLearning and distance education. He postulates that nowadays, as we move along the continuum from fully face-to-face teaching to teaching at a distance, more and more technology is used to replace the face-to-face elements and to enhance or facilitate learning (Bullen, 2006).

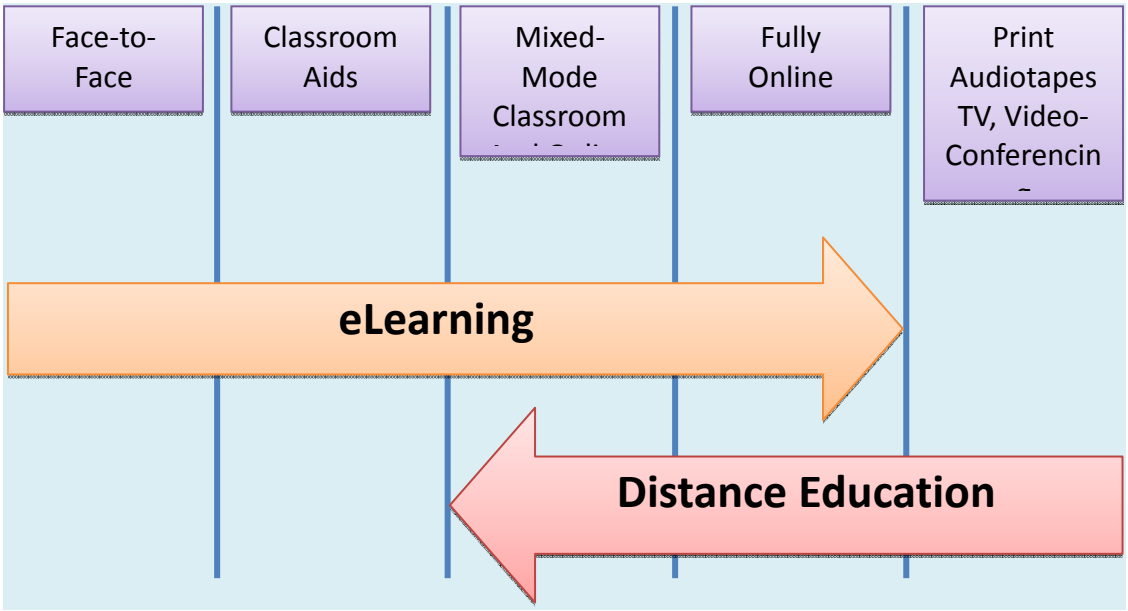


Figure 2.3 The type of eLearning and distance learning

Keeton (2004) also set out certain principles which provide direction to eLearning pedagogy. These are:

- Make learning goals and the path towards them clear
- Use extensive and deliberate practice
- Provide prompt and extensive feedback
- Provide an optimal balance of challenge and support that is tailored to the individual student's readiness and potential; elicit active critiques from learners on their growing experience base
- Link enquiries to genuine problems or issues of high interest to the learners (thus enhancing motivation and accelerating their learning)
- Develop learners' effectiveness as learners early in their education. Create an instructional environment that supports and encourages inquiry.

Using eLearning as a method of teaching provides more choices for achieving good education. The pedagogy of eLearning provides enhanced opportunities for educators to use online learning or its virtual equivalent and flexibility for computer applications. This illustrates how technology can be applied to Keeton's principle of "*linking learning to genuine problems or issues of high interest to the learners*" (Keeton, 2004).

2.4 eLearning management systems

The Learning Management System (LMS) has been described as a platform on which online courses or online components of courses are assembled and made available (Nichols, 2008). It is a software application for the administration, documentation, tracking, and reporting of training programs, classroom and online events, eLearning programmes, and training content (Ellis, 2009).

Many LMS applications have been developed to assist eLearning programmes since the late 1990s. These include both open source and commercial source applications. At the time of writing, the open source materials include: aTutor, Claroline, Chamilo, DoceboLMS, Dokeos, eFront, ILIAS, Moodle, OLAT and Sakai. The commercial source applications include: Blackboard Learning System, QuestionMark, CCNet, eCollege, Fedena, GeoLearning, Gyrus Systems, HotChalk, Informateca, it's learning, JoomlaLMS, Learn.com, Meridian Knowledge Solutions, Plateau Systems, Sclipo, SharePointLMS, SSLearn, Thinking Cap LMS, and Vitalect.

Nichols (2008) also indicated that most LMS applications provide similar eLearning tools for course designers. The following list is reasonably representative of the basic tools available:

- Web-pages for presenting course content and notices
- Links to other internet sites
- Discussion or bulletin boards with rich text editing for threaded discussions (E-Primer4, online discourse)
- Chat clients for same-time text-only communication
- Quizzes (usually multiple choice and other self-marking formats, though open-ended responses can also be captured)
- Grade storage
- Student tracking, ranging from login records to individual page views.

However, managing content-development processes of eLearning is crucial, and this includes assigning responsibilities to individuals during various stages of the process and supervising the entire development process (see Figure 2.4, Khan (2005c)).

Indeed, it is important to plan for storage of various eLearning materials when developing the process of content at the beginning. eLearning projects can be organised and hosted on two different servers or sites: firstly, a development site and, secondly,

an instruction and information site. Once the course materials are completed, they can be migrated from the development site to the instruction and information site (Khan, 2005b).

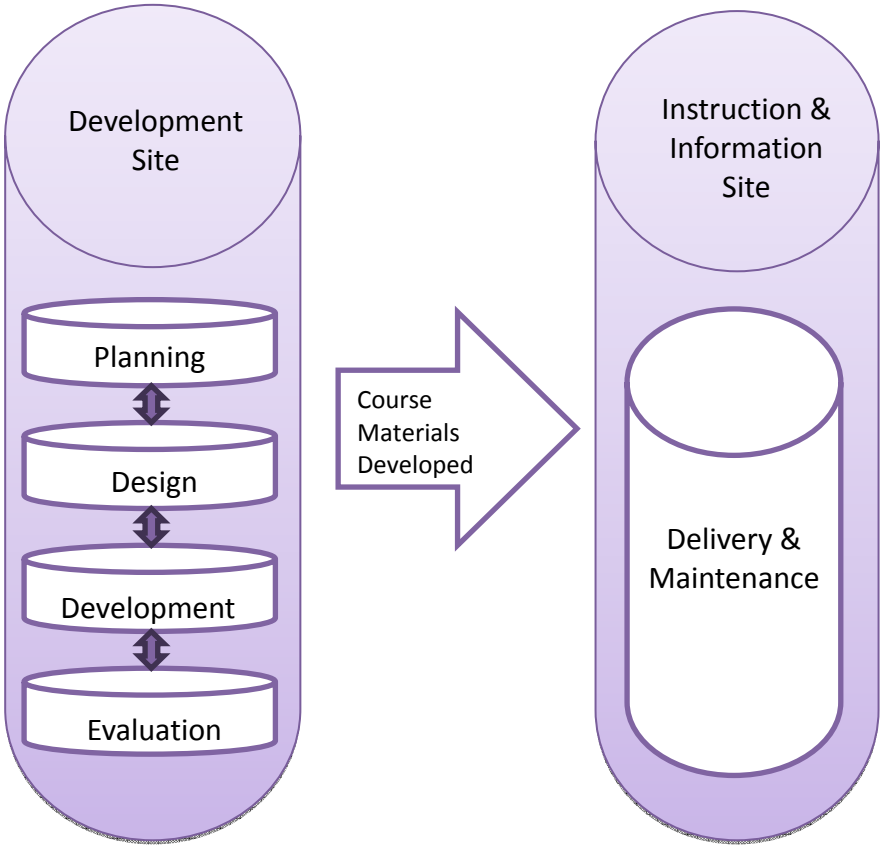


Figure 2.4 Content migration

Obviously, all online course material should be accessible by the learners at any time from anywhere in the world. The delivery and maintenance (D&M) team should maintain an effective and efficient learning environment with their assigned roles and responsibilities (Khan, 2005b). Khan also suggested that this team should provide technical support to students, instructors and support staff as well as managing LMS user accounts and network security.

2.5 Summary

This chapter has reviewed certain known problems in the planning, design and development of eLearning programmes. The literature shows that LMSs tends to lag behind the technical requirements of eLearning innovation. However, nowadays many

LMS resources are provided with suitable tools for the implementation of eLearning courses within an eLearning environment. Therefore, educational institutions need to look beyond the basic LMS in itself to make choices about the use of particular eLearning approaches. This background of eLearning literature is not only of interest in considering known limitations in the effectiveness of eLearning, but it is also highly relevant when considering the development of an eLearning module for healthcare professionals. It is essential to know the background to eLearning in the context of healthcare professionals, which it is hoped will enable us to predict the main barriers and drivers of eLearning in developing countries. The following chapter will discuss some of the issues that affect eLearning for healthcare professionals in Thailand, which include the current situation and extent of adoption of eLearning in the education of healthcare professionals.

Chapter 3

eLearning for Healthcare Professionals in Thailand

3.1 Introduction

Since the turn of the 21st century, technology for eLearning has been generally available in Thailand. There have been many technological challenges due to globalization and the associated technological revolution, especially in the educational sector. For example, advances in IT, hardware subsystems and telecommunications, make it possible to share information in an integrated way within the learning environment. The learning process generally covers a range of topics, involves communication between people, and uses many types of media to engage the students. That was the beginning of 'eLearning'. Use of technologies such as eLearning has spread widely, including into the healthcare sphere. This chapter discusses eLearning for healthcare professionals in Thailand from three aspects: eLearning experience around the world, the background to eLearning in Thailand, and eLearning for healthcare professionals. The last includes the current situation and adoption of eLearning by healthcare professionals.

3.2 eLearning experience around the world

Many countries realised the importance of adopting information and communication technologies in their education sector to make them more competitive

in the so-called 'Global Village' (Ariwa & Li, 2005). Information technology overcomes many restrictions of time and space (Oshima, 2000). Information technology, such as the internet and the World Wide Web, are part of the everyday life of students and teachers at any level all over the world. Students and teachers do 'meet' in Virtual Learning Environments (VLEs) using computers linked together via networks such as the internet and become involved in various forms of 'eLearning' (McConnell, 2006). eLearning increases productivity in education in that it provides access to learning materials at any time and at any place (Snae & Brueckner, 2007). A knowledge-based society needs lifelong learners who are more or less independent in their study habits (Brueckner & Tetiwat, 2004), and information technology supports these skills.

Over the last decades, educational researchers and politicians have shown a growing interest in the concept of learning in practice, i.e. learning in the workplace. Learning in practice plays an important role in connection with lifelong learning, as the workplace is an obvious setting for realizing this aim. Theories about learning in practice often include a critique of school-based learning by questioning the idea that learning in school can be transferred to action and by emphasizing the context dependence of learning and action (Aarkrog, 2005). Consequently, the use of ICT in the delivery of education and management training has major implications for lecturers, learners and institutions (Sandra et al., 2004). For example, increased emphasis on flexible, student-centred learning as part of mainstream higher education has influenced the general context of learning in higher education globally over the last two decades (Tait & Mills, 1999). Moreover, the new information and communication technologies currently affect most spheres of life, including higher education environments. Their effects are most likely to grow in the future. However, many predictions in the last few years as to the sweeping impact of the new technologies on restructuring the learning and teaching practices at universities, and their high-profit prospects, have not materialized (Guri-Rosenblit, 2006).

Mwanza and Engeström, (2005) point out that "*an adjustment in human mechanisms for organising and interacting with educational content has become necessary due to the remediation of established practices through the introduction of software-based techniques to structure content*." In many institutes of higher education, eLearning projects that use the new digital media are carried out with many different

intentions. For example, the University of Warwick in England implements eLearning courses in four faculties, especially in the Medical School, which used CoachPod. When students travelled to Leicester to use the dissection facilities, weekly briefing podcasts were produced, that were highly contextual in nature, for use on the motor coach (or beforehand), to ensure that students were well orientated to using the time available to its maximum potential. These podcasts also played an important role in preparing students for what could be a potentially distressing experience (WarwickUniversity, 2008). The University of Oxford has implemented an online course that encourages medical students by using computer aided learning (CAL) in Neuroanatomy (Svirko & Mellanby, 2008). One could argue that eLearning even demands a reconfiguration of traditional methods of learning and teaching. The beneficial effects of learners interacting with online programmes have been widely reported, see Autti et al. (2007) and Bamidis et al. (2008). Indeed, it is argued that online discussion promotes student-centred learning. It is therefore reasonable to suggest that the benefits of online discussion should translate into improved student performance (Davies & Graff, 2005). Because of the heightened competition introduced by the potential global market, and the need for structural changes within organizations delivering e-content, eLearning policy is beginning to take on a more significant role within the context of educational policy *per se* (de Freitas & Oliver, 2005).

Most of the work cited above covers eLearning in developed countries. There is a need for investigation of eLearning in developing countries since it may be different from the developed countries due to factors such as climate, and reliability of commitment. In addition, the lack of income and lack of facilities (e.g. access to technology and the internet) are particular issues. There may also be different motivations and other issues that affect eLearning. In developing countries such as Thailand, there is a need to investigate the online environment and learning because those differ with regard to politics, facilities and culture. There is some research into this. For instance, performance and outcomes for online learning have been researched in Thailand: Chotechuang (2005) has looked at advantages of eLearning systems for human development. She found a community web-board in an eLearning module more useful in helping her students to communicate, and share their knowledge. Her students used the internet to create two-way communication between lecturers and students

through the school's web-board. This author received good feedback from her students who found this system convenient and helpful in enabling them to easily get in touch with lecturers, saving both time and money (Chotechuang, 2005). Sritongthaworn (2004) has also investigated use of interaction in eLearning for undergraduate students in Thailand. She proposed common characteristics of the use of interaction (UI); her results revealed that UI comprises three main factors: human-to-human interaction, human-to-non-human interaction, and access duration. These outcomes show the value of using online systems to facilitate interactions, and reflect students' actual use of eLearning. Such systems also provide information to administrators and instructors about the pattern of interactions, from the student perspective.

Other researchers have investigated the factors influencing eLearning in Thailand, and suggested novel approaches for developing countries, e.g. Rodsutti et al., 2004. Morse, Leoseng, & Vassana (2004) identified 10 factors and recommended a hybrid approach, which ensures the effectiveness of eLearning. They identified nine factors that are important when designing distance learning and eLearning courses. The present study discovered a new variable *local facilitation* and introduced it into the domain of this hybrid approach. Those factors are:

- Involving stakeholders at the planning stage
- Selecting the LMS
- Developing content including practical examples, exercises and case studies
- Including essential references and providing additional references
- Introducing local facilitation
- Encouraging experience sharing (group working)
- Providing consultation with tutors
- Using multimedia to explain difficult concepts
- Providing on-line self test
- Benchmarking results of student's exercises for use by tutors on future courses. (Morse et al., 2004)

Considering all these aspects of programme design before starting an online course could be useful in preventing problems arising from the eLearning environment. In addition, the results from Rodsutti et al. (2004), show that Thai learners typically still believe that traditional training is more effective than eLearning. Such learners seem to have a particular difficulty in moving beyond the old paradigm.

3.3 The background to eLearning in Thailand

eLearning can meet the needs of a knowledge-based society, which is one of the aims of the government of Thailand for the year 2010 (Suanpang, Petocz, & Kalceff, 2004). While eLearning is no longer a novelty in Thailand, previously most people at all levels in society were not aware of it, but they are now rapidly becoming familiar with it. Some universities in Thailand have developed courses in online learning. These include Rhamkhamhaeng University, Sukhothai Thammatirat University, Rajabhat Suan Dusit University, Assumption University, Mahidol University, Suan-sunandha Rajabhat University, and the Asian Institute of Technology of Thailand. Fortunately, technology has become more generally accessible to people, and electronic communication has suddenly become a liberator in terms of bridging the gap between knowledge and the public.

The conditions for successful introduction of these programmes can be traced back to the 1999 National Education Act (Suanpang et al., 2004) and the substantial education reform that followed. The key aspects of this reform focussed on improving the efficiency and effectiveness of learning. Students were encouraged to become critical and creative thinkers, to acquire a facility in information technologies, and to develop their learning and individual potential, based on the 'student-centred' learning philosophy. In 2002, the Thai government announced plans to install computers connected to the internet in all high schools, and to make the internet and 'eLearning' or 'Online learning' the technology of choice for the Thai higher education system (Suanpang et al., 2004). This led Sirinaruemitr (2004) to announce that 'The era of eLearning has started'.

In practice, however, Thailand has been quite slow in deploying an eLearning service, including the necessary infrastructure, and transformation in the ways of using technologies for learning, especially in the rural areas. The experiences of Thai students show a significant lack of self-motivation, of independence of learning, and of creative and critical thinking, which is similar to the results Tetiwat and Huff (2003) reported in their research. They found that reading is not a common habit of Thai students. Rote learning and learning by example are common ways of learning in Thai culture. eLearning, on the other hand, requires a high level of discipline from the learner, which is often simply not the case for Thai students, whose attitude toward learning is less

participatory. Face-to-face interaction is the preferred method of learning and teaching, rather than virtual interaction (Tetiwat & Huff, 2003). Therefore, the eLearning system for Thai students has to consider these differences and offer appropriate help and support.

3.4 eLearning for healthcare professionals

3.4.1 The current situation

In the last decade, eLearning has become part of the mainstream in healthcare education. While eLearning means many things to many people, at its heart it is concerned with the educational uses of technology (Hersh, Bhupatiraju, Greene, Smothers, & Cohen, 2006). Deploying new technologies usually introduces tensions, and eLearning is no exception. Some wish to use it merely to perform existing activities more efficiently or faster. Others pursue new ways of thinking and working that the use of such technology affords them. One example is the Leonardo projects, EMIT and EMERALD, which developed eLearning courses through a partnership between a university and a hospital for medical physics graduates and other healthcare professionals. These projects used eLearning material to underpin work-linked training in hospitals on ultrasound, magnetic resonance imaging, X-ray diagnostic radiology, radiotherapy and nuclear (Aitken & Tabakov, 2005). Another example is Universities' Collaboration in eLearning (UCeL), which has partnerships between a number of schools of nursing, medicine and health studies in the UK, and is pioneering new methods of interactive eLearning content creation. UCeL was founded in March 2002 by the universities of Cambridge, Manchester, Nottingham, East Anglia, Wolverhampton and the Peninsula Medical School (Leeder, Rodrigues, & Wharrad, 2004). Healthcare professionals need to develop the skills to use the technology for their clinical practice (Glen & Cox, 2005). The use of modern information and communication technologies as enabling tools for healthcare services introduces new ways of creating access to high-level healthcare systems for all, anytime and anywhere. Traditionally, education in healthcare has been didactic or apprenticeship-based, that is, learning practical skills at the patient's bedside, with the aim of creating professionals who demonstrate the same modes of thinking and knowledge base as their teachers

(Thornett & Davey, 2006). Global networks and the use of computers for educational purposes stimulate and support the development of virtual universities for eLearning (Graschew, Roelofs, Rakowsky, & Schlag, 2008). The emphasis of eLearning has changed from information transfer to information processing. Web-based courses are growing via the Internet, which has become the preferred place for continuing education for the healthcare professional.

3.4.2 Adoption of eLearning for healthcare professionals

As with many forms of education, healthcare professional education is increasingly competency-based (Hersh et al., 2006). A growing concern among healthcare professionals is the need to keep their knowledge and skills continually up-to-date in order to enhance clinical practice. In some cases, eLearning can help registered them maintain the professional requirement to keep up-to-date with the knowledge base of their different professions (NHS Executive, 2004). It is recognized that there are major concerns about recruitment and retention of staff within health care, and an increasing need for valuing the existing workforce (Gill, 2007). At the same time, there is growing use of eLearning technologies, which can be linked to competencies via emerging eLearning standards (Hersh et al., 2006).

Studies have found both advantages and disadvantages to implementing eLearning in healthcare organisations. Tse and Lo (2008) found that nursing students were able to understand, rather than memorize, the subject content, and develop their problem solving and critical thinking abilities when using a Web-based eLearning course, 'Integration of Pathophysiology into Pharmacology in Hong Kong'. When a US study changed the traditional 2-day nursing classroom 'Dysrhythmia' course to an eLearning platform, they found that nursing staff development and the clinical nurse specialists proved to be driving forces for the transformation of the course, reinforcement of learning, and promotion of future educational technology (Elkind, Wus, & Parra, 2008). Gill (2007) contributed to the debate about the role of eLearning in continuing professional development (CPD) and personal professional development. He described how healthcare professionals utilized an innovative, self-managed, distance-learning module delivered online or by CD-ROM. The results indicated that participants showed some improvement in all categories (Gill, 2007).

Indeed, eLearning is an interesting method for hospital staff who work shift patterns that cover seven days a week, 24 hours a day. eLearning helps to solve the different time and different place clash typically encountered by healthcare professionals (Rutkowski & Spanjers, 2007). It also enables healthcare professionals maintain core skills, including the ability to use electronic libraries, critically appraise evidence for healthcare, and provide health information for service users (Wilkinson, While, & Roberts, 2009).

However, there are disadvantages to establishing an eLearning approach in the education of healthcare staff. Several studies have analysed how IT and eLearning influences or impacts healthcare practitioners and their role. For example, Gilchrist and Ward (2005) suggested that there are barriers in accessing eLearning which relate to the IT skill level within the current nursing community. They also raised concerns that eLearning may potentially disadvantage sections of society; this includes those with disabilities, learners from all age groups, both genders, and the difficult areas of ownership, intellectual property rights and copyright (Gilchrist & Ward, 2005). Gagnon et al. (Gagnon et al., 2007) reviewed the programme of the Continuing Professional Development Centre of the Faculty of Medicine at Laval University, which offered an internet-based programme on evidence-based medicine (EBM). They found that, after one year, only three physicians had completed the entire program, out of the 40 who had paid to register. Their results showed that barriers remained; in particular, the physicians' perceptions of time constraints, lack of personal discipline, and unfamiliarity with computers were also apparent (Gagnon et al., 2007).

The literature suggests that when implementing eLearning courses, especially for healthcare professionals who need special techniques to learn, one has to be cautious, especially regarding culture. There is little published on the possible role of culture affecting the choice of eLearning methods and infrastructure. The infrastructure is influenced by the technology used. This is particularly important for healthcare professionals, who must attain a high professional standard since their actions can save or lose lives. Few publications have described the impact of eLearning. Those that do exist reported findings such as: eLearning policy driving change (de Freitas & Oliver, 2005), the influence of cultural factors (Barton, 2006), the financial risk (Shoniregun & Gray, 2003), and the importance of an infrastructure (McNaught, Lam, Keing, & Cheng, 2006), which are related to eLearning methods. These four main areas, related

to the implementation of eLearning, seem particularly relevant to developing countries such as Thailand, and are different from those usually discussed in developed countries.

Providing eLearning support for healthcare professional students presents further challenges. Most healthcare professionals work in remote areas of Thailand. In addition, the following all need to be investigated for an effective eLearning environment: lack of facilities to access online learning, the cultural change required to use modern information and communication technologies, financial risk, and the impact of policy changes. The healthcare professional is typically the only one in the local area, and continual training is needed to update their knowledge and continue their professional development. Therefore, their learning is linked with professional development and the idea of lifelong learning. Many healthcare professionals working in rural Thailand and who are attempting to gain qualifications, unfortunately live too far away from a university campus to be able to participate in courses, as the journey would take too long. In the north east of Thailand in particular, which has few universities, some healthcare professionals live in areas that are over 400 km from these universities, therefore making the journey impossible. It would be difficult for some healthcare professionals to study full time at a university because this would leave the local area without healthcare support. Therefore, investigating the advantages and disadvantages of adopting eLearning techniques to support these professionals seems to be an important area for exploration. A better understanding of how healthcare professional students in rural Thailand may be supported with eLearning, will enable better healthcare to be supported in those rural communities.

3.5 Summary

The main goal of this chapter was to discuss eLearning by healthcare professionals, especially in rural areas of Thailand. eLearning was discussed in different contexts, such as developed and developing countries, and the chapter considered the impact of eLearning around the world. In particular, when implementing eLearning courses for healthcare professionals, there is a need to evaluate the impacts carefully. Healthcare professional students are typically part-time, shift workers, who live many kilometres from a university, and often do not have local colleagues with

whom to share their experience, and courses need to be designed with these characteristics in mind.

Chapter 4

Drivers and Barriers in eLearning

4.1 Introduction

> "One vision of the future of universities is that virtualisation and remote working technologies will enable us to study at any university in the world, from home."
>
> (MacKeogh & Fox, 2008)

Within the eLearning research community, it is accepted that there is a need for a research-based approach to understanding university experiences in eLearning, and to move away from depending on commentary that is primarily anecdotal in nature (Biggam, 2005). Some institutions have already managed to produce entire programmes of study that are eLearning enriched, while other eLearning departments are caught in an *ad hoc* pattern of development, and work only with those academics who are interested or coerced (Nichols, 2008). However, becoming a learning community can be thought of as both a means and a goal for an online classroom; not all classes are able to achieve full development of this potential (Swan & Shea, 2005).

This chapter analyses the literature on the drivers and barriers in eLearning. It became evident that few articles examine the risks associated with eLearning developments. The chapter summarises and diagrams a model of the relationship between four main barriers and drivers that encourage the uptake of eLearning, which are: infrastructure, finance, policies, and culture. This is called the IFPC model.

4.2 Drivers in eLearning

This review focuses on various organisations that have published on eLearning, to answer the question: *What were the key drivers for them to engage in eLearning?*

The literature suggests that there many situations in which students engage with eLearning. Childs et al. (2005), Sutton et al. (2005) and Lindh et al. (2007), present the key drivers that enable students to engage with their online study successfully. These are shown in Table 4.1.

Table 4.1 Suggestions key drivers of eLearning

Key drivers in eLearning	Authors
Standardization Strategies Funding Integration of eLearning into the curricula Blended teaching User friendly packages Access to technology Skills training Support Employers paying eLearning costs Dedicated work time for eLearning	Childs et al. (2005)
The programme is mature Analysis of the accumulated case-study material Provides evidence to support a set of good practices Development and delivery of the course	Sutton et al. (2005)
Improving cost/course material Efficiency/Improve flexibility in time and space Simplification of administrative process Meeting student expectations Collaboration with other universities Reaches students far away Enabling collaboration among students taking part in off-campus courses	Lindh et al. (2007)

Additionally, to make online education work, Benninck (2004) suggested that tapping into the actual needs of the organisation and the learners is the key to success.

She stated that a key message is to learn from others' experiences, to utilise their skills and expertise, and where possible form partnerships with organisations with similar or complementary needs. Harasim (1999) analysed the main problems in using generic networking environments for education. She provided better main strategies to encourage online learning, including:

- A standard way to organize course material
- Prior evidence of the environment's effectiveness in instructional uses
- Tools to support basic instructional activities, such as course design, organization of group spaces and personal space, grading, and easy integration of multiple media files
- Models to support learning strategies that involve collaborative learning, knowledge building, and multiple representations of ideas and knowledge structures.

Hall (2002) suggested six steps to eLearning success that will help the understanding of ways to implement eLearning courses. These are:

Step 1: *Prepare for eLearning*. Careful analysis and planning before conducting a detailed readiness assessment; consider performing a strategic assessment to determine the major barriers of organisation.

Step 2: *Develop a Strategy*. This step has three levels for developing an eLearning strategy that correlate to an organization's experience with eLearning. These are: little or no eLearning experience, two or more successful basic eLearning projects, and two or more successful intermediate or advanced eLearning projects.

Step 3: *Select Technology and Content*. This fundamental step has two major parts for an eLearning programme: a Learning Management System (the software to register and track learners), and content (the material your employees will learn).

Step 4: *Sell eLearning to everyone in the Organisation*. This includes leading the charge, assembling a team, partnering with IT, and marketing eLearning internally.

Step 5: *Implement Enterprise-Wide*. Enterprise-wide eLearning is typically aimed at one or more of these benefits:

- Access: Making training more available to learners
- Costs: Reducing training costs
- Content: Increasing the scope of offerings
- Reinvention: Re-engineering how training happens

- Relevance: Making training more meaningful to people's work
- Speed: Responding to constant change and rapid product innovations
- Efficiency: Avoiding the lock-stepped scheduling of classroom training
- Empowerment: Putting the responsibility for learning in the hands of learners
- Business: Using fast, effective learning as a competitive weapon
- Globalization: Making training both consistent and available across the world
- Convenience: Letting time-pressured students learn at the best time and place
- Connection: Connecting learning data to other systems

Step 6: *Measure the Business Benefit*. In this step, Hall (2002) suggests that the results should be communicated to stakeholders in three areas: reports to senior teams, associated learning gains, and addressing performance associated gains.

Mungania (2003) verified that successful eLearning demands social, cognitive, and behavioural skills. The three pillars (see Figure 4.1 below) that determine the success or failure of eLearning programs are the interconnectedness among persons (e-learners' cognitive skills), behaviour, and environment. She suggested that:

- eLearners must have the prerequisite knowledge and skills necessary to participate in eLearning; also, computer competency through training, and practice, and time management skills are essential
- Environment: Organizations must support eLearning by offering a supportive culture, incentives, models, resources, and fostering eLearning self-efficacy
- Belief and Behaviour: e-learners must have high eLearning self-efficacy and the appropriate behavioural skills such as taking responsibility for learning (Mungania, 2003).

The diagram connected with those three major areas is presented in Figure 4.1 (Mungania, 2003).

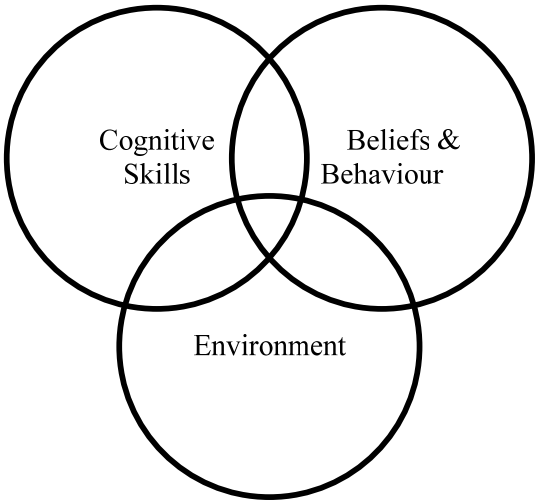


Figure 4.1 Three pillars of successful eLearning

4.3 Barriers to eLearning

In this section, the literature is reviewed to investigate the impact and effective use of online learning or eLearning. Whilst eLearning has potential, its success is significantly limited by its context, which influences its degree of sophistication and integration and its ability to contribute to the corporate university learning processes and outcomes (Homan & Macpherson, 2005). However, there are disadvantages in eLearning for both the teachers and learners as discussed by Harun (2001), Childs et al. (2005), Lindh et al. (2007), and Moule (2006). There are:

- lack of time
- lack of knowledge about technology
- lack of technical support
- lack of money
- lack of strategies or leadership
- institutional culture.

Although focussing on the learner has improved the quality of eLearning provision, damage has unfortunately been done in terms of the perception of eLearning (Benninck, 2004). According to Childs et al. (2005), the main barriers to implementing eLearning courses were:

- requirement for change
- costs
- poorly-designed packages

- inadequate technology
- lack of skills
- need for a component of face-to-face teaching
- time intensive nature of eLearning
- computer anxiety

Subsequent researchers also argued that the main barriers to eLearning are lack of mission and vision in implementing online learning and teaching, such as having the policies on eLearning; this includes the lack of knowledge of technologies. For instance, Lindh et al. (2007) found that teachers experienced limited support from the university management in their ambitions to develop eLearning. It was especially evident to Keller and Cernerud (2002) that lack of incentives for teachers was an important barrier to eLearning development. They also observed that the strategy of implementing an eLearning system at the university had a more important influence on students' perceptions than the individual background variables. Students did not regard access to eLearning on campus as a benefit. They also found that male students, students with previous knowledge of computers, and students with positive attitudes to new technologies, were all positive towards eLearning on campus compared with other students.

People from different parts of the world, with their own cultures, will react differently to online learning. Living in the developed world is different from the developing world, particularly in terms of culture, climate, attitudes and behaviours, motivation, and social factors. Hence, when providing online learning in the developing world, models and approaches produced for developed countries should be not be imported without first ensuring the underlying assumptions and concepts remain relevant. For example, research on using technology in Malaysia, a developing country, reported that women are still under-represented in almost every aspect of computer culture (Sharma & Ignou, 2003). The authors relate this to the assumption in Malay culture that women are primarily the carers of the family and the children (Sharma & Ignou, 2003).

Barton et al. (2007) found that key academic teachers, by making an effort to reach out and engage with people and to build trust, have played a significant role in the development and establishment of online teaching and learning in Turkey.

According to Sharma and Ignou (2003), there are several barriers that hinder the growth of ICT in developing countries. They identified six barriers, which are outlined below.

- Infrastructural Barriers: e.g. the high price of computers and low penetration of internet and telephones
- Policy Planning by Governments: this depends largely on the policies designed to popularize ICT in the education sector
- Political Factors: the political powers of any nation greatly affect the introduction of new technology. If the political leaders favour technology, it will blossom.
- Economic Factors: four major economic considerations that could affect the adoption of ICT in a country include financial strength of the nation, attitudes of policymakers, budget allocation for the technology, and cost-efficiency of the technology
- Cultural Factors: there are certain specific contexts and socio-cultural variables, such as, gender, age, caste, class, ethnicity and educational attainment, which affect the access to and use of ICT. In particular, a cultural factor – language education – was found to be the key barrier to the use of ICT by women in Bangladesh, and was a major barrier in developing counties where English is not so widely spoken.
- Other barriers include the low social status of women, and women and girls not being allowed to study, as they are expected to attend to domestic chores, etc.

In researching the likelihood that eLearning will have a real impact on levels of participation in lifelong learning, Gareis (2005) found that the main barriers to engaging in adult education activities were

- Too much time taken up by family or work
- Times of courses are inconvenient
- People prefer to spend free time doing other things
- Employer does not offer training.

Additional barriers to lifelong learning were also shared by all those who looked for training courses: having to pay the fees charged for courses, lack of good training offers locally, and lack of information about available courses (Gareis, 2005).

Models are being developed to understand the impact of eLearning. Mungania (2003) has suggested that the barriers to eLearning lie in three areas: the seven eLearning barriers, the four significant predictors of eLearning, and the other influential variables. The framework is shown in Figure 4.2 below, (Mungania, 2003). This

particular critique details the eLearning environment, which mostly covers investigation of the impact of online learning.

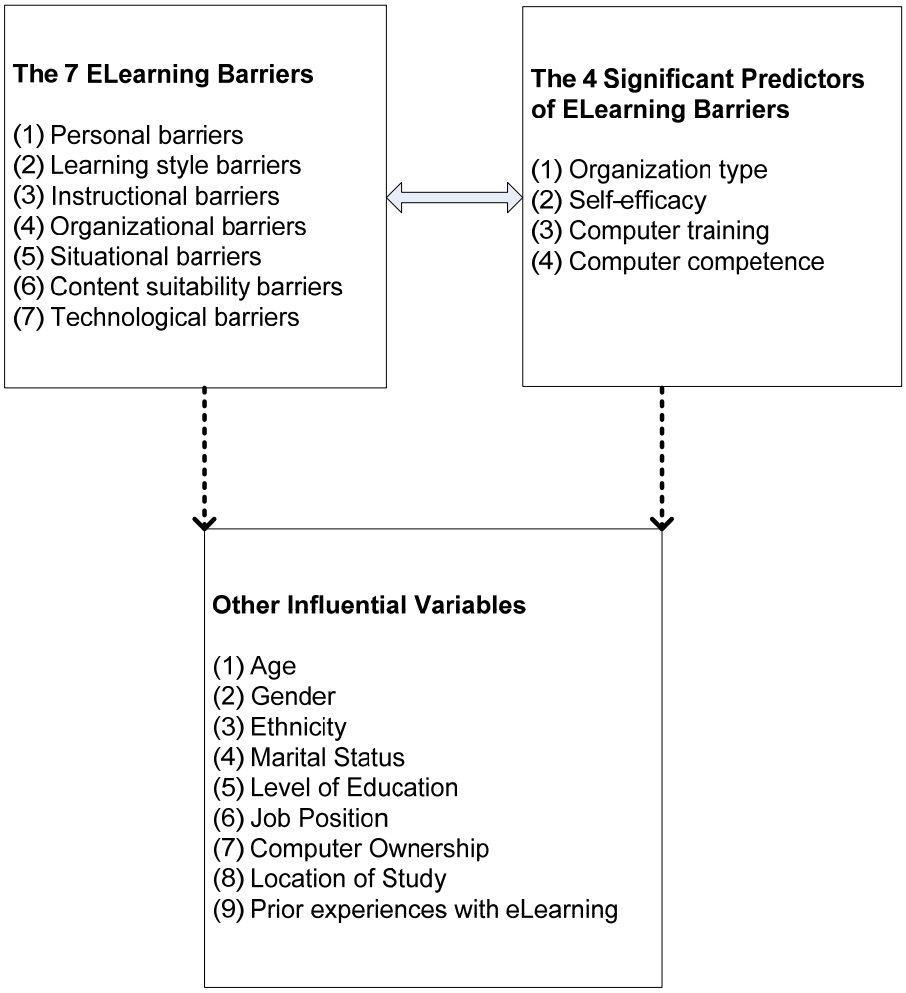


Figure 4.2 eLearning Barriers and Predictor Variables

Harris et al. (2004) proposed another framework, which criticized the impact of eLearning within Further Education (FE) in the UK. Their findings indicated that

- key informants were positive about the effect of eLearning on participation, retention and attainment, with potential impact thought to occur by creating a sense of engagement, excitement and involvement
- personalisation of the learning interface to individual needs
- improving communication.

They also showed that technological infrastructure was now thought to be generally acceptable within further education. There was a view that there was still a need to develop teachers' skills and confidence in using eLearning across the curricula, with implementation varying greatly between subjects and departments. Leadership and

Management were seen as key to effective implementation (Harris et al., 2004). The detail is shown in Figure 4.3 below.

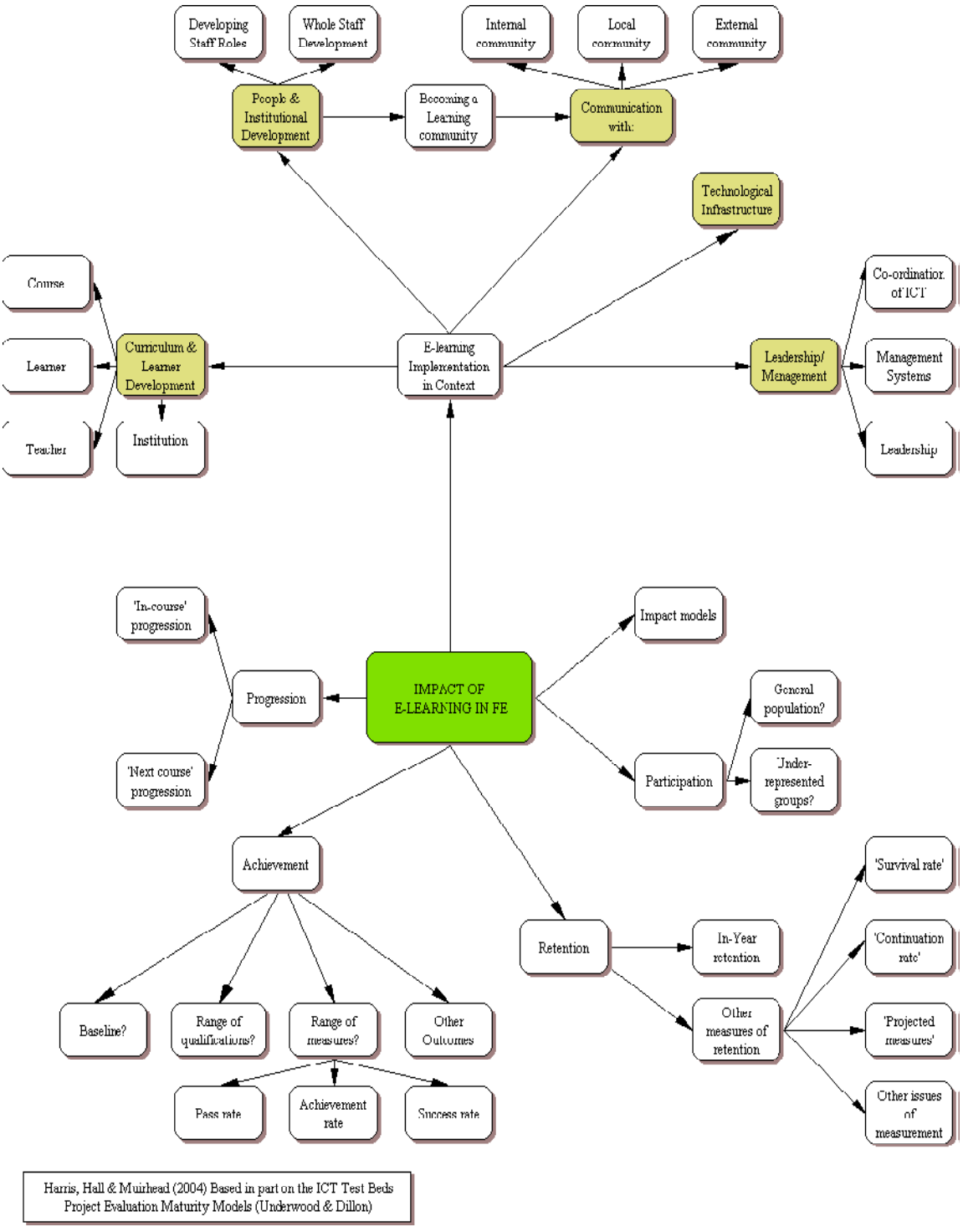


Figure 4.3 Framework for the scoping study on impact of eLearning within Further Education

4.4 Summary of barriers and drivers of eLearning

The literature cited above demonstrates that the drivers and barriers have been raised as single issues, but some interact with each other. The result of a successful implementation of eLearning is one that engages all the stakeholders, especially the students and the teachers.

From all this literature, the summary of barriers and drivers in eLearning that are concerned with planning in eLearning, is shown in Table 4.2.

Table 4.2 Summary of barriers and drivers in eLearning

Drivers of eLearning	Barriers of eLearning	References
Standardization Strategies Funding Integration of eLearning into the curriculum Blended teaching User friendly packages Access to technology Skills training Support Employers paying eLearning costs Dedicated work time for eLearning	Requirement for change Costs Poorly-designed packages Inadequate technology Lack of skills Need for a component of face-to-face teaching Time intensive nature of eLearning Computer anxiety	Childs et al. (2005)
The programme is mature Analysis of the accumulated case-study material Provide evidence to support a set of good practice Development and delivery of the course	Teachers experienced Limited support from the university management in their ambitions to develop eLearning	Sutton et al. (2005)
Improving cost/course material Efficiency/Improve flexibility in time and space Simplification of administrative process Meeting student expectations To collaborate with other universities To reach students far away Enabling collaboration among	Lack of time Lack of knowledge about technology Lack of technical support Lack of money Lack of strategies or leadership Institutional culture	Lindh et al. (2007)

Drivers of eLearning	Barriers of eLearning	References
students taking part in off-campus courses		
Tapping into the actual needs of the organisation and the learners is the key to success Learn from others' experiences to utilise their skills and expertise	The cost of purchasing and maintaining a learning management system was prohibitive for many of the smaller organisations. Difficulty in knowing what is the best way to approach eLearning. Organisations are literally bombarded by vendors trying to sell expensive products and services. Lack of understanding of eLearning and how it can be used leading to; inertia, ineffective models of eLearning. Training personnel resistance Staff resistance Lack of time and/or skilled training personnel Lack of support from all levels and stakeholders within the organisation Bandwidth issues can be a problem-sometimes more in metropolitan sites than regional areas. Lack of basic computer and Internet skills of learners Copyright issues	Benninck (2004)
Achieving life-long learning Fulfilling personal interests Time-saving based on job needs Information diversity Flexibility in time and space Self-regulated learning Cost-effectiveness Less impact on family life and duties	Poor computer competence Lack of a personal computer or no internet access Heavy work load Heavy family duties Conflict with personal preferences Heavy economic burden Lack of motivation Low self-control	Yu et al. (2007)
A standard way to organize course material Prior evidence of the environment's effectiveness in instructional uses Tools to support basic instructional activities, such as course design, organization of group spaces and		Harasim (1999)

Drivers of eLearning	Barriers of eLearning	References
personal space, grading, and easy integration of multiple media files Models to support learning strategies that involve collaborative learning, knowledge building, and multiple representations of ideas and knowledge structures		
Prepare for eLearning Develop a Strategy Select Technology and Content Sell eLearning to everyone in the Organisation Implement Enterprise-Wide Measure the Business Benefit		Hall (2002)
eLearners must have the prerequisite knowledge and skills necessary to participate in eLearning; also, computer competency through training, and practice, and time management skills are essential Environment: Organizations must support eLearning by offering a supportive culture, incentives, models, resources, and fostering eLearning self-efficacy Belief and Behaviour: e-learners must have high eLearning self-efficacy and the appropriate behavioural skills such as taking responsibility for learning	Personal barriers Learning style barriers Instructional barriers Organizational barriers Situational barriers Content suitability barriers Technological barriers Organization type Self-efficacy Computer training Computer competence *Other Influential Variables* Age Gender Ethnicity Marital Status Level of Education Job Position Computer Ownership Location of Study Prior experiences with eLearning	Mungania (2003)

4.5 Summarized into four categories of IFPC

For this research, the drivers and barriers for eLearning are divided into four domains: Infrastructure, Finance, Policies, and Culture, as shown in the IFPC model in Figures 4.4 and 4.5 below. The IFPC model ensures that the essential factors of drivers in eLearning in each domain are made clear when planning and managing online learning, and that the domains are connected to each other. For example

1. *Infrastructure*: in order to establish online courses, infrastructure is necessary for running the programme, such as computers, telephone, and internet connections
2. *Finance*: having sufficient funding is essential to cover the cost of planning, implementing, and managing the programme
3. *Policy*: strategies are needed to support and encourage people to engage with the courses, such as teachers, students, staff, and policymakers
4. *Culture*: there is a need to be aware of this when employing the courses in different parts of the world, particularly of gender, age, caste, class, ethnicity, beliefs, values, attitudes and behaviour, and educational attainment. These need to be fully understood.

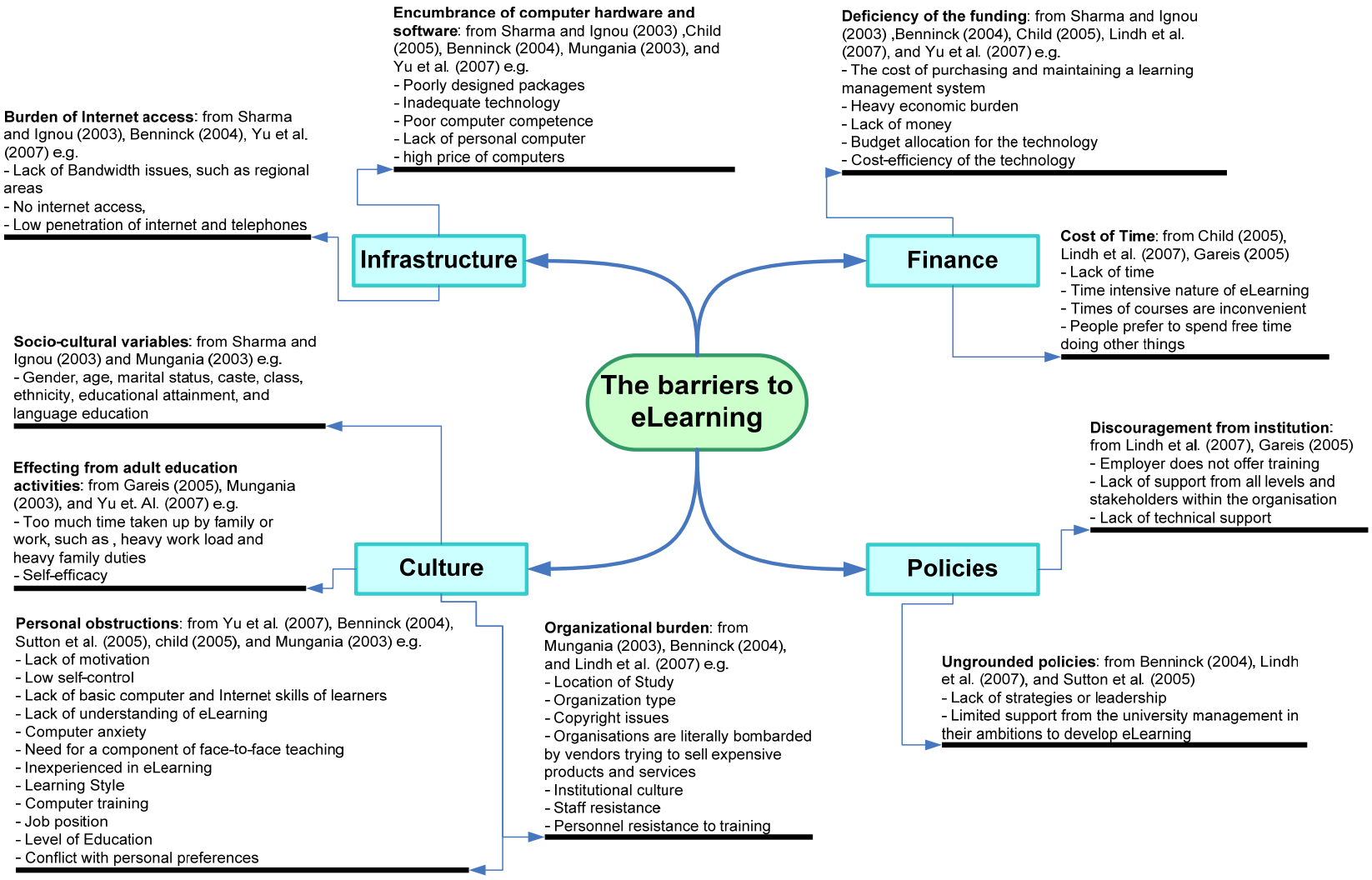


Figure 4.4 Summary of four main barriers (IFPC) affecting eLearning

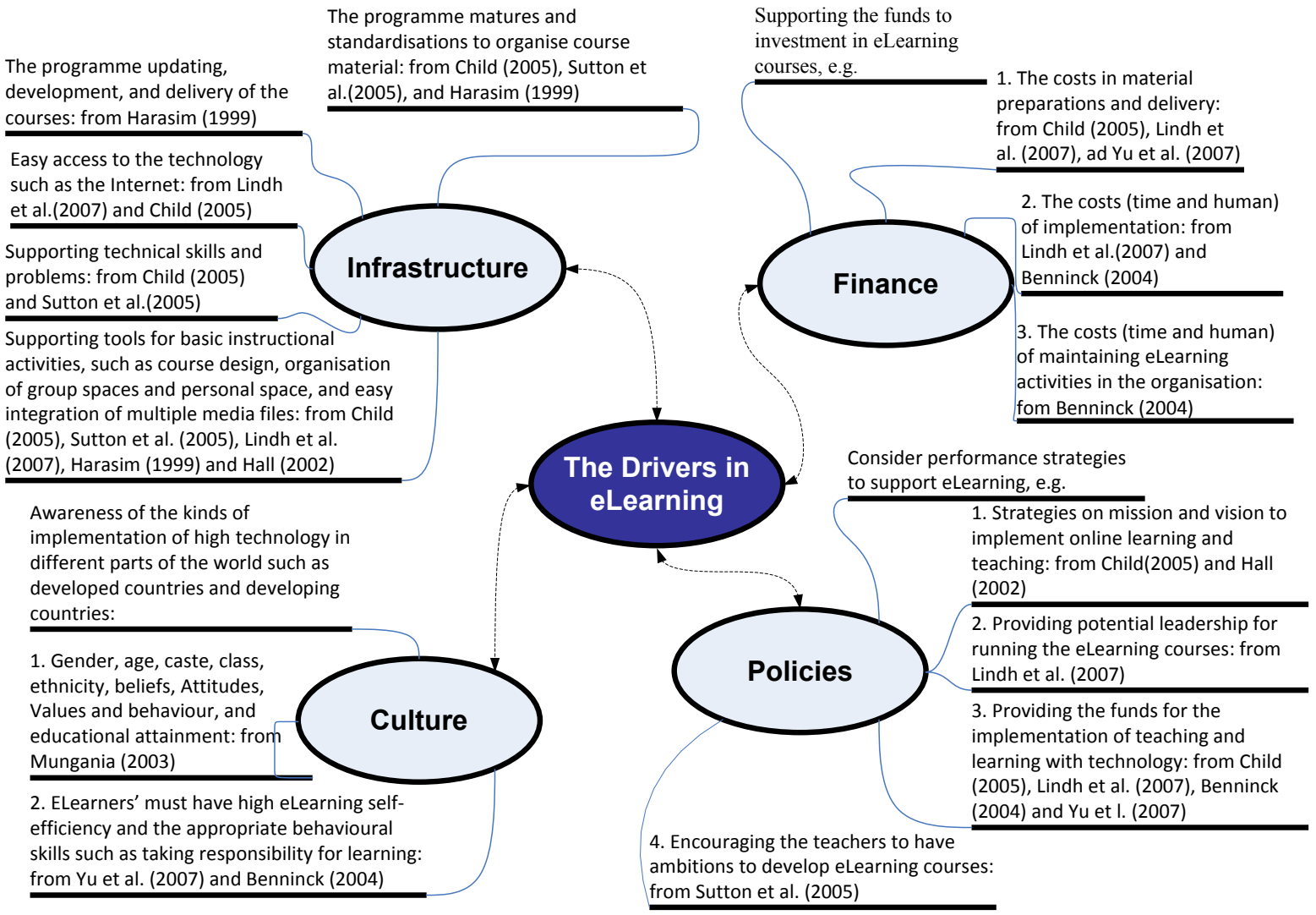


Figure 4.5 Summary of four main drivers (IFPC) for implementation of eLearning

4.6 Summary

The reviews have shown the drivers and barriers in eLearning. It is important to analyse the field of healthcare, specifically the situation of learners. These drivers and barriers not only occur in the eLearning process, but also in the development of more sophisticated programmes and tools especially designed for eLearning courses, which will enhance the eLearning process.

However, understanding the drivers and barriers in eLearning will encourage the categories of people mentioned to engage in implementation of eLearning courses, such as students, teachers, and policymakers. A new model has been proposed to assist planners in this research. The IFPC model includes essential concepts that are believed to be important when implementing eLearning in rural Thailand.

Chapter 5

eLearning at Work: A Pilot Study

5.1 Introduction

This chapter presents a pilot study examining the challenges in eLearning for healthcare professional students. This research looked at an exemplar university in a rural area of Thailand that has established an eLearning course for healthcare professional students. The eLearning course is based in the Faculty of Public Health at Maha Sarakham University (MSU); the course is a Masters' degree called *MSU eLearning*. This qualitative research employed four methods: a survey questionnaire, in-depth interviews, group discussions, and observations. The questions used in this investigation were adapted from the Technology Acceptance Model (TAM) (Davis, 1985) and Learning Styles group (Clarke, 2004). This chapter reports the research in six sections: the Thailand environment, the background to MSU eLearning, research questions, research method, the results, and summary.

5.2 Regions of Thailand

Thailand consists of four regions, called the North, the North East, the Central and the South (see Figure 5.1). The population is about 67.7 million

(2010, est.)[1], of which 32.9 million are male and 34.1 million are female. Thailand is bordered by Myanmar to the north and the west, Laos P.D.R., to the North and North East, Cambodia to the South East and Malaysia to the South. The country comprises 76 provinces that are further divided into districts, sub-districts and villages. Bangkok is the capital city and the centre of political, commercial, industrial and cultural activities. The people who live in the different areas of Thailand have different weather and culture, in particular the north and the south. The basic statistics of Thailand are shown in Table 5.1. This section later presents information about the number of healthcare professionals who work in Thailand.

Figure 5.1 The four regions of Thailand[2]

[1] National Statistical Office of Thailand (web.nso.go.th/index.htm)

[2] Source: www.mythailand.ch/blog/?page_id=9

Table 5.1 Basic Statistics for Thailand, 2008-2009

Population	
Total (million) 2009	67.76
Density (per km^2) 2009	132
GDP	
Total (US$ billion) 2008	273.25
Per capita (US$) 2008	4055
Ratio of mobile cellular subscriptions to fixed telephone lines	11.8:1

Source: International Telecommunication Union (ITU)

5.3 Cultural Concerns

Thailand is a constitutional monarchy whose present king is His Majesty King Bhumibol Adulyadej, King Rama IX, or the ninth king of the Chakri Dynasty. The King has reigned for more than half a century, making him the longest reigning Thai monarch. Thailand embraces a rich diversity of cultures and traditions.

5.3.1 The weather

The weather in Thailand is almost always wet. From May to September there are warm, rainy winds, called monsoons. From November to March, there are dry periods with cool monsoons. The long, narrow, peninsula that forms the southern part of Thailand is always hot and humid.

5.3.2 Social values

The population of Thailand comprises different ethnic groups of people, of which the Thais form 75%, the Chinese form 14%, and others 11%. The literacy rate of the Thai people is 92.6%, for those who are aged 15 and over (2000 census).

5.3.3 Religion

Buddhism is the main religion in Thailand, followed by 94.6% of the population. However, other religions are represented, such as Islam 4.6%, Christianity 0.7%, and others 0.1% (2000 census).

5.3.4 Language

The official language is Thai. However, in some places English is usually the second language of the elite. There are a few local languages, which are found around the borders of Thailand, large areas of the NE speak either Isaan Lao or Khymer.

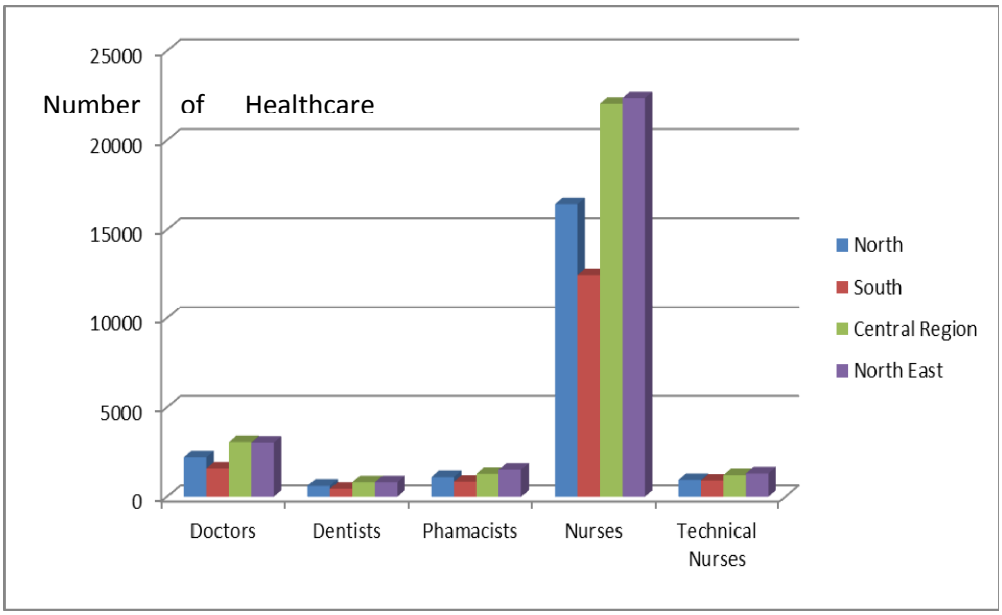
5.4 ICT Infrastructure of Thailand

Penetration of the internet into households is key to achieving several ICT development-related targets (World Summit on the Information Society (WSIS) Targets and Millennium Development Goals (MDGs)) and is important, not only for economic but also for the socio-economic benefits associated with it. These are: digital inclusion, access to knowledge and information, acquisition of skills increasingly demanded in a range of occupations and sectors, and school performance (ITU, 2010). The relevant information relating to healthcare professionals, the data on household use of the internet in Thailand, and price paid for ICT by developed and developing countries is now shown.

5.4.1 Information relating to Healthcare Professionals

The following diagrams show the number of healthcare professionals who work in each region of Thailand, and in Bangkok, what they do and their facilities (see Chart 5.1, Chart 5.2, and Table 5.2).

Chart 5.1 Number of Healthcare Professionals in Thailand, 2008



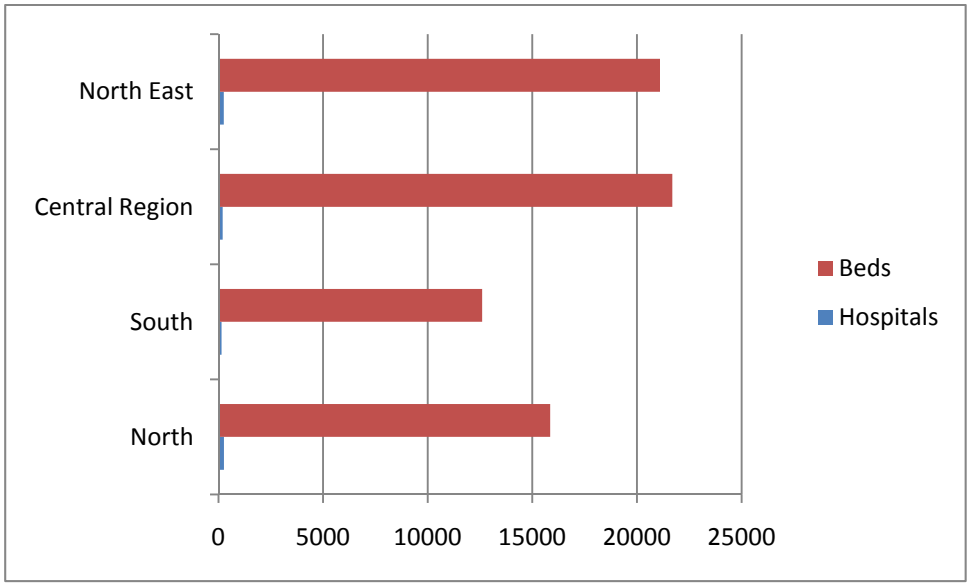
Source: Bureau of Policy and Strategy, Ministry of Public Health, Thailand

Table 5.2 Staff working for the Ministry of Public Health, 2006

Occupations	Number	%
Nurses	69,142	40.8
Public Health Technical Officers	14,772	8.7
Technical Nurses	13,495	8.0
Public Health Officers	13,030	7.7
Medical Doctors	11,571	6.8
General Administration Officers	9,555	5.6
Statistics Officers	5,936	3.5
Pharmacists	5,767	3.4
Dental Nurses	4,311	2.5
Pharmaceutical Assistants	3,184	1.9
Medical Technician Assistances	3,074	1.8
Dentists	2,884	1.7
Radiological Technologist	1,545	0.9
General Service Officers	1,404	0.8
Medical Technologist	1,148	0.7
Statistical Officers	1,067	0.6
Technician Officers	831	0.5
Medical Scientist	744	0.4

Source: Ministry of Public Health, Thailand

Chart 5.2 Number of hospitals and their beds in Thailand, 2008



Source: Bureau of Policy and Strategy, Health Ministry, Thailand

Table 5.3 illustrates the ratio between doctors and the population in Thailand. The data shows the situation in the four regions of Thailand, as well as in Bangkok.

Table 5.3 Ratio of doctors to population in Thailand, 2008

Regions	Doctors : Beds	Beds : Population
Bangkok	1 : 4	1 : 196
Central region	1 : 7	1 : 386
North East	1 : 7	1 : 723
North	1 : 7	1 : 490
South	1 : 7	1 : 497
Total	1 : 6	1 : 450

Source: Bureau of Policy and Strategy, Ministry of Public Health, Thailand

5.4.2 Household use of the Internet in Thailand

This section focuses on recent household data on internet use in Thailand (see table 5.4 and table 5.5), in particular, the difference in the price paid for ICT between developed and developing countries (see chart 5.3).

Table 5.4 Public ICT statistics for Thailand, 2009

ICT statistics database	
The Internet	
Subscriptions (000s)	No information available
Subscriptions per 100 inhabitants	No information available
Users (000s)	17,486
Users per 100 inhabitants	25.8
Broadband Subscriptions	
Total (000s)	994
Per 100 inhabitants	1.47

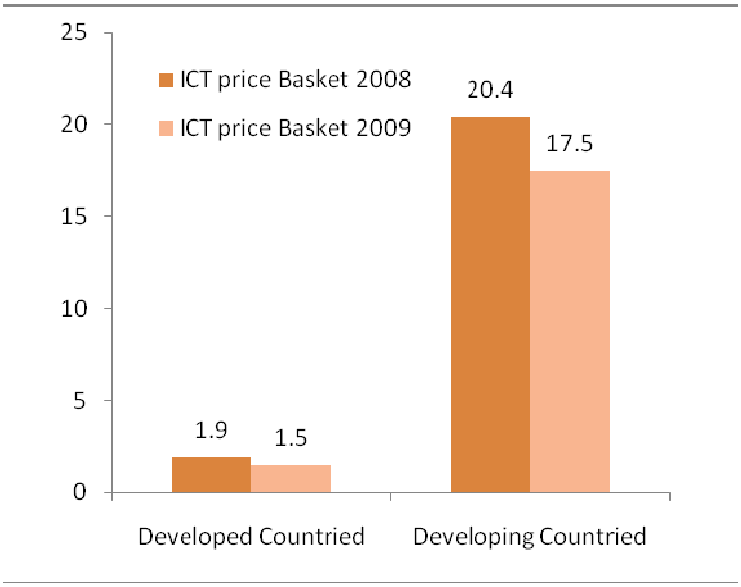
Source: International Telecommunication Union (ITU)

Table 5.5 Main telephone line statistics for Thailand, 2009

Main Telephone lines	
Fixed telephone lines	
2004 (000s)	6,811
2009 (000s)	7,024
Compound Annual Growth Rate (CAGR) (%) 2004-2009	0.6
Fixed telephone lines per 100 inhabitants	
2004	10.43
2009	10.37
CAGR (%) 2004-2009	–0.1

Source: International Telecommunication Union (ITU)

Chart 5.3 Price paid for ICT equipment per year by developed and developing countries



Source: International Telecommunication Union (ITU)

5.5 The background to MSU eLearning course

Maha Sarakham University is located in the Khamriang District of Maha Sarakham province, North-Eastern Thailand as shown in Figure 5.2. It is a community-based institution, placing special emphasis on passing on knowledge and wisdom to rural people in what is Thailand's poorest region, and utilising a range of educational systems and modern technologies. In addition, MSU takes a leading role in research in this part of North-Eastern region and has taken part in many international collaborations (Mahasarakham University, 2008).

The motto of the Faculty of Public Health at MSU is "*Learning in the Workplace and Lifelong Learning*." Its mission is the development of well-trained public health personnel and promotion of well-being among the rural communities of Northeastern Thailand.[3] At the same time, the Faculty is committed to increasing the numbers of high quality graduates and postgraduates completing professional courses. Thus, teaching and training courses should be aimed at high technology environments. One of the mission's goals is to adopt relevant trends in teaching curricula. Hence technology is

[3] http://www4.msu.ac.th/public_health/web2/index.asp

adopted because the University wishes to satisfy this goal. Students, trainees and educators should be able to access modern technologies anytime and anywhere.

The Faculty admits about 200 healthcare students annually to take the eLearning course. While the course is based at the main campus in Maha Sarakham province, students come from all parts of Thailand. There are also satellite campuses around the Northeast of Thailand, in Nakhon Phanom, Nakhon Ratchasima, Sisaket, Buriram, Udon Thani, and Surin, as shown in Figure 5.2[4].

Offering courses for healthcare professional students in Northeast Thailand will provide a means to engage them with advanced knowledge and information. This should help them improve their professional competency.

Thornett (2006) listed several varieties of teaching structure that can be used for healthcare professional students: the traditional face-to-face delivery mode, and access to materials that respond to change, depending on current priorities within the healthcare environment. The traditional mode requires expensive infrastructure and student attendance, which can be particularly difficult for healthcare professional students who have to take time off work to attend classes.

[4] http://www.mapsofworld.com/thailand/thailand-map.html

Figure 5.2 The map of Thailand and sites of Faculty of Public Health, MSU campus

The MSU eLearning course was developed in 2002, through collaboration between the Ministry of Public Health and the Faculty of Public Health at Maha Sarakham University, and matches the established Faculty aims of promoting

learning in the workplace and lifelong learning. The course was first offered on two university campuses, one in Nakhon Ratchasima province and at the main campus in Maha Sarakham province. It was introduced into a few modules first: Health and Management, Applied Epidemiology, Public Health Research Methodology, Applied Statistics for Public Health Research and Public Health Policy, as shown in Figures 5.3 and 5.4. These modules offer the MSU course through a blended eLearning mode.

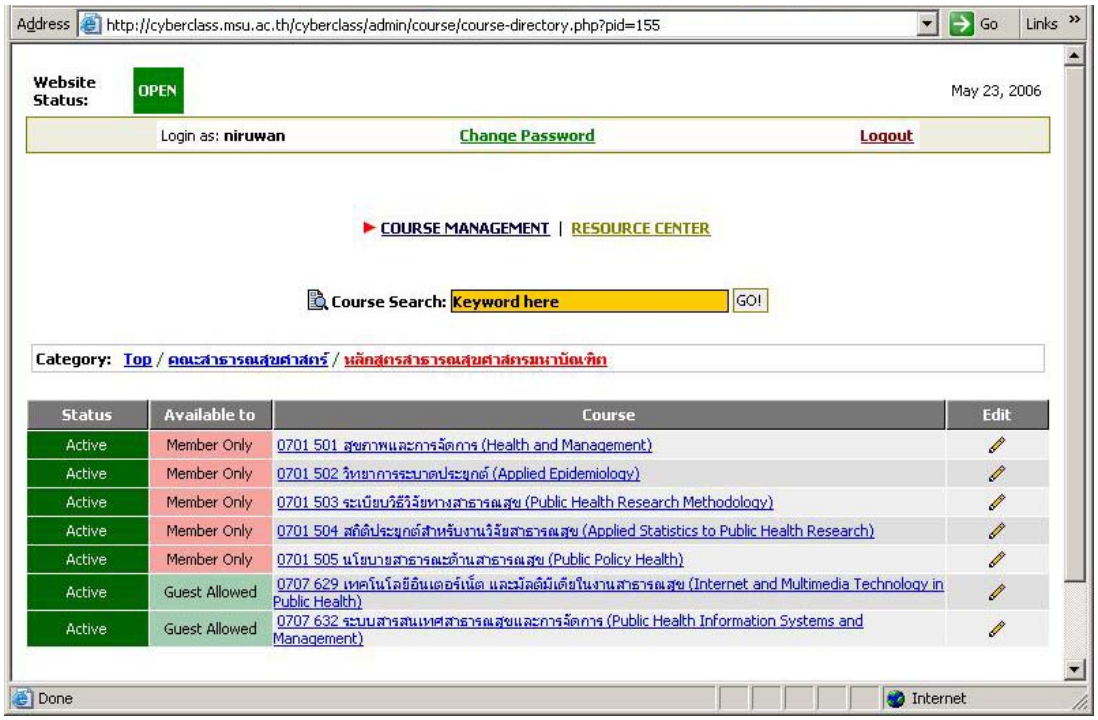


Figure 5.3 Homepage for the MSU eLearning course

5.6 Research Questions

This research was conducted to investigate six research questions.

1. What sources of information do health professional students use in general?
2. What electronic information do students report that they need to use in their everyday work?
3. To what extent do they use electronic information (as opposed to other forms of information) in everyday work situations?
4. What factors do health professional students say affect the use or non-use of electronic information?

5. What learning styles do these healthcare professional students exhibit?
6. What do healthcare professional students and their lecturers think about MSU eLearning?

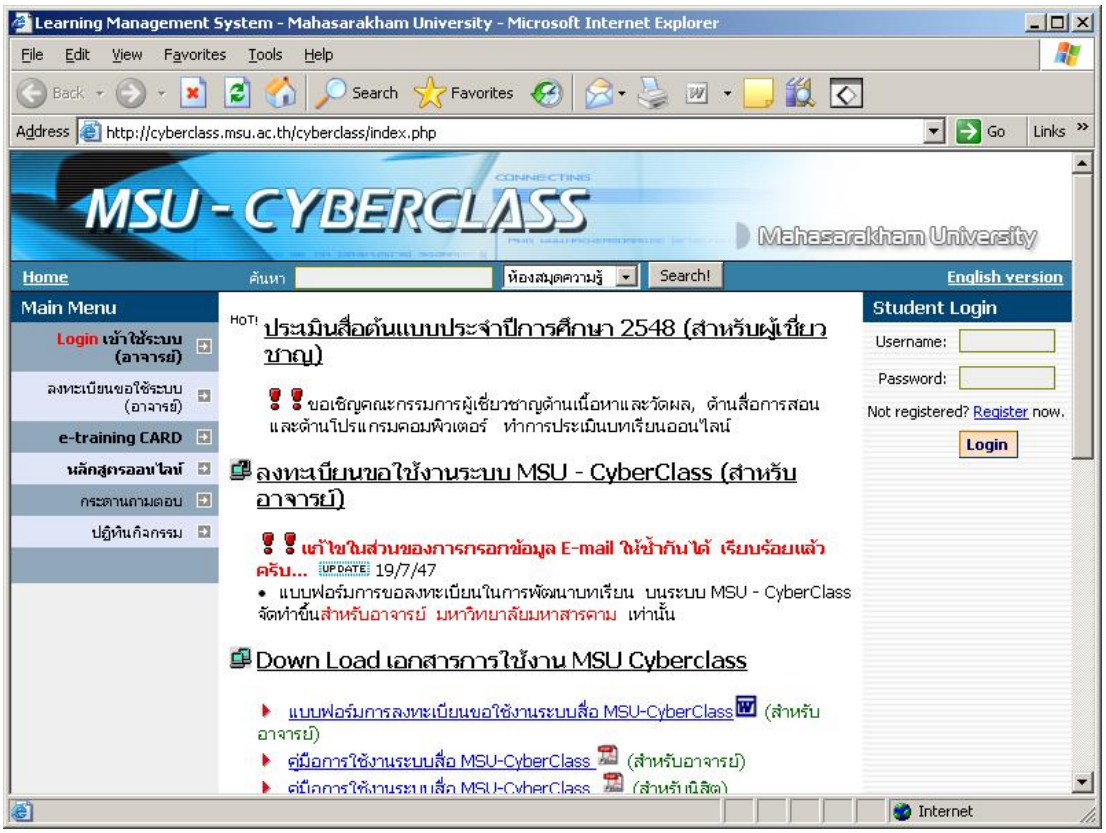


Figure 5.4 Main page for the MSU eLearning course

5.7 Research Method

This initial study used both quantitative and qualitative research methods in two phases. Phase 1 used a survey, while phase 2 used in-depth interviews, group discussions, and observations. The detail of the data collection is shown in Figure 5.5.

In order to understand, '*what is the research going to do*', Table 5.6 below shows the link between the research questions and the research methodology.

Table 5.6 Links between research questions, theory, and methods

Research Question	Theory	Methods
What sources of information do health professionals use in general?	Technology Acceptance Model (TAM) (Davis, 1985)	Questionnaire and Interviews
What electronic information do students report that they need to use in their everyday work?	Technology Acceptance Model (TAM) (Davis, 1985)	Questionnaire and Interviews
To what extent do they use electronic information (as opposed to other forms of information) in everyday work situations?	Based on Campbell (2004)	Interviews
What factors do health professionals say affect the use or non-use of electronic information?	Based on Campbell (2004)	Interviews, Observation
What learning styles do healthcare professionals exhibit?	Clarke (2004)	Questionnaire
What do healthcare professionals and their lecturers think about MSU eLearning?	Based on Campbell (2004)	Interviews, Group discussion

Provisional timetable for research

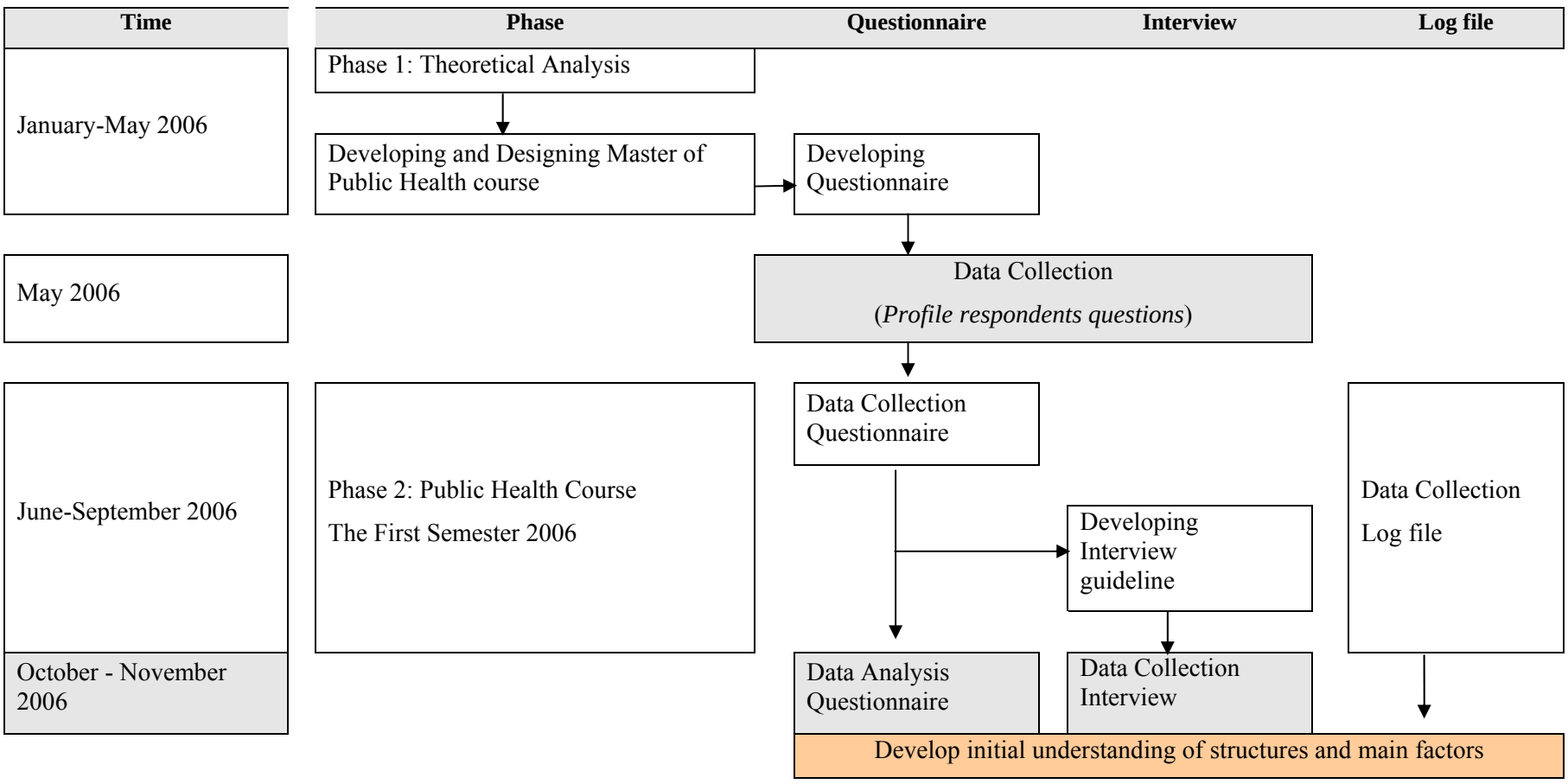


Figure 5.5 Planned Timetable for Data Collection

5.7.1 Phase 1: Survey of respondent profiles

Phase 1 took place before the eLearning course started. The questionnaire adapted the questions from the Technology Acceptance Model (TAM) (Davis, 1985) **to** answer the questions 'what do healthcare professional students perceive as useful in information technology?' and 'what do they perceive as ease of use of information technology?'

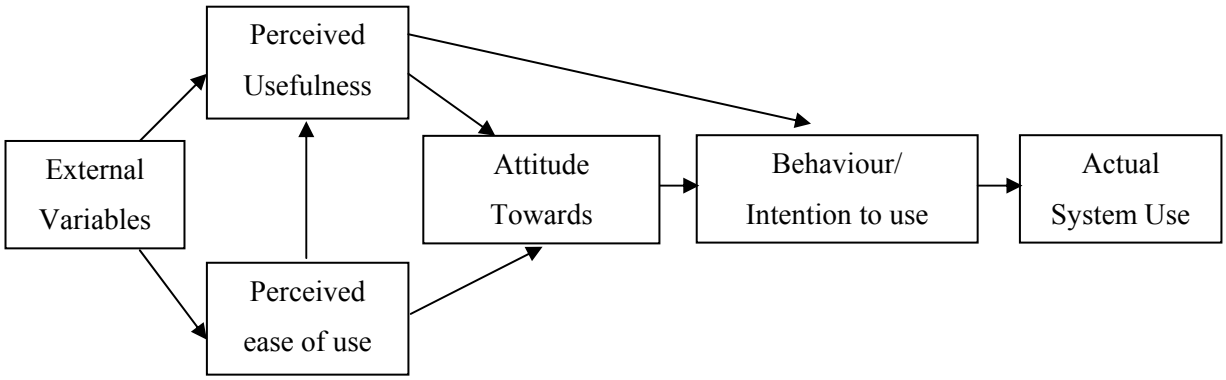


Figure 5.6 Original Technology Acceptance Model

This study also investigated the learning styles of these healthcare professional students, in order to answer 'what are the learning styles of healthcare students?' The questions were adapted from Clarke (2004) who suggested that the appropriate presentation of material in eLearning should consider the students' preferences in terms of their seeing, hearing and doing (Clarke, 2004), as shown in Figure 5.7.

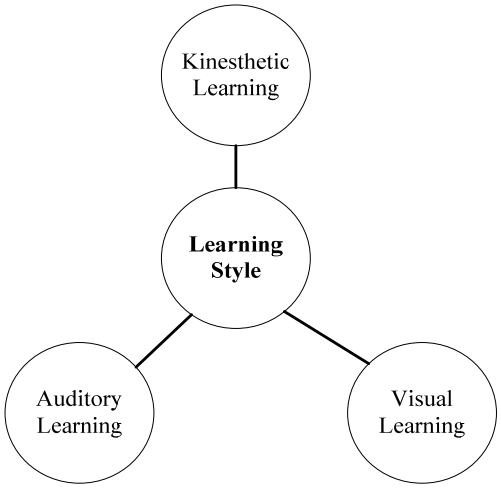


Figure 5.7 The Learning styles

5.7.2 Phase 2: Understanding of structures and factors

In phase two, a number of methods were used to investigate the structure and factors that affected the attitudes of healthcare students when using electronic information and MSU eLearning within this environment. These were: interviews, group discussions, and observations, and were conducted while the healthcare students were studying in term time.

1) Interview

This study interviewed 23 of the 30 healthcare professional students who attended the eLearning class of the academic year beginning October 2006. The purpose of the interviews was to support the quantitative data from the survey (see Appendix A). Two different types of interview were used: a structured interview, and a semi-structured interview for evaluation. Denscombe (2007) considers that there are three types of interview method: structured interviews, semi-structured interviews, and unstructured interviews. Each uses a different approach. Structured interviews are often associated with social surveys, where researchers are trying to collect large volumes of data from a wide range of respondents. Semi-structured interviews are prepared to be flexible in terms of the order in which topics are considered, and perhaps more significantly, to let the interviewee develop ideas and speak more widely on issues raised by the researcher. The answers are open-ended, and there is more emphasis on the interviewee elaborating points of interest. Thus, the structured interviews here consisted of administering structured questionnaires, and interviewers were trained to ask questions (mostly fixed choice) in a standardised manner, whereas the semi-structured interviews were conducted on the basis of a loose structure consisting of open-ended questions that defined the area to be explored (Britten, 1995) (see Appendix B).

2) Group discussion

The 23 healthcare eLearning students were invited to discuss MSU eLearning. Students gave their permission to record the session on video tape. Unfortunately, it was not possible to separate such a large group discussion into smaller groups, owing to limited time. The students were encouraged to give their opinions on '*how MSU eLearning and information technology affected their study life*.' However, only five healthcare students gave their opinions. These fell into three areas: 1) the facilities for access to the internet, 2) the design and content of the eLearning module, and 3) the

communication of the course, e.g. chat room, web-board. The results are discussed in 5.5 below.

3) Observation

Observations are often supplemented with group discussions and interviews. The observation proved that this inference would have been incorrect, but this does not destroy the analytic usefulness of the original statements made to the fieldworker in an informal interview (Becker & Geer, 1957). Becker and Geer also stressed that many things we were observing might ordinarily be missed or misunderstood in such an interview.

The combination of observations, group discussion, and interviews, helps provide understanding of problems in greater depth. This combination of methods will identify the feasibility and real problems within the eLearning environment. This study therefore investigated not only healthcare professional students, but also looked at associated people who participated in the MSU eLearning environment. They were classed in the following four additional groups: administrative, tutors and lecturers, librarians, and pedagogy and curricula support.

5.8 The results

The results are presented in two phases. The primary investigation took one month and involved visiting students and staff who were engaged in the MSU eLearning course, and the distribution and collection of survey questionnaires. The second phase involved a three-month field study, consisting of interviews, group discussion and observations.

5.8.1 Survey

At the beginning of 2006, 30 healthcare professional students were studying in the Faculty of Public Health at Maha Sarakham University; 20 were studying Behavioural Sciences and Health Promotion, and 10 were studying Health Systems Management. There was a 100% response rate to the survey. Its was designed to investigate ‘how electronic information affected healthcare professional students

following an MSU eLearning project'. The survey questions were administered in Thai, an English translation of which is included as Appendix A.

The survey results are organized into four sections: Section 1 Information Applications; Section 2 Perceived Usefulness; Section 3 Perceived Ease of Use; and Section 4 Learning styles.

Section 1 Information Applications

This section presents how, and how often, the healthcare professional students use electronic information and how this solved their problems. This information is presented in Tables 5.7, 5.8, and 5.9.

Table 5.7 shows that most healthcare professional students access the internet from their workplaces (96.7%). Those that accessed the internet using a modem made up 69.6% of the sample. The categories of electronic information used most by respondents were e-mail and online learning (with 76.6% of the sample reporting that they made use of each of these). In the past five years, 50% of healthcare professional students used the internet to find out information more than once a week, while at the time of the survey (2006) 30% used the internet once a day and 30% once a week. Further, 43.3% of healthcare professional students experienced technical problems when accessing the internet from their workplaces, and 55.2% had occasionally sought support help.

Table 5.7 Utilisation of the internet and online learning resources (N=30)

Information Applications	Frequency	Percentage
How do you access the internet?		
From home	14	46.7
From the workplace	29	96.7
From Internet café	10	33.3
From other places such as the universities	1	3.3
If you access the internet from your home, what kind of internet connection do you have?		
Modem	16	69.6
ISDN	1	4.3
DSL	3	13.0
LAN	3	13.0
Others such as…	–	–

Information Applications	Frequency	Percentage
In the past year, about how often did you look on the internet for information?		
Every day	6	20.0
More than once a week	15	50.0
About once a week	5	16.7
Once a month	–	–
Every 2-3 months	2	6.7
Less than every 2-3 months	2	6.7
How many times do you currently use online information from the internet		
More than once a day	5	16.7
About once a day	9	30.0
Once a week	9	30.0
Every 2-3 week	6	20.0
Less than every 2-3 week	1	3.3
Which online information do you always use from the internet?		
Online Database from Ministry of Public Health	22	73.3
Tele-medicine	1	3.3
Tele-conference and Tele-education	1	3.3
MIS of health care between public health facilities and the Ministry of Public Health	12	40.0
Tele-Consultation and Appointments	4	13.3
Online Learning	23	76.7
e-mail	23	76.7
Check the news	4	13.3
Check the weather	5	16.7
Sports information	4	13.3
Game online	4	13.3
Shopping	1	3.3
Internet banking	–	–
Chat rooms	9	30.0
Others such as Search Engines	3	10.0

Information Applications	Frequency	Percentage
Have you had technical problems with accessing the internet		
Yes, at home	10	33.3
Yes, at the workplace	13	43.3
No	7	23.3
Do you usually seek support to help you with any difficulties encountered		
Always	9	31.0
Sometimes	16	55.2
Never	4	13.8
Please provide examples of what support you needed and who you contacted (IT help desk, Programmer)		

When asked, using an open-ended question, about access to the internet, 23.7% experienced problems while accessing the internet from a telephone landline and a further 18.4% could not access the internet or had an extremely slow connection to the internet. Moreover, when they had technical problems, 35.5% sought the help of an expert in IT.

Table 5.8 Problems reported in data from Open-ended Questions (N=38)

Answers	Number	Percentage
Problems with landline	9	23.7
Cannot connect to the internet	7	18.4
Slow connection to the internet	7	18.4
Cannot connect to websites	5	13.2
Problem with network	3	7.9
Server down, couldn't send the files to the server	2	5.3
The hardware is very slow while dialling to the internet	1	2.6
Cannot download, slow download of data	1	2.6
Cannot read the text from the websites	1	2.6
No telephone service in the area	1	2.6
System not working	1	2.6

Table 5.9 Number of participants who needed support and who they contacted (N=31)

Answers	Number	Percentage
Expert in IT	11	35.5
Help desk	7	22.6
Landline centre	6	19.4
Colleague	4	12.9
Computer Centre at university	3	9.7

Section 2 Perceived Usefulness

This section reports the compared means of one sample t-test responses to the questions on the perceived usefulness of electronic information. A five-point Likert-type scale was used which ranked from 0 ('Not useful at all') to 5 (Very useful), in terms of usefulness to their jobs. The overall test value is 3.52, $p < 0.05$, which found that more respondents said that eLearning was useful, confirming work by Saadé et al. (2007). The results found healthcare professional students thought electronic information was useful in their jobs (Mean = 3.94). Furthermore, the indicators of perceived usefulness found most significant were '*Electronic information enables me to accomplish tasks more quickly*' and '*Using electronic information makes it easy to do my job*' (see Table 5.10).

Table 5.10 Perceived Usefulness

Questions	Mean	S.D.	t-values	Sig. (2 tailed)
Using electronic information improves the quality of the work I do	3.92	0.64	4.26	0.000*
Electronic information enables me to accomplish tasks more quickly	3.88	0.70	1.09	0.284
Using electronic information increases my job performance	3.88	0.70	2.61	0.014*
Electronic information supports critical aspects of my job	3.82	0.67	2.15	0.040*
Using electronic information increases my productivity	3.80	0.74	2.58	0.015*
Using electronic information enhances my effectiveness on the job	3.80	0.58	3.31	0.002*
Using electronic information makes it easy to do my job	3.80	0.58	1.63	0.114
Using electronic information gives me greater control over my work	3.71	0.65	2.19	0.037*
Using electronic information allows me to accomplish more work than would otherwise be possible	3.69	0.74	2.98	0.006*
Overall, I find electronic information useful in my job	3.94	0.56	3.52	0.001*

Scale: 5 = Very useful, 4 = Useful, 3 = Neutral, 2 = Not so useful, 1 = Not useful at all

Section 3: Perceived Ease of Use

Using a five-point Likert-type scale, which ranked from 0 ('Not useful at all') to 5 ('Very useful'). The overall test value is 3.5, $p < 0.05$. Healthcare professional students found electronic information easy to use (Mean = 3.47), and four values were found significant '*Interacting with electronic information requires a lot of mental effort*', '*I find electronic information cumbersome to use*', '*My interaction with electronic information is clear and stable*', and '*Interacting with electronic information is often frustrating*' (see Table 5.11).

Table 5.11 Perceived Ease of Use

Questions	**Mean**	**S.D.**	**t-values**	**Sig. (2 tailed)**
I find it takes a lot of effort to become skilful at using electronic information	4.00	0.61	–0.39	0.699
Interacting with electronic information requires a lot of mental effort	3.55	0.61	–3.61	0.001*
I find electronic information cumbersome to use	3.47	0.82	–3.94	0.000*
I find it easy to get electronic information to do what I want to do	3.29	0.79	–1.02	0.318
My interaction with electronic information is clear and stable	3.29	0.74	–2.69	0.012*
Electronic information is rigid and inflexible to interact with	3.27	0.67	–1.37	0.178
It is easy to remember how to perform tasks using electronic information	3.22	0.77	0.00	1.00
Learning to operate electronic information is easy for me	3.14	0.75	–1.84	0.076
Interacting with electronic information is often frustrating	3.02	0.69	4.36	0.000*
Overall, I find electronic information easy to use	3.47	0.62	**0.3.5**	1.000

Scale: 5 = Very useful, 4 = Useful, 3 = Neutral, 2 = Not so useful, 1 = Not useful at all

Section 4: Healthcare professional learning styles

The learning style of healthcare professional students was also tested (see Appendix B). Most students belong to the auditory learner group (42%), as shown in Figure 5.8, although learning styles are not significant regarding their perceived usefulness and perceived ease of use of information, as shown in Table 5.12.

Table 5.12 Correlations between Learning Styles, Perceived Usefulness and Perceived Ease of Use (N=30)

	Pearson Correlation	*p-value*
Perceived Usefulness in Learning Styles	–0.023	0.904
Perceived Ease of Use in Learning Styles	–0.116	0.542

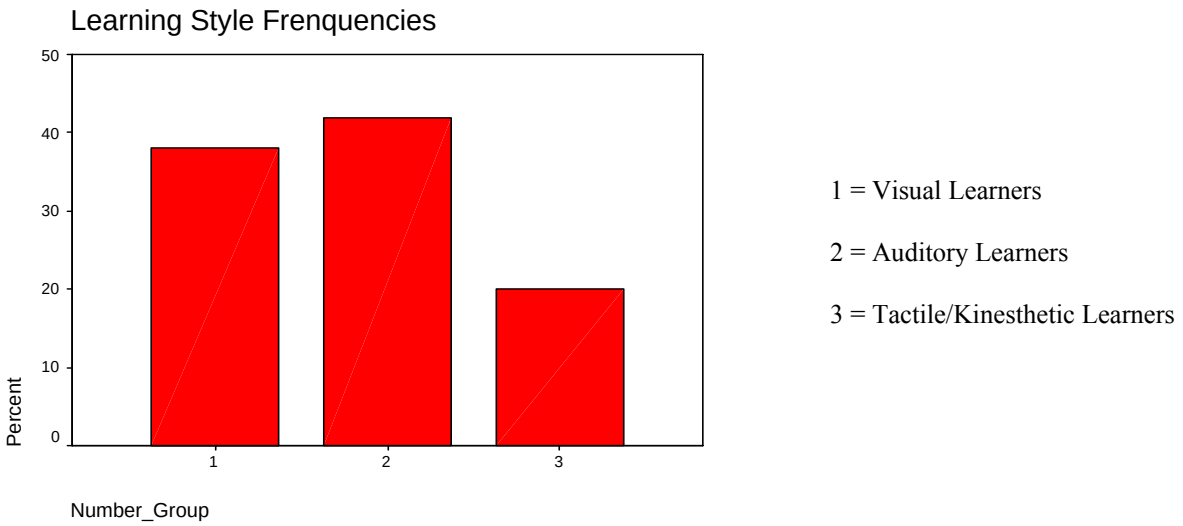


Figure 5.8 Learning style groups

5.8.2 The relationship between the Learning Styles, Perceived Usefulness and Perceived Ease of Use

A correlation analysis was undertaken using the SPSS analytical software, with $\alpha = 0.05$. This calculation showed that each group in the survey needs to have at least 30 participants. This seems particularly important in a study that shows 'no statistical significance' between the Learning styles, Perceived Usefulness, and Ease of Use, see Table 5.12 above.

5.8.3 Interviews

Interview questions were designed using five topics (see Appendix A). The design of the questions examined each of the key components of the information of the environment within the MSU eLearning class. The topics were: A. Information Wanted; B. Factors affecting use/choice of information sources; C. Opinion on MSU eLearning Course; D. eLearning Environment Structural team, Learner Support and Motivators (see Figure 5.9) and E. Learning Styles, treated in Chapter 4.

The interviewees gave their permission for their interviews to be tape-recorded. The respondents included the healthcare professional leader, and the committee of the student group. The interviews were recorded in Thai, and then translated into English for the purpose of this thesis. A summary of the interviewees' responses to questions is

given below. SPSS and MS Excel software was used for analysis to assist this approach.

Figure 5.9 Concept Map Questions for interview exploration

A. Information Wanted

Four categories were use to investigate 'Information Wanted', which revealed the following results.

A1. What information do you always use? (How often)

The results show 20 out of 23 healthcare professional students use leaflets and documents from the Ministry of Public Health, and non-electronic journals, and use them 2-3 times a week in searching for information. For electronic information, they use internet search engines such as Google (www.google.co.th), the website of the Ministry of Public Health (www.moph.go.th), and the Maha Sarakham University

website (www.msu.ac.th). In addition, 6 healthcare students used e-mail to communicate with the others daily. They also used e-mail to elicit information as opposed to, say, social gossip or other areas of work-related communication.

A2. How do you search for information?

For non-electronic information, 16 out of 23 healthcare professional students search health-related documents at their workplaces, and 8 students use the local library or their workplace's library. Moreover, for electronic information, 16 students searched the internet at their workplace, and 8 students searched the internet from home.

A3. What difficulties do you find in searching for or using information?

Healthcare professional students gave three different opinions on this question.

- Do not have time to search for information (10 of 23)
- Hard to find out some information (11 of 23), which included
    a) Live too far from source
    b) Didn't know how to research their topics
    c) Lack of data, especially for public health or some special topic, e.g. Avian Influenza
    d) The books or journals are too expensive for them
    e) Cannot access the internet, e.g. no computer, no landline or other means of access, not many computers in their workplace, or they have to wait their turn in a queue.

Student A said '*I live too far from the source of information, such as the library and the bookshop, so I have to take time travelling to go there*.'

Student B said '*Health information in Thailand is not updated, and also the computer is quite old for using the internet and needs to be modernised*.'

Student C said '*My place does not have IT at all, so sometimes if I need to search for information from the internet, I have to go to the town to find the internet café for searching and I have to pay for it*.'

- No problem searching for or using information (2 of 23).

A4. Do you find it easy using some information more than Information sources?

16 healthcare professional students found it easy to use information.

Student D said '*Sometimes I find it easier to search on the internet than to find information from other sources*.'

However, 7 students still worry about some information from the internet.

Student E said '*I don't find it easy at all, because I feel uncomfortable when I use the computer, and I have never before tried to search electronic information*.'

B. Factors affecting use/choice of information sources

The following part criticises the factors that affected on both non-electronic and electronic information.

B1. What factors affect use of non-electronic and electronic information?

The results show 14 of 23 healthcare professional students lack the time to use both non-electronic and electronic information. For example, for non-electronic information some of them said '*I have so many things to do at my work, so I don't have time to search for information*' and '*I think I am too old to study so I can't understand much when I read a paper; sometimes I have to ask somebody to explain something for me*.'

Student F said '*I don't have free time to search; some websites are hard to access, and I don't know how to find out the data from other websites that I have never seen before*.'

B2. What factors affect how students search electronic information?

The same result as for the B1 question. 14 healthcare professional students have similar problems in searching, as they need more time to search. For example, '*lack of facilities for searching information in the work place and I do not have time to search*.'

Student G said '*I don't have the time to use the internet from my office, so while I work I can't search for information, and I can't access the internet from my house. I have very little time to search at all*,' and another student said '*In my case, it's hard to search the internet. I can't get on some websites as I don't know the address of the website and some websites are not available in the Thai language, so I can't understand them*.'

C. Opinion of MSU eLearning course

This part was analysed by categories, which appeared along with relationships. Three questions emerged.

C1. What do you perceive from MSU eLearning courses?

The responses of the healthcare professional students to this question fell into two categories. 5 students had never been through the MSU eLearning course and 18 students said they had gained additional information or knowledge from this course.

Student H said '*I can't give more information about this Module because I can't access the internet, so I don't know what the module is about. Sometimes I just ask about this module from my friends*.'

Student I said '*I can't access the program. Sometimes it's a bit slow to access, and also my internet is very slow*.'

Student J said '*I am just starting to learn from the Module and also when my teacher assigns homework on that Module, it takes time for me to understand it, but it is useful in helping me to learn*.'

Student K said '*I can get more information about my subject and also I can read it over again after classes to help me to remember the contents*.'

Student L said '*It creates more ways for me to find out information other than from the classroom*.'

Student M said '*The Module is helping me to find out more information. It encourages me to study much longer*.'

C2. What are the factors and the barriers for using this eLearning course?

The answers for this question fell into three categories.

- 14 of 23 students reported that they did not have regular, reliable access to the internet: this includes no computer to enable access, limited access, and no internet in their area.

Student N said '*Sometimes it's hard to access the cyber-class (MSU eLearning) and that tuition is quite slow when watching the Video, and also the information from the subject is not enough for me, e.g. not many links to search, not many websites to find out more information on that content***.'**

Student O said '*I don't have the internet in my house or in my office*.'

Student P said '*It isn't easy for students who have no access to the internet or computers*.'

- 4 of 23 found problems with the quality of content in the eLearning module, which added no new data, it was hard to download and they could not read the content (in low resolution).

Student Q said '*Some pictures from the topics are blurred and the video clip is a bit slow*.'

Student R said '*Sometimes it's hard to get into the course and download some documents from the module*.'

- 5 of 23 said that the module contained insufficient provision for online communication and interaction, such as a 'chat room' or message board.

Student S said '*Some courses in the module don't have the lecture notes to update data or share the ideas, so it makes the course uninteresting*.'

Student T said '*There is no web board or chat room. It should have these, so we can discuss the course*.'

C3. What are your ideas to help develop the MSU eLearning program?

This question asked healthcare professional students for help in developing MSU eLearning courses. The answers to this question fell into three categories.

- 7 students made no comments (including some who had never been through the MSU eLearning program).
- 9 students suggested that the content should be updated, which included making attachment files smaller (easier to download) and make the gateway easy to access.

Student U said **'***Sometimes the presentation of content is hard to understand also the content is hard to read. It should be made easier to use, to read, and to download*.'

Student V said '*The content in the module is contained in a very large file, thus it is hard to access, and download. It should be made lighter and put into different file types*.'

Student X said '*More development is required for networking to support the information technology, especially the internet, e.g. the speed of dialling, modem, broadband, LAN, and the specification of the computer (speed, memory, graphic memory)*.'

- 7 students suggested that this programme should be continued.

Student Y said '*It needs to be developed, then to be continued*.'

Student Z said '*We need to have courses like this for the whole curricula of the Master of Public Health course*.'

D. eLearning Environment

Data from the structured interview revealed more details regarding three further topics: Instructional team, Learner support, and Motivators. These are shown in Tables 5.13, 5.14, and 5.15. Table 5.13 summarises responses on the instructional 'team', divided into responses about Instructors, Tutors, Discussion Facilities, Copyright Coordinator, and Guest Speaker. The results show that healthcare professional students rated as '*Good*' the Instructors (47.8%), and the Tutors (43.5%). However, they only

rated as '*Fair*' the Guest Speaker (52.2%), the Copyright Coordinator (47.8%), and Discussion Facilities (47.8%).

Table 5.13 Instructional team

	Excellent		***Good***		***Fair***		***Poor***		***N/A***	
	freq	%	freq	%	freq	%	freq	%	freq	%
Instructors	0	0	11	47.8	9	39.1	1	4.3	2	8.7
Tutors	1	4.3	10	43.5	9	39.1	0	0	3	13.0
Discussion Facilities	0	0	5	21.7	11	47.8	3	13.0	4	17.4
Copyright Coordinator	1	4.3	5	21.7	11	47.8	2	8.7	4	17.4
Guest Speaker	0	0	8	34.8	12	52.2	1	4.3	2	8.7

Table 5.14 also scored its range using a five point Likert scale, which shows the rating of learner support divided into three topics: Technical support, Library support, and Counselling service. The results show that most healthcare professional students thought all categories were '*Fair*'.

Table 5.14 Learner Support

	Excellent		***Good***		***Fair***		***Poor***		***N/A***	
	freq	%	freq	%	freq	%	freq	%	freq	%
Technical support	1	4.3	6	26.1	13	56.5	1	4.3	2	8.7
Library support	1	4.3	4	17.4	12	52.2	3	13.0	3	13.0
Counselling service	1	4.3	3	13.0	16	69.6	0	0	3	13.0

Table 5.15 presents five motivators identified within the MSU eLearning environment. This table used the scoring range from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). The results show that healthcare professional students '*Neither Agree or Nor Disagree*' to 'Personal interaction' (60.9%), 'Learning community' (47.8%), and 'Easier to use course' (47.8%). However, they '*Agree*' with 'Learn new technology' (47.8%) and '*Neither Agree nor Disagree*' to 'Time/location flexibility' (43.5%).

Table 5.15 The Motivation

	Strongly Agree		*Agree*		*Neither Agree Nor Disagree*		*Disagree*		*Strongly Disagree*	
	freq	%	freq	%	freq	%	freq	%	freq	%
Time/location flexibility	2	8.7	10	43.5	10	43.5	1	4.3	0	0
Personal interaction	1	4.3	2	8.7	14	60.9	6	26.1	0	0
Learning community	2	8.7	9	39.1	11	47.8	1	4.3	0	0
Learn new technology	1	4.3	11	47.8	8	34.8	3	13.0	0	0
Easier to use course	0	0	5	21.7	11	47.8	3	13.0	4	17.4

5.8.4 Group Discussion

Three subjects were addressed:

- The facilities for access to the internet
- The design and content in eLearning modules
- Provision for communication within the online course, e.g. chat room, web-board.

Five healthcare students gave their opinions as follows.

Student A said '*The main problem in this course is that there is no place to study which has access to the internet. Thus we need an internet room including the facilities to learn within the eLearning environment.*'

Student B said '*In the MSU eLearning course there should be a sample test to help students practice before they have they do the real test.*'

Student C said '*We are interested in this programme (MSU eLearning) which enables us to find out more information, but the problem is some courses have no online content at all. Also, some content is not updated, and when we access these courses, we cannot find anyone who can help us to resolve problems, because there is no communication from the web-board or the chat room.*'

Student D said '*The content of the course should contain 1) practice tests, 2) related links to help students to find out more information about the course, and 3)*

accessing eLearning courses should be made easier regarding login, downloading contents, and having an easy link to the library.'

Student E said '*One problem is that we have never met the tutors or teachers in the communication room in MSU eLearning courses, such as on a web-board or in a chat room. Thus the Faculty (of Public Health, Maha Sarakham University) should have a policy to make sure that they (tutors or teachers) are ready to teach on the visual learning courses*.'

5.8.5 Observation

The researcher observed 36 people, of whom 30 were healthcare professional students, 5 were lecturers or tutors, and 1 was a librarian. This included investigation of the pedagogies and curricula of MSU's eLearning programmes. The components are shown in Figure 5.10.

A. Healthcare professional students

At the beginning of the eLearning course, some of the students worried about '*How they can learn? How they can be successful on this course*.' Learning from the internet is a new concept for them. When they were first given questionnaires to find out whether '*they are ready to learn online*,' one student said they '*should have the chance to choose whether they would like to learn online or in the traditional class room. They should not be pushed into studying this course just to follow the new policy*.' However, some students were excited about learning a new technology, and commented '*It is a good chance to learn, as we use the internet a lot. Why shouldn't we get the benefits from it*.' Before the class started, we trained healthcare students for two days on how to use the MSU eLearning Module. This training included the basics of computers, accessing the internet, and searching for information from the internet.

During the term-time course, healthcare professional students were prevented from making effective use of the MSU eLearning course because no lecturers interacted with them online. They only accessed the online course when they needed to print some documents, e.g. PowerPoint.

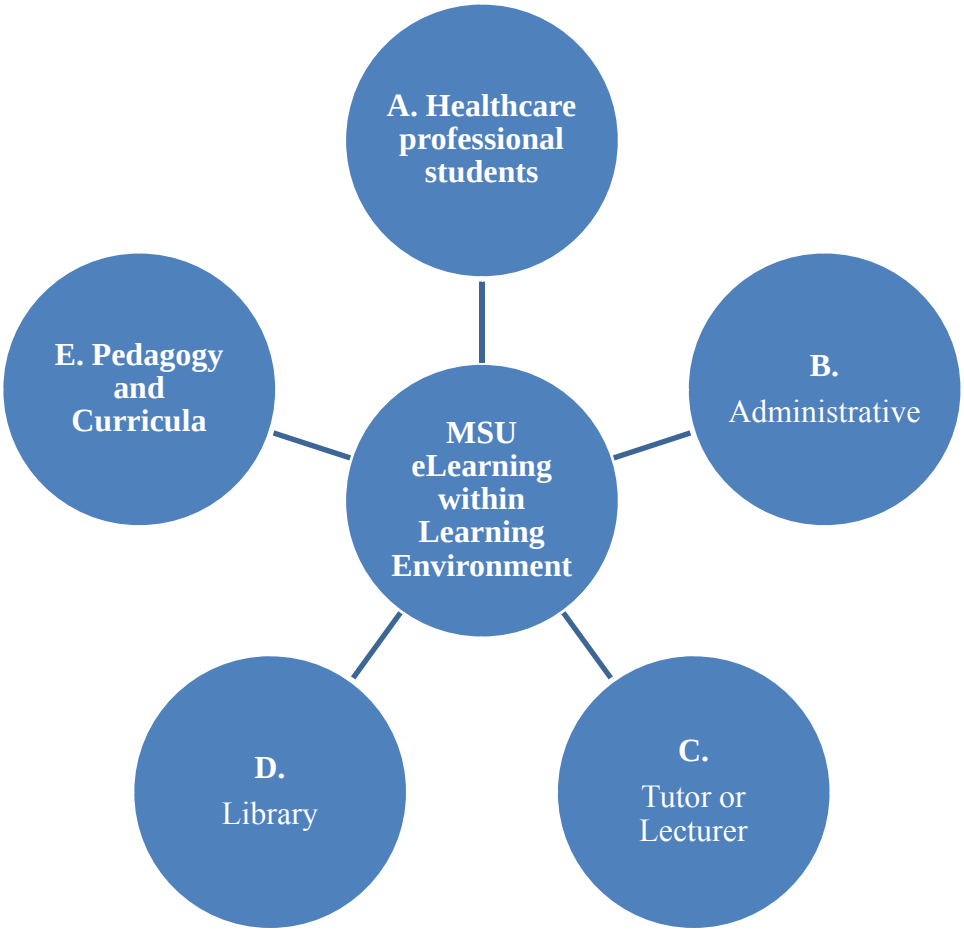


Figure 5.10 Division of people within MSU eLearning environment

B. Administrative

In the initial implementation of eLearning courses, the administrator adopted policies that would allow healthcare professional students to study by eLearning. He therefore met vendors and subsequently implemented changes in the eLearning courses on the Master of Public Health degree. His policy included securing funding for the lecturers to convert courses into the MSU eLearning module, and to support on-line learning. This had the potential to create more opportunities for healthcare professionals, especially those living far from the campus, who did not want to leave their work to attend the university. However, a change in the administration of the

course resulted in a lack of continuity. Thus, when the champion of this policy left, it seemed that nobody wanted to continue, and the programme therefore effectively stopped.

C. Tutors or Lecturers

At the time of the implementation of the eLearning programme, five lecturers had been chosen to teach online because their subjects were compulsory for the course. We then completed a training course for those lecturers, showing them how to manage their online courses. During term time, we spoke to and observed the lecturers who were responsible for the courses. From these conversations and observations, it seemed that some did not like using the internet for teaching. The lecturers always told the students: '*You can find everything you need from that module (MSU eLearning)*'; they did not make time to discuss matters with students in the chat room or web-board room. They had too many classes to teach and too many things to do. They were not only teaching, but also undertaking research, and so on. Thus, online students could not benefit as much as hoped for from the online courses. A lecturer said '*I would like to follow the policy of teaching students online, but I do not even know how to check an e-mail, so how can I teach students online?*' Another lecturer commented that '*I am too busy to sit with a computer and it needs too much time to manage the course. Teaching face-to-face seems easier than online, because we just go to the class, and talk about the subject until the time is up. That means everything is done, there is no comeback.*' Thus, some topics in the eLearning courses were taught in the traditional classroom.

D. Library

A librarian was asked to update the library's website to allow students to connect when off-campus and access online facilities such as journals, online books, and some documents in the digital library. Unfortunately, this task seemed to be too difficult to manage. The reason for this being that there is not enough staff to manage the library computer servers, and most of them do not know how to set up the system to allow access of this kind. Therefore, online students had to use library facilities in the same way as traditional students, as they could not access information online in a way that would have supported the eLearning courses.

E. Pedagogies and Curricula

The pedagogies and curricula on MSU eLearning course included: Health and Management, Applied Epidemiology, Public Health Research Methodology, Applied Statistics for Public Health Research, and Public Health Policy. For observations on this topic, we looked at pedagogies in five courses already in the MSU eLearning module. Most of these had been scanned from books, which were held as *pdf* files (old versions, so very large files). Further, some of them could not be read because the scans were too dark or blurred. Some topics were put onto video clips in the module. However, these seemed to be difficult to download, and most of the videos were only introductions to the courses. The rest of the contents were PowerPoint presentations prepared by lecturers. It was unfortunate to find no useful links that related to the topics, no assignments for students, or messages from the lecturers or tutors who were responsible for the topic.

5.9 Summary

The 'Maha Sarakham University eLearning' course was an ambitious effort to use eLearning to reach underserved healthcare professional students in Thailand with quality accredited educational opportunities. Over a period of nine months, the project partners were unfortunately unsuccessful in delivering the second semester. The online courses for the Masters degree in Public Health at Maha Sarakham University were therefore terminated.

Key factors associated with these results were that the courses threw up a number of different problems. In the first phase of study, factors revealed by the survey were mostly about accessing the internet from the workplace, using a modem, and only using it for checking e-mail and online learning. In particular, the result showed that accessing the internet from a telephone landline provides an extremely slow connection, and the main problem was gaining access to the internet.

The Perceived Usefulness (PU) and Perceived Ease of Use (PEU) section found electronic information was useful in a healthcare professional's job, and that information was easy to use. Interestingly, the following values of PU are significant:

'Using electronic information improves the quality of the work they do'

‘Using electronic information increases their job performance’

‘Electronic information supports critical aspects of their job’

‘Using electronic information increases their productivity’

‘Using electronic information enhances their effectiveness on the job’

‘Using electronic information gives them greater control over their work’

‘Using electronic information allows them to accomplish more work than would otherwise be possible’

‘Overall, they found electronic information useful in their job’.

Four values of PEU are significant:

‘Interacting with electronic information requires a lot of mental effort’

‘The students found electronic information difficult to use’

‘The students’ interaction with electronic information was clear and stable’

‘Interacting with electronic information was often frustrating.’

Moreover, the healthcare professional learning styles identified fall under the general category of auditory learner group, although learning styles are not significantly correlated with both the perceived usefulness of information (POU) and perceived ease of use (PEU) of information.

This pilot stage study was to be followed by a more extensive second stage study (Chapter 7). This pilot study included interviews, group discussions, and observations, which revealed the facilities and policies that they have at their learning environment (workplace or university). A lack of facilities was shown, such as no computer to access the internet, not many computers in their workplaces to share for searching for information, no landline to access to the internet, and a particular need for more time to search for, or use, information.

Healthcare professional students gave their opinions of their MSU eLearning courses. They felt they had gained additional information or knowledge from the course, despite the fact that five students had never been through an MSU eLearning course. Their opinions revealed that they were interested in this module. Unfortunately, the design of the content of the course was poor. For instance, the module did not

contain many links to further research, there were few linked websites providing relevant information on course content, and the content of the module was in a very large file and thus hard to access and download, when smaller files would have been more appropriate.

On a more positive note, some responses suggested that the module needed to be developed further, and then continued. They felt that the Faculty of Public Health needed to introduce online courses like this across the whole curricula of the Master of Public Health degree. Moreover, the results concerning the MSU eLearning environment showed that students thought the instructors and tutors were good, but only rated *fair* the discussion facilities, copyright coordinator, and guest speakers. In the 'Learner Support' section for this module, the students rated the technical support, library support, and consulting service as fair.

In the 'Motivation Section', they agree with regard to 'Learning new technology', but they neither agree nor disagree on 'Time/location flexibility', 'Personal interaction', and 'Easier to use the course'. From the researcher's observations of five groups of people within MSU eLearning (healthcare professional students, administrators, tutors or lecturers, librarians, and pedagogies and curricula), similar results to those of the questionnaire, interviews, and group discussions were revealed. In particular, administrative policies tended to change according to the funding invested in the eLearning courses, for tutors and lectures, and so on.

Co-operation with the university's staff, such as tutors, lecturers and librarians, was essential and fundamental to the discussion. The results showed that some lecturers did not seem to like being online teachers. The lecturers' opinions show that they were too busy to sit with the computer and felt that too much time was needed to manage the course. They also felt that teaching face-to-face seems easier than online, and they need IT training before starting online courses. Further, a librarian suggested that the library needs specialist staff for managing the MSU eLearning course, especially for the help-desk and web-master role.

However, these factors are different from what makes eLearning work elsewhere in the world, especially in developed countries. While there are still major difficulties to overcome and much work to be done, eLearning nevertheless had potential to improve educational programmes if implemented more effectively. eLearning can be a powerful approach for reaching healthcare professional students in particular.

This finding tends to confirm the ideas of Sharma (2003) who notes that the barriers to growth of communication technologies in developing countries are: infrastructures, policy planning by the government, political factors, economic factors, and cultural factors. As we have seen, the discussion is ongoing and there is a particular emphasis on the impacts of barriers and drivers in eLearning environments (see for example Arami & Wild (2006), Barton (2006), Brown, Anderson, & Murray (2007), Conole, Smith, & White (2007), Booth et al. (2005), Childs et al. (2005), Dyson (2004), de Freitas & Oliver (2005), and Clarke et al. (2005)). These studies suggest that these factors are influential, whether or not an eLearning initiative is successful. Having provided the main outline, discussion of the barriers and drivers in eLearning will continue in more depth in the next chapter.

Chapter 6

The IFPC model of eLearning for Healthcare Professionals

6.1 Introduction

The previous chapters discussed the issues of barriers and drivers in eLearning (Chapter 4), which included the pilot study (Chapter 5) concerning the impact of eLearning for healthcare professionals of an exemplar university in Thailand. This chapter will explore further those four main topics related to the drivers and barriers in eLearning: Infrastructure, Finance, Policies, and Culture (IFPC). The chapter discusses why these four topics need analysing and considers how and whether the topics are related. Particular attention is given to '*why we need to critically assess them*' and '*how the factors in each topic are related*.' The specific needs of healthcare professionals who work in the rural areas of Thailand are investigated, by providing some further models and frameworks that are related to the implementation of eLearning within change management and eMedicine. The IFPC research model is then described.

6.2 Infrastructure to support eLearning

Infrastructure means '*the basic physical and organizational structures (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise*' Compact Oxford English Dictionary (2009). It is also identified as '*an underlying base or foundation especially for an organization or system*' (YahooEducation, 2000). In

other words, ICT infrastructures are '*the telephone and telecommunication infrastructures, the information technology (IT) sector, electronic power, the internet, and the content of ICT penetration and ICT industry that facilitates data and image communications*' (Tan, Kifle, Mbarika, & Okoli, 2005). According to Campbell (2004), the contributing infrastructures for eLearning are: software, hardware, curriculum resources, and technology access, such as, high speed broadband and mobile telephone.

To enable the use of eLearning, the institution needs a solid base of eLearning infrastructure. Indeed, in order to access the courses, telecommunications infrastructure has usually been measured in terms of *tele-density* (number of main telephone lines for every 100 inhabitants) (Mbarika, 2002). Studies by Berge (1998) and Benson Soong et al. (2001) have shown that inefficiency of infrastructures for eLearning are the main barriers to successful courses. These include a lack of access to resources and people, the level of perceived IT infrastructure, and lack of technical support. Such factors have an impact in many Asian countries. Studies in recent years have shown that developed countries are experiencing tremendous growth in the use of computers, internet connectivity, wireless communications and many other related technologies. However, there is a lack of access to the IT resources and lack of technical support encountered in South East Asia (Benson Soong et al., 2001). This is also found in Africa's Least Developed Countries (LDCs), which are still greatly lagging other regions of the world in terms of the level of basic telecommunications infrastructure, such as tele-density (Mbarika, 2002). In the healthcare sector particularly, learning infrastructures need to be consistently improving. Further study by Tan et al. (2005) (see Figure 6.1) suggested that the infrastructure driving the diffusion of eMedicine needs to be more advanced in computer hardware and telecommunications, along with improved high capacity storage technology. Providing sufficient facilities to support online learning is therefore more crucial in the case of developing countries.

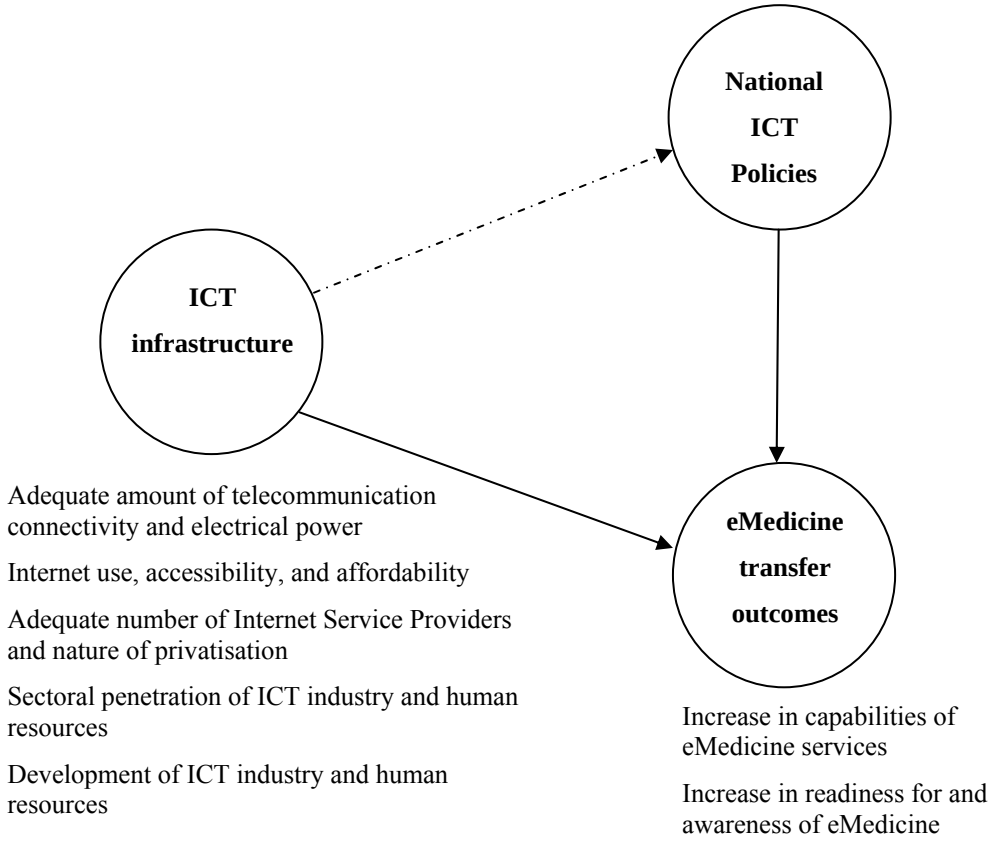


Figure 6.1 Effects of ICT infrastructure on eMedicine transfer outcomes

Thongprasert and Burn (2003) discuss some of the distinctive features of the situation in Thailand, where there are multiple influences on eLearning such as social psychology, human relations, cultural context, and in particular, infrastructure (technological determinism), see Figure 6.2 (Thongprasert & Burn, 2003). As we have discussed, infrastructure can be costly because of using advanced technologies. In developing countries, the costs can also be a problem.

It was found that this also occurred in the pilot study (see Chapter 5). When the students were first admitted to the MSU eLearning courses, two sample opinions were:

Student A said '*The main problem with this course is, there is no place to study which has access to the internet, thus we need an internet room including the facilities to learn within an eLearning environment*.'

Student B said '*More development is required for networking to support information technology, especially the internet, e.g. the speed of dialing, modems, broadband, LAN, and the capability of the computer (speed, memory, graphics memory)*.'

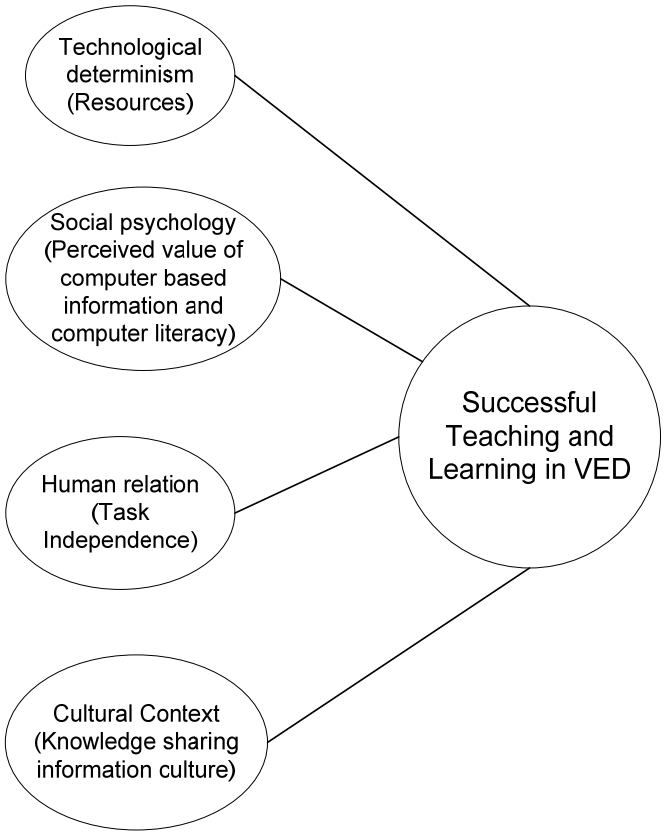


Figure 6.2 Factors influencing VED success

The statistics for internet use in Thailand show an increasingly sharp rise from 1991 to 2008. In 1991 only 30 people had access to the internet, which has increased dramatically to 16 million in 2008 (NECTEC, 2008). However, the number of people using the web is still only 24% of the whole country, which is indeed low. The total population who have access to educational websites is even fewer (2%) (Koanantakool, 2007). Thus, consideration needs to be given to providing sufficient infrastructure to assist Thai students to engage in online learning courses.

There are three crucial issues in providing potential infrastructure for students to approach eLearning programmes (see Figure 6.3).

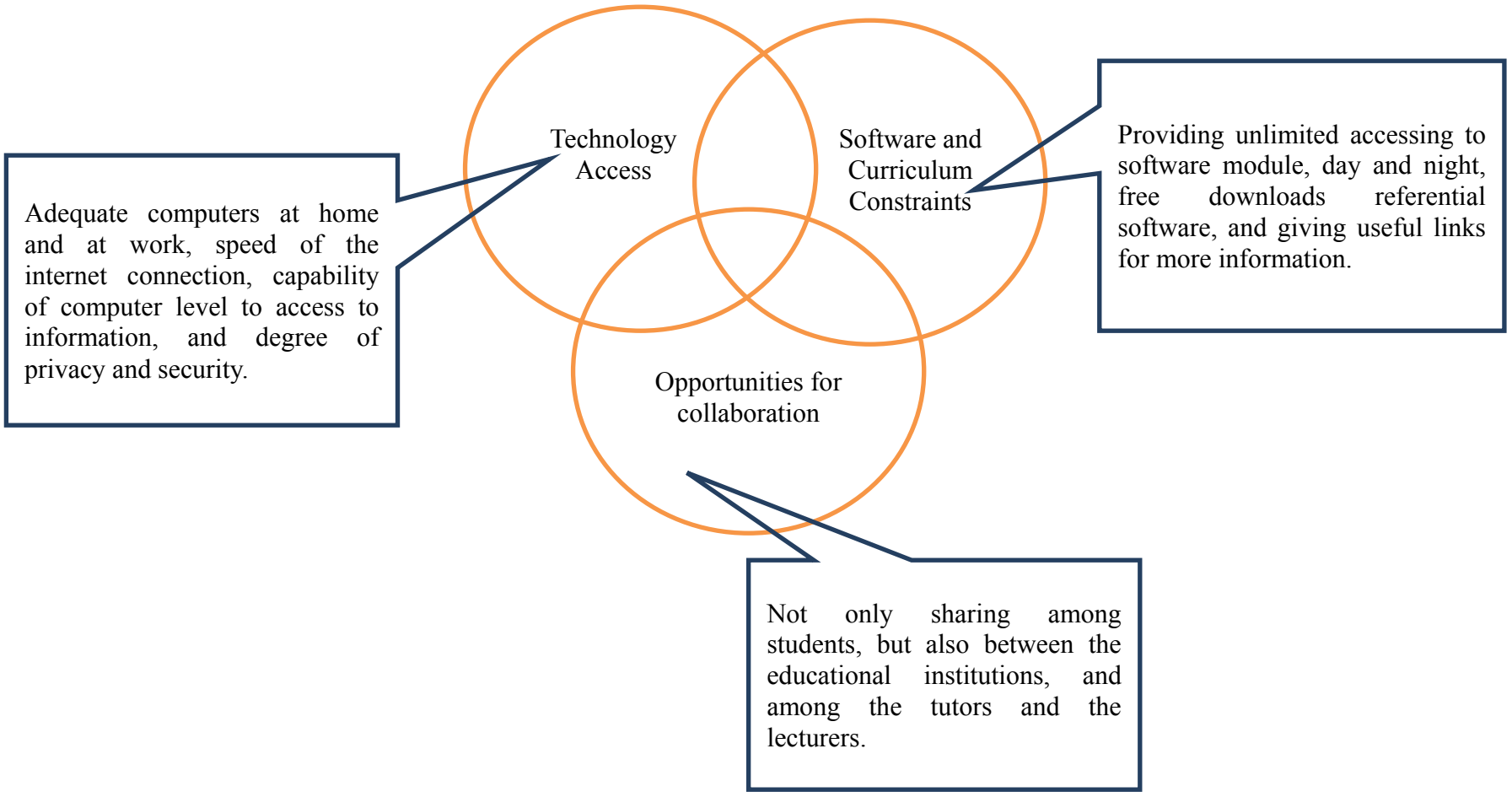


Figure 6.3 Three crucial issues of potential infrastructures

6.3 The Financing of eLearning

The global economy has been driven by greater integration of world markets and the spectacular growth of information and communication technologies (Baliamoune-Lutz, 2003). While there is substantial literature on the possible determinants of globalization, much less work has been devoted to understanding the determinants of ICT diffusion, particularly in developing countries. eLearning has been identified as the enabler for people and organisations to keep up with changes in the global economy that occur since the advent of the internet. This is especially the case for the financing of eLearning, as this affects eLearning implementation, maintenance of eLearning initiatives, and integration of eLearning into a learning system.

With regard to the budgetary effects on online learning, there is still a need for empirical work, particularly with the world economic downturn since 2008 to the present (2010). Implementations of eLearning courses are a massive cost. Campbell (2004) suggested that, when estimating the costs associated with developing online courses, three factors should be considered:

- People
- Hardware costs
- Timelines.

For developing countries in particular, providing the finance to invest in online learning is essential but can be a significant component of GDP. There is much competition for basic societal requirements. Vast amounts of money in developing countries are concerned with providing the basic requirements of everyday life, such as

- the need for basic infrastructure such as roads, buildings, and power supplies
- sufficient healthy food
- a full medical health service.

Therefore, funding investment in eLearning courses is a crucial challenge for lower income countries. Furthermore, Ruth (2006) observed that there are three distinct challenges that demand solutions if traditional universities are to successfully confront the economic realities of distance learning.

1. Many traditional universities are not willing to draw useful lessons from the more advantageous financial and IT models, or to profit from the experiences of other non-traditional institutions
2. Only about a third of eLearning courses at U.S. graduate schools are accredited by professional bodies, and many programmes have relatively high limits on student numbers; some have no limit on class enrolment
3. The production of course content by full-time university professors is not guaranteed.

He also suggested that institutions could consider several options in shaping a long-term strategy for achieving acceptable financial returns from eLearning, see Figure 6.4 (Ruth, 2006).

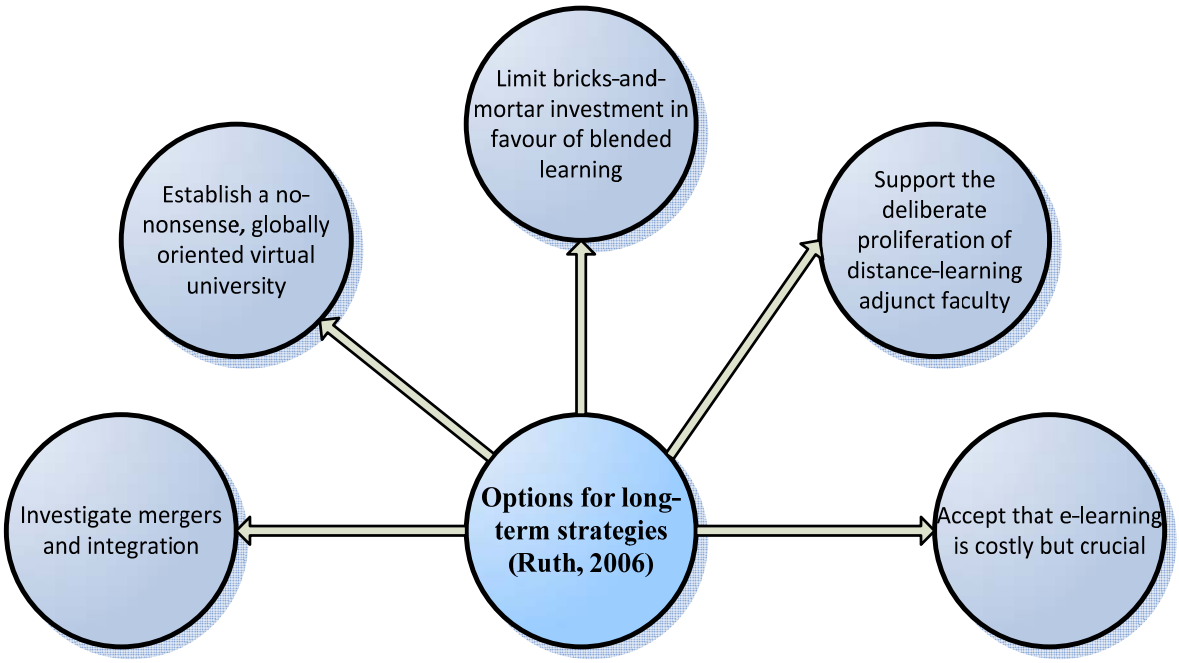


Figure 6.4 Several options in shaping a long-term strategy for achieving acceptable financial returns from eLearning

However, implementation of eLearning courses might be cost effective if there are full supporting financial controls in place, and it could be more advantageous for people who have limited time to attend a university. Several formal benefits to eLearning were outlined by a Continuing Medical Education project in Malaysia (Harun, 2001). He found that web-based eLearning offered benefits, including

1. Just-in-time learning: eLearning and performance support are available whenever and wherever needed by the workforce
2. Just-enough learning: healthcare professionals can find and use exactly the instruction or information support they need for the task-at-hand. They would not need to spend many hours or days in a class when only five minutes of eLearning would suffice to meet the immediate need.
3. Eliminate travel costs: travel has historically been the most costly aspect of healthcare workforce training, especially as training courses are often held in major cities or in specialised training institutes. eLearning eliminates travel costs and the time away from the workplace and job that travel necessitates.
4. Low-cost delivery: upfront costs may seem prohibitive but, in the end, huge savings are made for the organisation as access to training courses and materials will only incur a fraction of traditional classroom training costs.
5. Always up-to-date: with eLearning and performance support resources available a finger-touch away, updates are immediately obtainable to all workers involved.
6. Providing eLearning specific to the individual's environment: this covers a personalised eLearning environment, personalised eLearning plan support for individuals, and learning management and administration capabilities (Harun, 2001).

6.4 The Policies

Over the past decade, policymakers have increasingly focused on the need to develop system capacities for educational reform and change. It is argued that a responsive ICT in education policy in each country is the key to the success of eLearning projects such as e-school projects across Africa (Evoh, 2007) and an e-university in Wales (Roffe, 2002).

However, in recent years, pressures have emerged from policymakers and other stakeholders to embed eLearning technologies in mainstream higher education (MacKeogh & Fox, 2008). While recognising the desirability of reaching out to new students and engaging in innovative pedagogical approaches, MacKeogh and Fox (2008) found that many academic staff continue to prefer traditional lectures, and are sceptical about the potential for student learning in online settings. Extrinsic factors,

such as lack of time and support, serve to decrease motivation and there are also fears of loss of academic control to central administration (MacKeogh & Fox, 2008). These staff-related issues need management before the implementation of eLearning in higher education systems. Burn and Thongprasert (2005) proposed a strategic framework for Thai VED (Virtual Education Delivery) covering resources, computer literacy of instructors and students, perceived value of computer-based information, culture of knowledge sharing, information culture and task interdependence (see Figure 6.5).

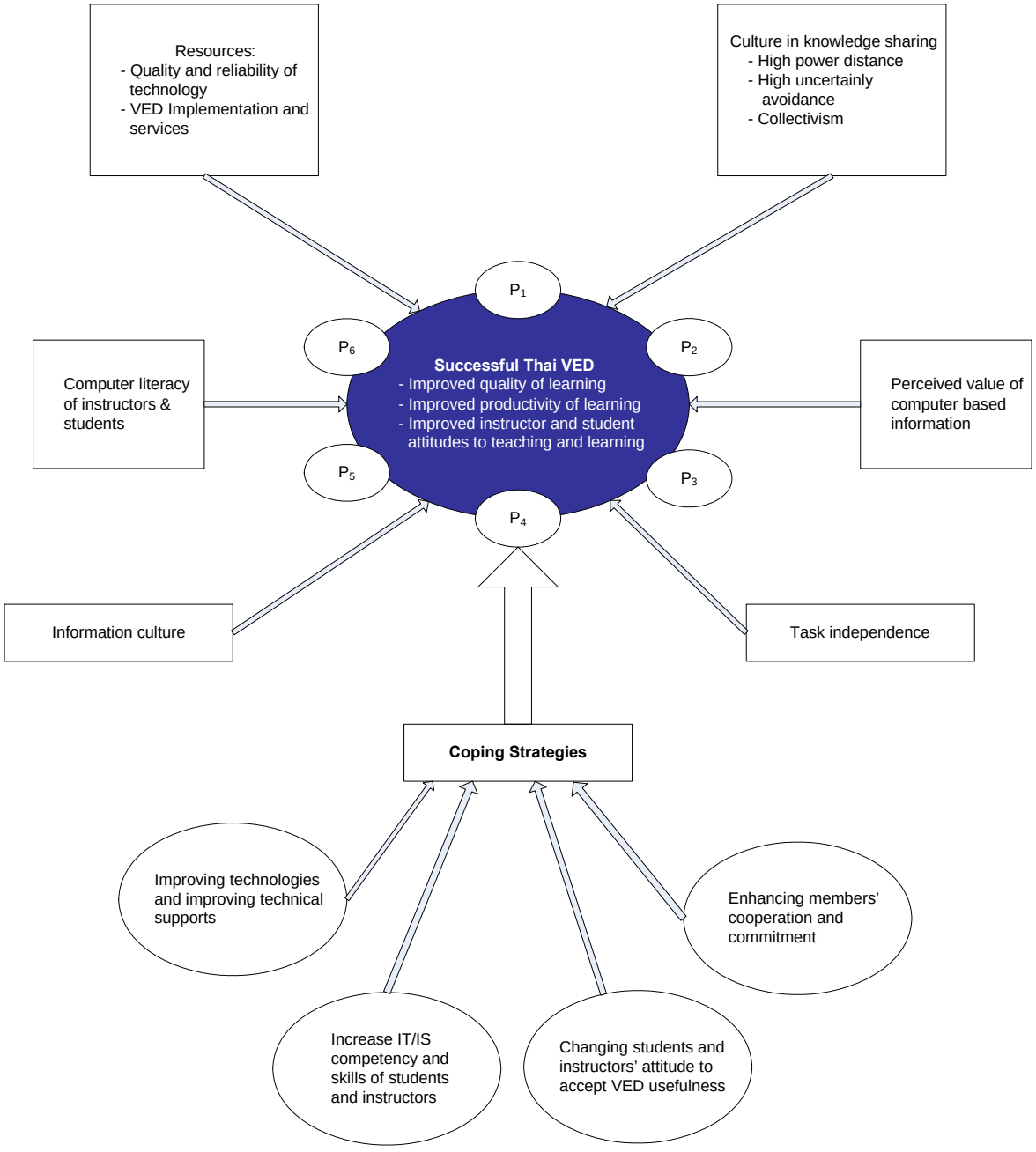


Figure 6.5 The strategic framework for Thai VED

Conole et al. (2007), from a widening participation perspective, illustrated the relationship between eLearning and other policy directives particularly clearly. She drew attention to two paradoxes:

1. eLearning is often seen as a way of supporting increasing diversity, but it may be that non-traditional learners do not have suitable preparation to work in online environments, thereby exacerbating inequality.
2. Even amongst the traditional student population, claims about sophisticated use of technologies tend to derive from personal and gaming technologies rather than those that support learning.

Evidence for the negative impact of a policy upon student experience is illustrated in our pilot study (see Chapter 5). This healthcare professional student was asked for his opinion on the MSU eLearning course, and observed that

'*We should be given the chance to choose whether or not to learn online or in the traditional classroom. The Faculty of Public Health should not offer only one method of studying. This course is just following the new policy*.'

This remark was made in the context of a policy directive regarding the pilot project for healthcare professionals, which took place under a particular university policy. "*The project (MSU eLearning) should be conducted by giving opportunities to healthcare professionals to continue with their professional development*." Unfortunately, the situation arose that the policy was being promoted by one administrator, but when they moved, the eLearning project was stopped. Thus, the key to a successful strategy is needed to develop an eLearning policy.

Hall (2002) presented six steps to drive an eLearning programme. One of these is to develop a strategy, especially with executive support. One organisation states it simply:

'*Senior management supports eLearning because it delivers what is needed when it is needed.*' (Hall, 2002)

It has been reported that ICT policies are related to the other effects of implementation of eLearning courses, particularly for developing countries (Bradbury, 1989). For example, misunderstanding the policies adversely affects financial funding to online courses, and ICT infrastructures for those courses. This is reported in a study on eMedicine in Ethiopia (Tan et al., 2005), see Figure 6.6.

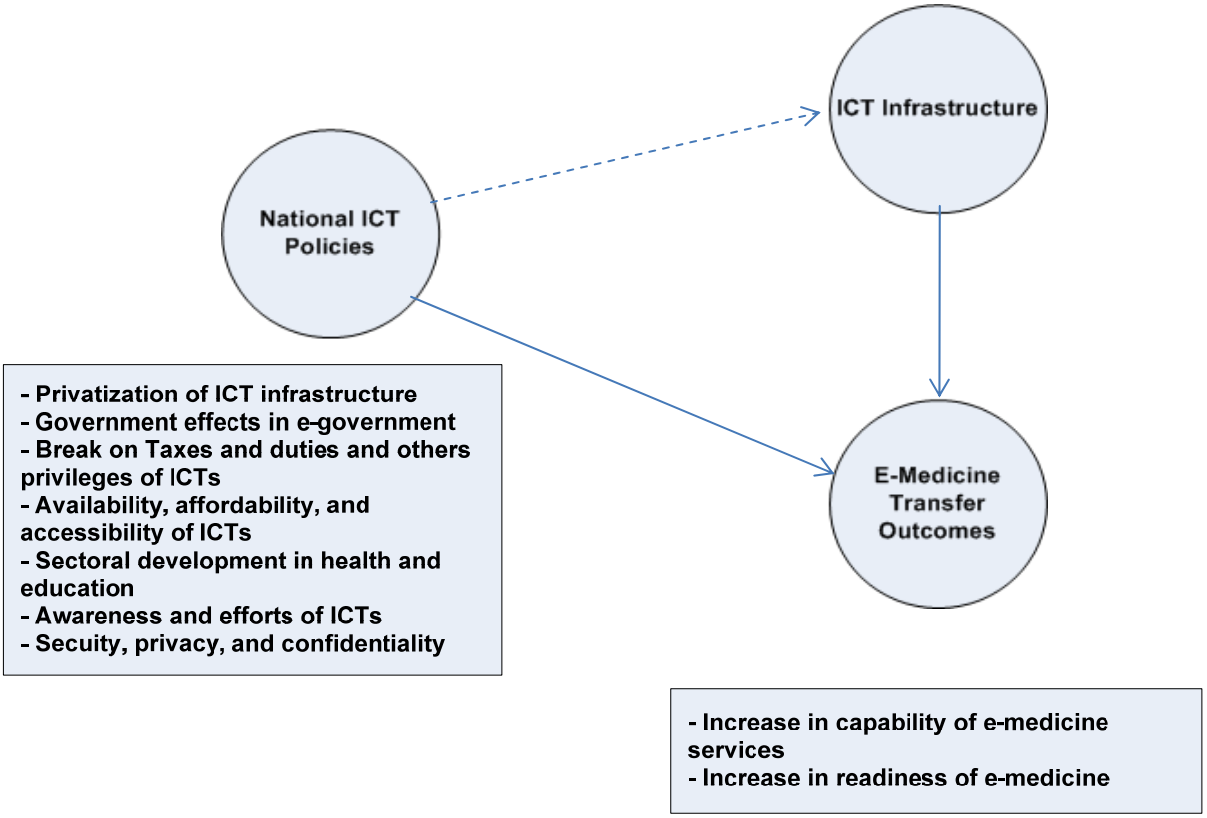


Figure 6.6 Effects of National ICT policies on E-medicine transfer outcomes

6.5 Culture

Culture means many different things to different people. It is an integrated pattern of human knowledge, beliefs, values, attitudes, and behaviour that depends upon man's capacity for learning and transmitting knowledge to succeeding generations (Tebo, 2005). Information systems researchers have shown that culture can be related to influences of information technology, including educational background, age group, social milieu, cultural orientation and gender (Barton, 2006; Bond et al., 2004; Coiera, 1999; Rathod & Miranda, 1999). Burn and Thongprasert (2005) proposed a strategic framework for their investigation of three specific features of Thai culture which correlated with virtual education delivery: high power distance *Bhun Khun*, uncertainty avoidance *Kreng Jai*, and collectivism *Kam Lang Jai*. Furthermore, being *Kreng Jai* is a reciprocal process, which was mentioned by Chaidaroon (2003). He also pointed out that when a person appeared to be *Kreng Jai* to someone, that person is obliged to become *Kreng Jai* to the person in return. Therefore, a *Kreng Jai* person does not exhibit the *Kreng Jai* trait only for presenting himself or herself as a socially admirable being in a Thai community, but also performs *Kreng Jai* acts to create, maintain,

honour, and/or rebuild the face of his or her interlocutor Chaidaroon (2003). This framework can be modified for any cultural environment.

Learning new technology (such as eLearning), involves an awareness of age, gender, ethnicity, language, nation, religion, social behaviour, attitude towards computer use, cognitive development, professional association, and learning styles (Campbell, 2004). There are particular issues in developing countries relating to culture, as most people think learning with IT is a new method. Literature reviews suggest that Thai students show a significant lack of self-motivation and independence of learning, and of creative and critical thinking (Tetiwat & Huff, 2003). In the pilot study we observed that in Thai culture, people like to share with each other; this is called *Phun Ghun* (Burn & Thongprasert, 2005), which means *sharing with friends and family*. In addition, there is also respect for the senior age group. Thai people respect older people and religion, especially Buddhist monks and the Royal family. Respect for elders and those in senior positions needs to be taken into account when considering culture, which brings together the ideas, values, social behaviours and customs of a society and religion. It is crucial, therefore, to design effective learning activities to be used in conjunction with the relevant technology. This must also be compatible with local cultural expectation. Technology alone is meaningless and useless (Benninck, 2004). As Schwartz (1994) showed, ecological variables are necessary to examine structural, contextual, and sociological effects on human behaviour and disease development. eLearning programmes need to be designed to mesh with local cultures. Hofstede (2002), Burn and Thongprasert (2005), and Chaidaroon (2003), saw that in the group *Bhun Khun*, *Kreng Jai*, and *Kam Lang Jai*, emphasised by Hofstede (2002), five independent dimensions of national culture are also included:

1. Power distance (*Bhun Khun*) is related to the different solutions to the basic problem of human inequality
2. Uncertainty avoidance (*Kreng Jai*) is related to the level of stress in a society in the face of an unknown future
3. Individualism versus collectivism (*Kam Lang Jai*) is related to the integration of individuals into a primary group
4. Masculinity versus femininity: this is related to the division of emotional roles between men and women

5. Long-term versus short-term orientation: this is related to the choice of focus for people's efforts – the future or the present.

To make the eLearning course work, it is necessary to understand the individual and group dynamics involved in the adoption and development of online learning information technology. There are crucial consequences for encouraging the students to stay with the eLearning programme, particularly healthcare professionals who work different shifts from others. Thus, implementing eLearning courses at the University, such as the School of Health Sciences, School of Public Health, School of Medicine, School of Nursing, needs cooperation in the context of the university culture and the professional culture.

Barton (2006) argued that the key to addressing the successful take-up and development of online learning in tertiary teaching programs lies with motivating academic staff. Indeed, in academic work as in a learning culture, trust, inspiration and teamwork are elements of motivation. As one lecturer said in the pilot study (see Chapter 5)

'*I am too busy to sit with the computer and it needs too much time to manage the course. Teaching face-to-face seems easier than online, because we just go to the class, talk about the subject until the time is up, and there is no come-back*.'

The coercion of academics tends to produce minimal responses and unsatisfactory results (Barton, 2006). Academics need a lot of persuading. Getting them to adopt online learning typically requires them to increase their workload, at least in the short term, and takes time away from other projects (Barton, 2006). Good eLearning requires three things.

1. Inspirational teaching, which generates a certain level of enthusiasm
2. Trust, which provides confidence to learn and experiment
3. Networking, which needs encouragement and empowerment. This applies to all teachers and students.

Barton (2006) suggested that the one important area, in which management can significantly influence the implementation and use of online technology, is that of human factors. Rathod and Miranda (1999) showed that technological infrastructure was found to have a negative impact on cohesiveness. Cultural uncertainty avoidance was found to result in lower interdependence and trust levels. High Power-distance resulted in lower interdependence levels, and high individualism was found to result in

lower cohesive levels among tele-workers. As for professional culture, all occupations have different duties, for example, healthcare professionals work to improve people's lives. In particular, working with a healthcare system in developing countries differs culturally from those of developed countries, e.g. lifestyles, and climate, see Rutkowski & Spanjers (2007), and there are concerns when selecting suitable online courses. However, using blended learning seems to encourage more students to succeed in their studies (Hofmann, 2002).

For this study, the investigation of how culture affects information technology, particularly for a healthcare system, is of importance. For example Tan et al. (2005) found that different cultural contexts (such as developed and developing countries), affected attitudes towards the use of technology. These authors investigated the implementation of eMedicine in two countries. The developed country was Canada, which subscribes to the vision of universal healthcare, and all citizens, regardless of race, ethnicity, or religious beliefs, have equal rights of access to information from the healthcare system. In contrast, in Ethiopia, beliefs and values ingrained in people by their cultural context, significantly affected their thinking and perspectives, including their approach to using technology. For example, they have a stubborn preference for face-to-face interactions (see details in Tan et al. (2005)). Figure 6.7 (Tan et al., 2005) considers the effect of national ICT culture on eMedicine transfer outcomes.

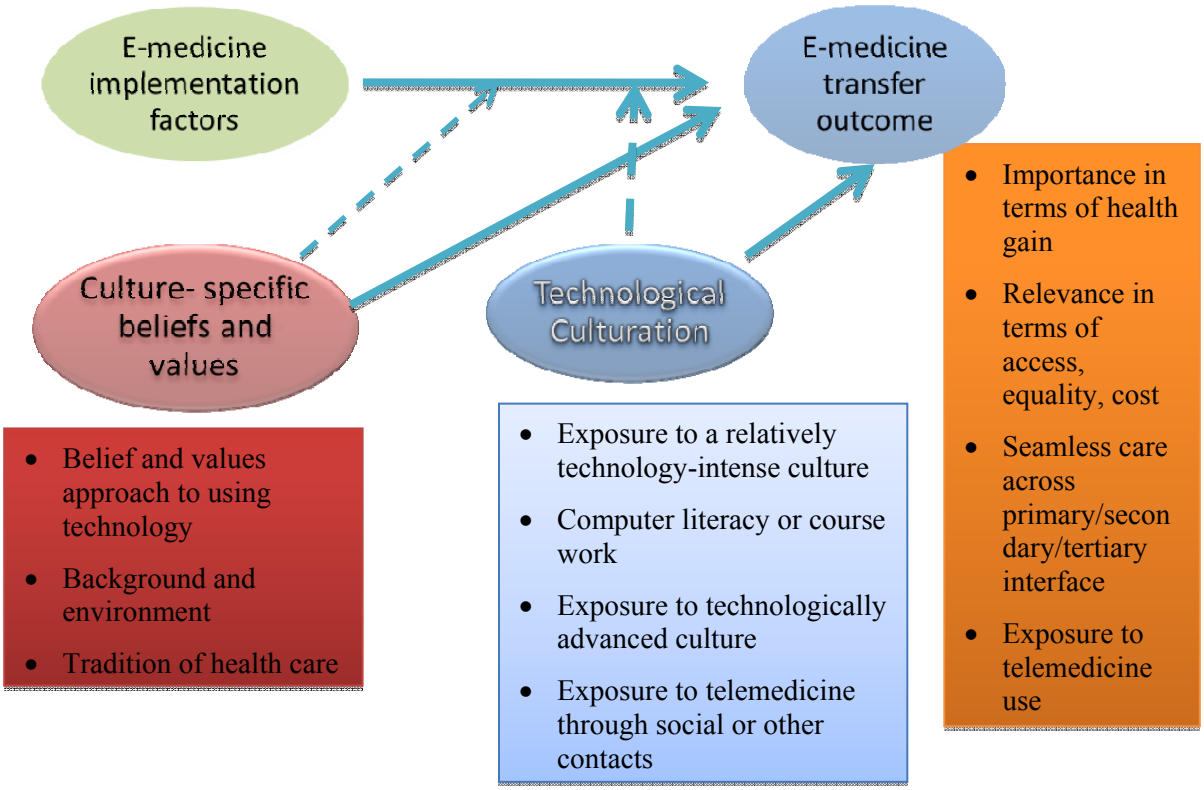


Figure 6.7 Effect of national ICT culture on e-Medicine transfer outcomes

6.6 Proposed IFPC model

The literature identifies several drivers and barriers and, in some cases proposes solutions and implications for eLearning courses. Researchers, such as Blakeley & Fripp (2003) and Harasim (1999), have suggested ways to engage students with online courses. Their advice covers many approaches on managing eLearning courses. When implementing online courses, one university may use a different method to another, especially those aimed at healthcare professional students. Our pilot study and literature review have shown that problems can arise, and perhaps can be solved. Here, a model is proposed which classifies the drivers and barriers to eLearning into four domains: Infrastructure, Finance, Policies, and Culture (IFPC). These seem to require a significant change to management policy regarding the strategy for implementing eLearning courses. Indeed, if change is not accomplished by organizing a two-day workshop or by an organisational leader making an announcement, it will be a long-term process through which individuals and organizations gradually come to understand, and become competent in the use of, new technology. Ignoring the process aspect of change can be seen as one of the most common failures in the management of change (Hall & Hord, 2001). To be productive, eLearning courses need to change

differently or other management models applied, to encourage students to be successful in their study.

There are several models to assist in strategies for planning and implementation of change. One process is to commence with an analysis of the current situation and to identify factors that will influence the change.

The approach known as PESTLE analysis (Political, Economic, Social, Technological, Legal, and Environmental factors), was originally designed for the business environment, and centres on an analysis of the external macro-environment in which a business operates. Such environments often contain factors which are beyond the control or influence of a business, see Figure 6.8 (Provenmodel, 1950).

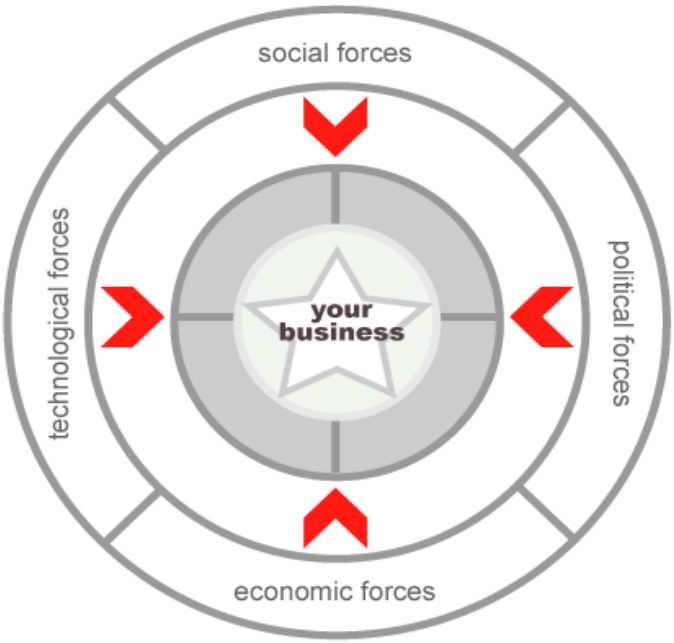


Figure 6.8 PEST factors, analysis

However, there are important elements in this to be aware of when attempting to apply this to eLearning courses. Each component also refers to more localised factors in the environment surrounding an organisation. In the case of developing countries such as Thailand, the PEST analysis model seems to cover investigations of this study, as Iles (2005) showed in her PEST analysis with regard to leading a service through a change in the healthcare system. They are as follows:

1. Political factors might include initiatives stemming from central government, from local health community and from the 'small' politics within an organisation

2. Economic factors might include finance, and the different markets that part of the organisation operates in
3. Sociological factors might include work-life balance, the ageing of the society, and its impact on caring responsibilities for women
4. Technological factors might have a wider effect than those of equipment, and may encompass methods, e.g. quality management, aspects of learning organisation, and various changes in management tools.

Iles (2005) also described 'The Seven Ss model', which is simply a list of different aspects of an organisation that need to support each other. They are depicted in Figure 6.9. Some variables are linked to the method of the IFPC model. For example: Structure and System are similar to Infrastructure, Strategy is similar to Policy, and Style of management and Shared beliefs are similar to Culture. These variables are detailed below.

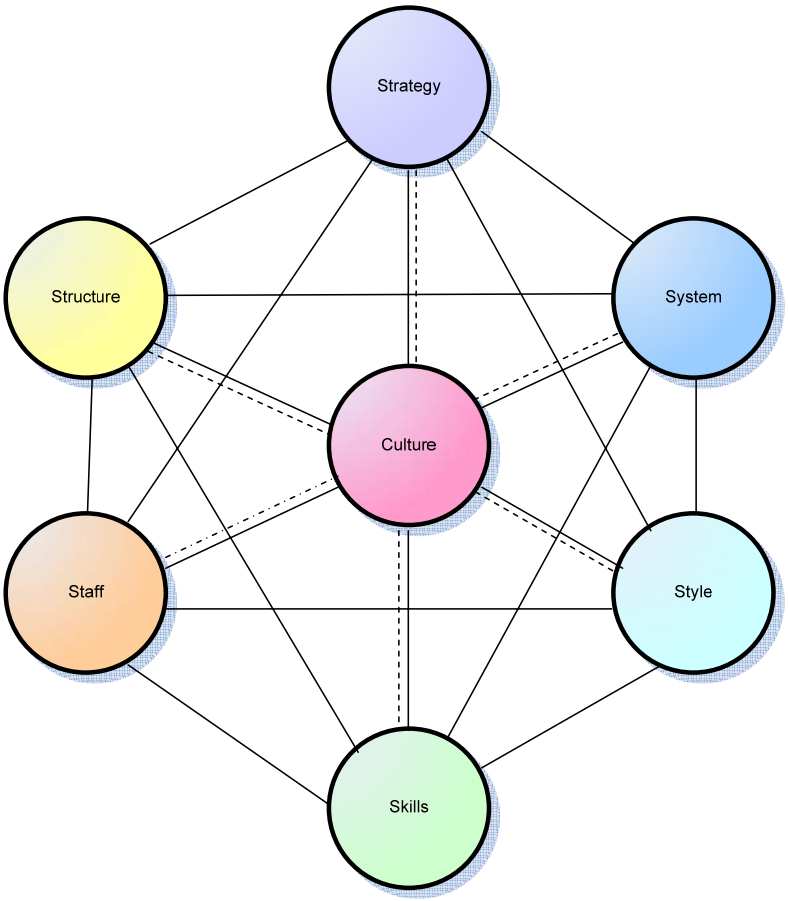


Figure 6.9 The Seven Ss model

1. Strategy: the action that is being planned
2. Structure: who is accountable to whom, and for what?
3. System: the procedures that make an organisation 'work'
4. Staff: how many people work here, what professions, what seniority, etc.
5. Skills, in four categories: clinical/technical; interpersonal/behavioural; managerial; research/evaluation
6. Style (of management): autocratic, participative, paternalistic, laissez-faire, empowering, supportive, etc.
7. Shared beliefs, or Culture: often beliefs about ideas.

Another useful model is the conceptual framework of issues in telemedicine transfer in Ethiopia (Tan et al., 2005). This paper showed how the key factors of ICT infrastructure and National ICT policy, are affected by culture as reflected in specific beliefs, values and technology. The details of these are shown in Figure 6.10.

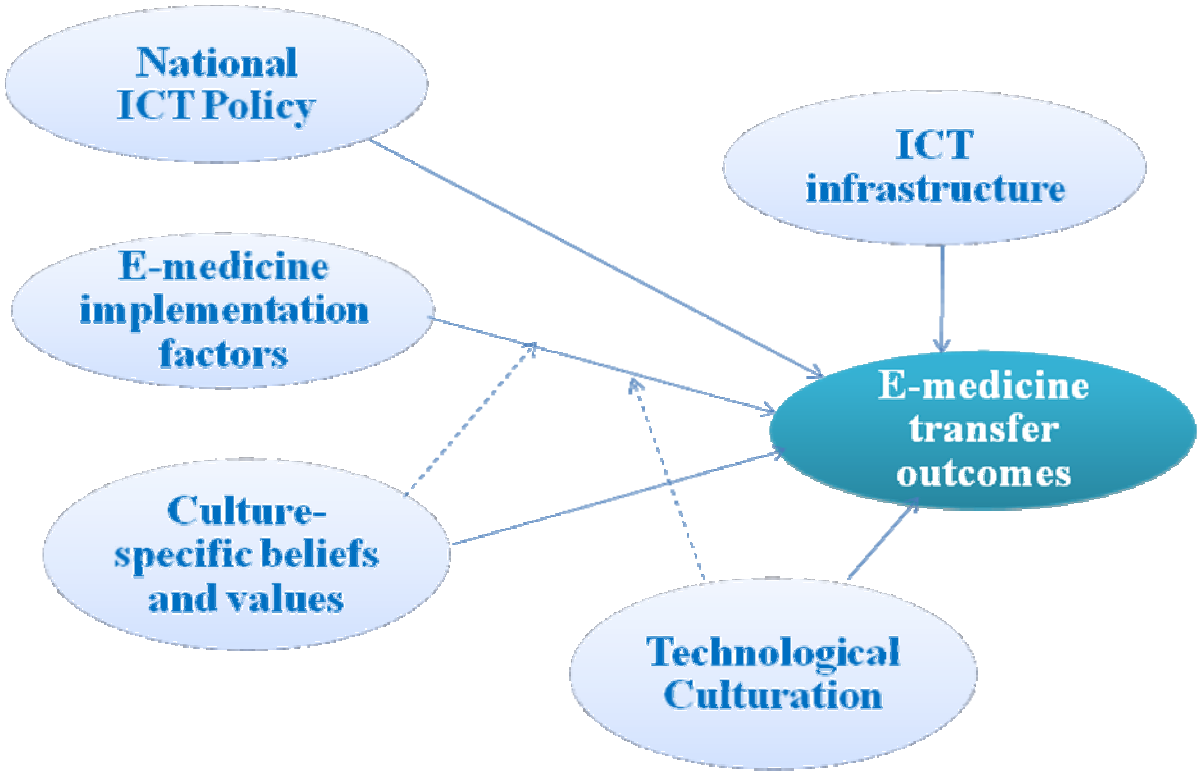


Figure 6.10 Conceptual Frameworks of Issues in Telemedicine Transfer in Ethiopia

Although there is substantial literature about barriers and drivers in eLearning, there are relatively few attempts to investigate their influences on online courses. In particular, no one has investigated the impact of the IFPC domains. Yet it seems clear

that the interaction of Infrastructure, Finance, Policies, and Culture may affect the implementation of eLearning courses.

6.7 IFPC model

The IFPC model was developed in the light of the academic literature; the focus is on the issues listed in Chapter 4. The proposed model is shown in Figure 6.11, with descriptions of the IFPC variables.

Infrastructure Variables

- Supporting tools for basic instructional activities, such as course design, organisation of group spaces and personal space, and easy integration of multimedia files
- Programme updating, development, and delivery of the courses
- Easy access to the technology, such as the internet
- Supporting technical skills and problems

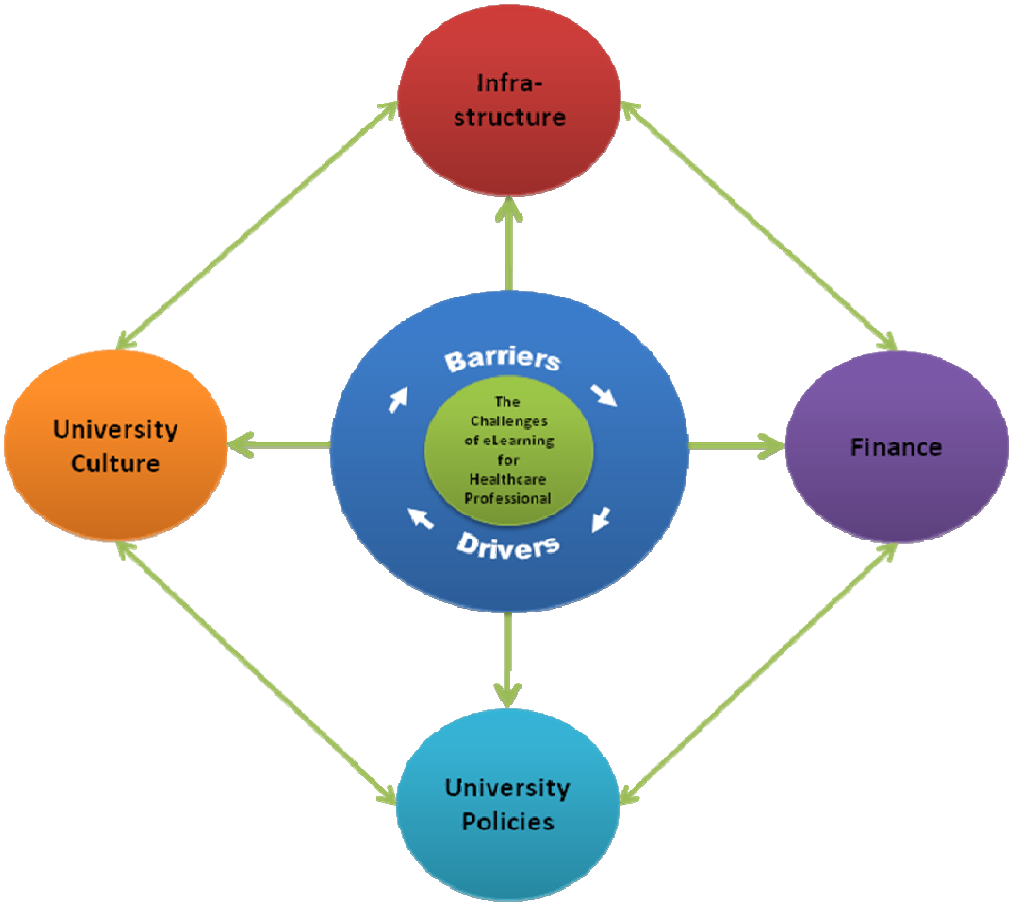


Figure 6.11 IFPC drivers and barriers of eLearning

Finance Variables: Supporting the funds to invest in eLearning courses

- The costs in material preparations and delivery
- The costs (time and human) of implementation
- The costs (time and human) of maintaining eLearning activities in the organisation

Policy Variables: The performance strategies to support eLearning

- Mission and vision to implement online learning and teaching
- Providing potential leadership for running the eLearning courses
- Providing the funds for the implementation of teaching and learning with technology
- Encouraging teachers to have ambitions to develop eLearning courses

Culture Variables: considered in the context of different parts of the world, such as developing and developed countries, particularly towards attitudes, values, and behaviour

- Awareness of the approaches to implementation of advanced technologies in different parts of the world, including both developed and developing countries
- Gender, age, caste, class, ethnicity, belief and behaviour, and educational attainment
- eLearners must have high eLearning self-efficacy and the appropriate behavioural skills, such as taking responsibility for learning.

6.8 Summary

eLearning will not be the only factor influencing the focus of universities. Other forces are at work, including changing government and professional requirements, economic development, technological change, changing employment patterns and opportunities, and changing expectations of students. Although the literature has presented many positive benefits and impacts of eLearning, none has addressed the impact in the four domains of the IFPC model. Therefore, consideration of these is crucial. While these have been investigated separately, especially when implementing learning and teaching at a distance, they have not been assessed as a whole. This applies particularly to those who use technology, for instance healthcare professionals in developing countries such as Thailand who need to continue updating information for their patients.

Chapter 7

Methodology for Second Stage Study

7.1 Introduction

This second stage research investigates the barriers and the drivers of eLearning for healthcare professionals in rural Thailand, including evaluation of the IFPC model. The earlier chapters have shown the scope of the barriers and drivers presented in the literature and found in our pilot study. This led the author to develop the IFPC model used to identify the main issues around the impact of eLearning. This chapter presents the research methodology (see Figure 7.1), followed by the research questions (section 7.2), the research design (section 7.3), the strategy of this research (section 7.4), the participants (section 7.5), and ethical issues and government data protection (section 7.6).

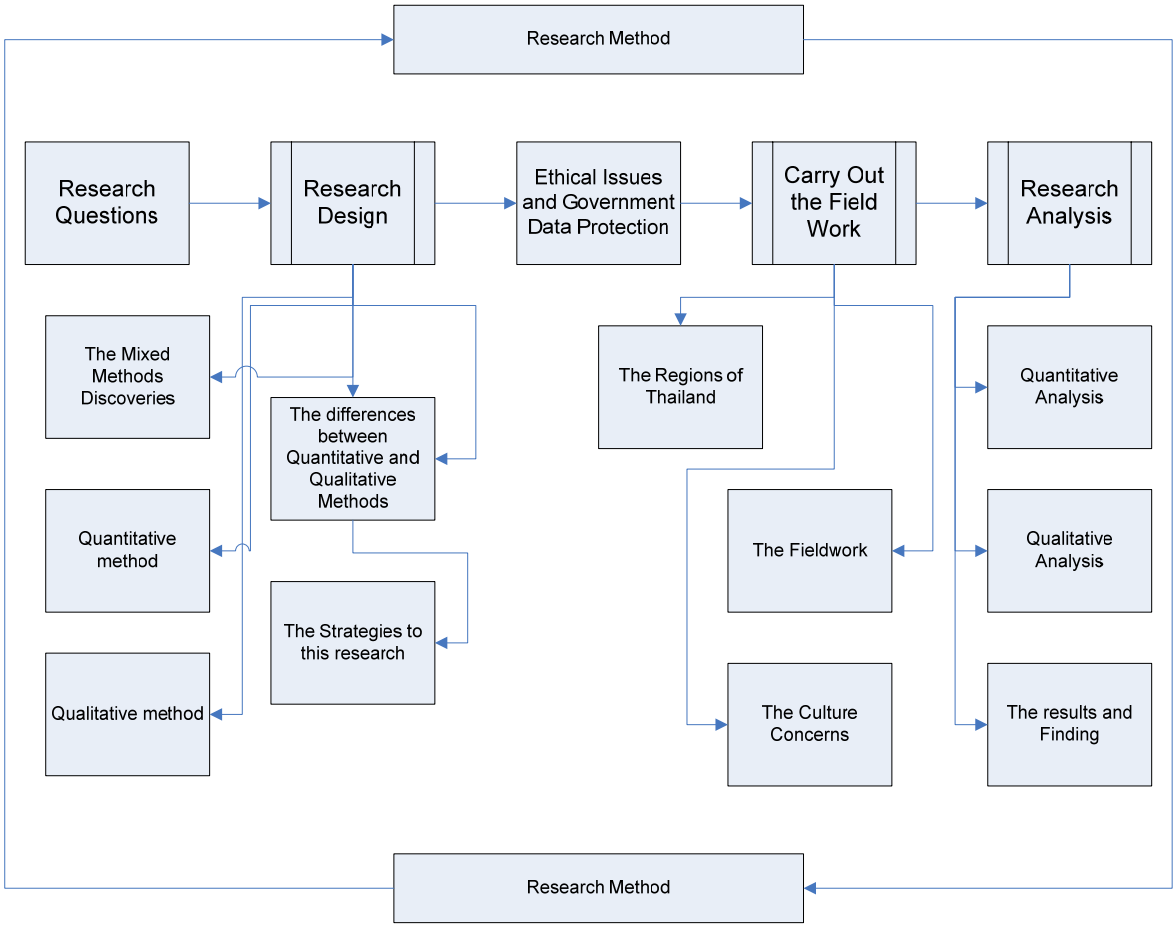


Figure 7.1 Design of the research method

7.2 Research Questions

The main aim of this research is to find the answers to the research question '*How do the barriers and drivers of eLearning affect uptake and use for healthcare professionals in rural Thailand?*' The research question was split into five categories.

(Q1) What are the barriers and the drivers to eLearning for healthcare professionals in rural Thailand?

(Q2) How is the attitude to the use of computers affected by the barriers to eLearning?

(Q3) How does the attitude to the use of computers affect the motivation for eLearning?

(Q4) How is the motivation for eLearning affected by the barriers to eLearning?

(Q5) What is the relationship between the factors of infrastructure, finance, university policies, and culture within an eLearning environment?

7.3 Research Design

It is common in designing research studies, to select and perhaps combine a number of methods, chosen according to the study objectives, assumptions and the need to test the hypotheses identified. One method may deal with one situation, while another method will suit another position. This empirical research used a mixed methods approach, as it allows for in-depth investigation of the impact of the eLearning environment on healthcare professionals in rural areas of Thailand. Three approaches to empirical research are discussed in the following sections: mixed methods studies (section 7.3.1), quantitative methods (section 7.3.2), and qualitative methods (section 7.3.3). The later sections describe how quantitative and qualitative methods differ (section 7.3.4), and the strategy chosen for this research study (section 7.4).

7.3.1 Mixed research methods

According to Taylor (2005b), research is an integral part of our society, and mixed research methods have been used for more than a decade, (Johnson & Onwuegbuzie, 2004; Onwuegbuzie & Teddlie, 2003; Sale, Lohfeld, & Brazil, 2002; Tashakkori & Teddlie, 2003). Authorities in this field suggest that mixed methods are effective when working with different types of data, answering different types of question, including working in research teams using different research paradigms. Mixed methods researchers do not have an *a priori* commitment to either quantitative or qualitative methods and refuse to choose between the two approaches. This approach is still in its early stages since scholars do not agree on many basic issues related to the field (Teddlie & Tashakkori, 2003).

Johnson and Onwuegbuzie (2004) declared that "*Mixed methods is the class of research where the researcher mixes or combines quantitative and qualitative research techniques, method approaches, concepts or language into a single study*." Onwuegbuzie & Teddlie (2003) defined "*A mixed methods study involves the collection or analysis of both quantitative or/and qualitative data in a single study in which the*

data is collected concurrently or sequentially, are given a priority, and involve the integration of the data at one or more stages in the purpose of research."

In spite of the diversity of approaches, discussion about mixed methods by researchers is productive, because it offers an immediate and useful middle position, philosophically and methodologically (Johnson & Onwuegbuzie, 2004).

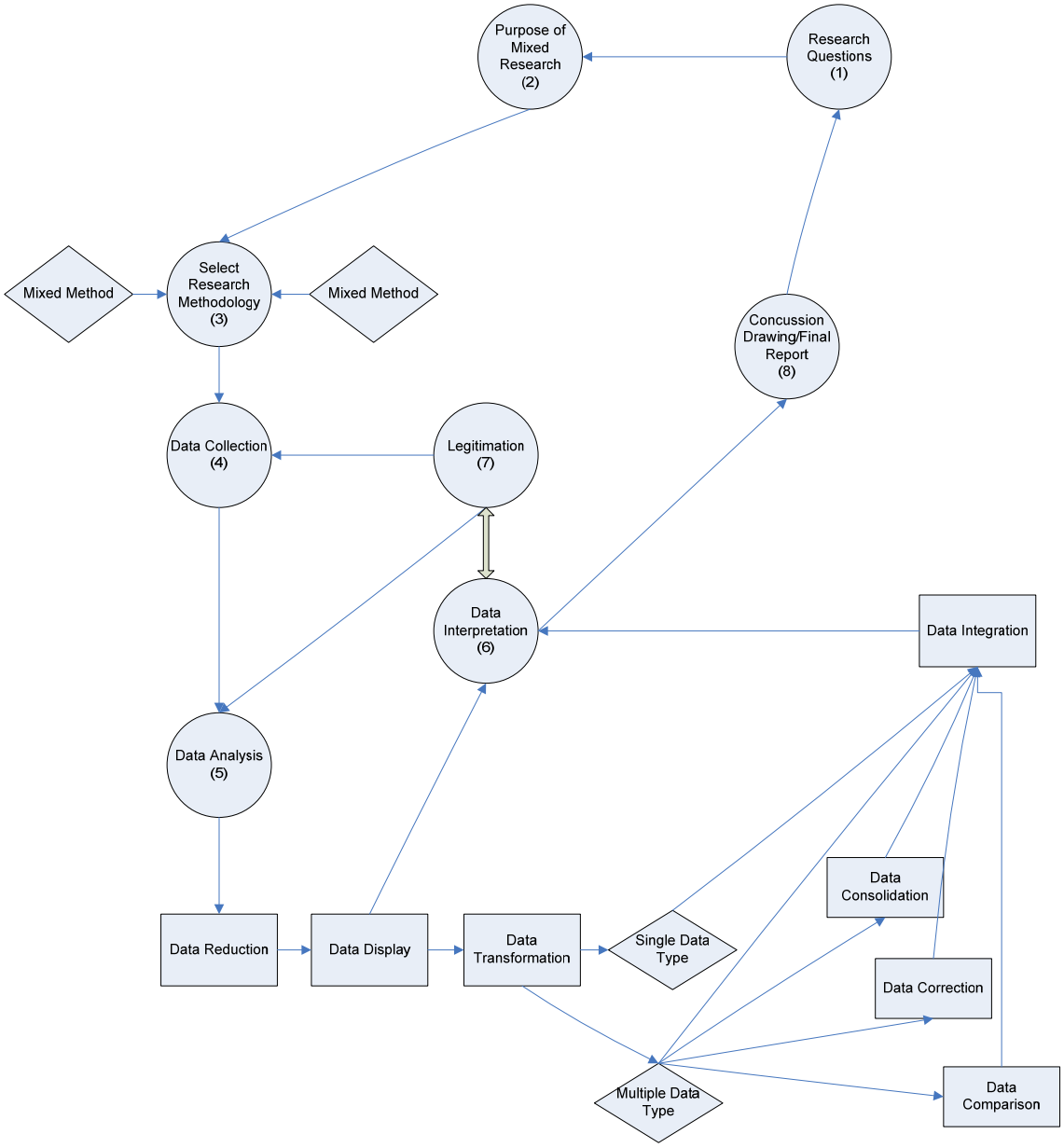


Figure 7.2 Mixed research process model

Gaining an understanding of the meaning of mixed methods puts a researcher in a position to use multiple data sets by combining the different approaches and methods into research strategies (see Figure 7.2 in which represent steps 1-8 in the mixed

research process: rectangles represent steps in the mixed data analysis process, diamonds represent components (Johnson & Onwuegbuzie, 2004)).

7.3.2 Quantitative methods

Much quantitative research aims to establish relationships between phenomena, to provide valid and objective descriptions of phenomena and the relationships between variables. Taylor (2005b) has identified the paradigms for the quantitative research method, and they are:

1. Test a theory/hypothesis
2. Select variables that have been quantified to numbers
3. Statistical procedure to analyse data
4. Determine if the theory/hypothesis is accepted or rejected.

In order to make this research valid, it used a questionnaire adapting questions and scales from literature reviews, which are shown in the four domains of the IFPC model.

The structure of the questionnaire for IFPC

The aim of the questionnaire is to investigate the facts and opinions of the user group about the barriers and drivers to eLearning for healthcare professionals. This critique is a feedback into the IFPC model. According to Denscombe (2005b), the information from the questionnaires tends to fall into broad categories, such as 'factual information' (i.e. respondent's addresses, age, gender, marital status, number of children), and 'opinion' (i.e. attitudes, views, beliefs, preferences). This research therefore covered the following areas: (The detailed questionnaire is given in Appendix C).

1. Facilities of the eLearning environment
2. Funding, Time and Training
3. University policies for the eLearning courses
4. Attitude to the use of computers for eLearning courses (PEOU)
5. Student's motivation for signing up for eLearning.

Moreover, the questionnaire was applied using valid and reliable methods, as described below.

The Validity of the Questionnaire for the IFPC

The questionnaire was validated by four senior healthcare professionals who are currently studying for a PhD in the School of Health Science at the University of Southampton. They checked for validity of content, which were matches for actual situations within eLearning for healthcare professionals, particularly in rural Thailand. This method is advocated by Design (2007), who suggested that all proofs of validity employ one or more of these methods: Validity of Content, Predictive Validity and Validity of Construction.

The Reliability of the Questionnaire for the IFPC

The questionnaire was pilot tested on 37 healthcare students who are currently studying on an eLearning course at a university in an anonymous rural area of Thailand. The reliability was tested for a sample as a whole using Cronbach's alpha measure of reliability, which ranges from 0 to 1. Hair et al. (2010) indicated that the values of 0.60 to 0.70 were deemed to be the lower limit of acceptability. The result obtained was 0.83, as shown in Figure 7.3, which therefore demonstrates that this method would produce the same result if the assessment were to be repeated a number of times. The parts of the questionnaire, which were used for the trial, included perceived ease of use for the eLearning courses (PEOU) and perceived usefulness (PU) for the eLearning courses.

Reliability

```
 ****** Method 1 (space saver) will be used for this analysis ******



  R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

                                                        N of
Statistics for         Mean    Variance     Std Dev  Variables
      SCALE         58.9730     62.0826      7.8793         22


Item-total Statistics

               Scale          Scale      Corrected
               Mean          Variance       Item-            Alpha
             if Item         if Item        Total           if Item
             Deleted         Deleted    Correlation         Deleted

VAR00034       56.4595         56.5330         .3664           .8289
VAR00035       56.2703         59.5360         .1149           .8423
VAR00036       56.3243         59.1141         .1696           .8382
VAR00037       56.5405         58.6997         .1513           .8420
VAR00038       56.5405         58.6441         .2809           .8318
VAR00039       56.4595         60.7553         .0316           .8462
VAR00040       56.1622         56.9730         .4366           .8257
VAR00041       55.8108         56.1021         .5748           .8209
VAR00042       55.7297         57.5360         .4250           .8265
VAR00043       55.6216         55.6306         .6407           .8186
VAR00044       56.0541         55.4414         .5363           .8212
VAR00045       56.4054         58.2477         .3458           .8294
VAR00046       56.1622         55.0841         .6257           .8181
VAR00047       55.9730         55.8048         .5857           .8202
VAR00048       56.7297         54.3694         .5476           .8199
VAR00049       56.5135         54.8679         .5526           .8201
VAR00050       56.8649         57.1757         .4183           .8265
VAR00051       56.5676         54.9745         .4960           .8225
VAR00052       56.3243         54.9474         .7174           .8158
VAR00053       56.5676         57.7523         .3453           .8294
VAR00054       56.2432         58.9670         .3257           .8302
VAR00055       56.1081         57.1547         .4750           .8247


Reliability Coefficients

N of Cases =     37.0                    N of Items = 22

Alpha =     .8340
```

Figure 7.3 Cronbach's alpha test for the sample size of 37

7.3.3 Qualitative methods

Holloway (2005) remarked that qualitative research could be an important tool in understanding the emotions, perceptions and actions of people, including particular types of behaviour, which can only be understood when it is observed and people are asked about it. Qualitative research also seeks out the 'why', not the 'how', of its topic through the analysis of unstructured information, e.g. interview transcripts, emails, notes, feedback forms, photos and videos. It does not rely on statistics (Ereaut, 2007) because the participants do not make up a randomly selected representative sample; the samples are relatively small, and not all participants are asked precisely the same questions. Instead, the researcher might seek to describe or explain what is happening within a smaller group of people. This, they believe, might provide insights into the behaviour of the wider research population, but they accept that everyone is different

and that if the research were to be conducted with another group of people, the results might not be the same (Sanchez, 2006).

Moreover, one of the major reasons for doing qualitative research is to become more experienced with the phenomenon you are interested in (Trochim, 2006). During the last fifty years, qualitative methods have become established in a range of academic disciplines, such as education, social policy, human geography, social psychology, history, organisation studies, and health sciences (Avis, 2005). Details of these disciplines are shown in Figure 7.4, Ereaut (2007).

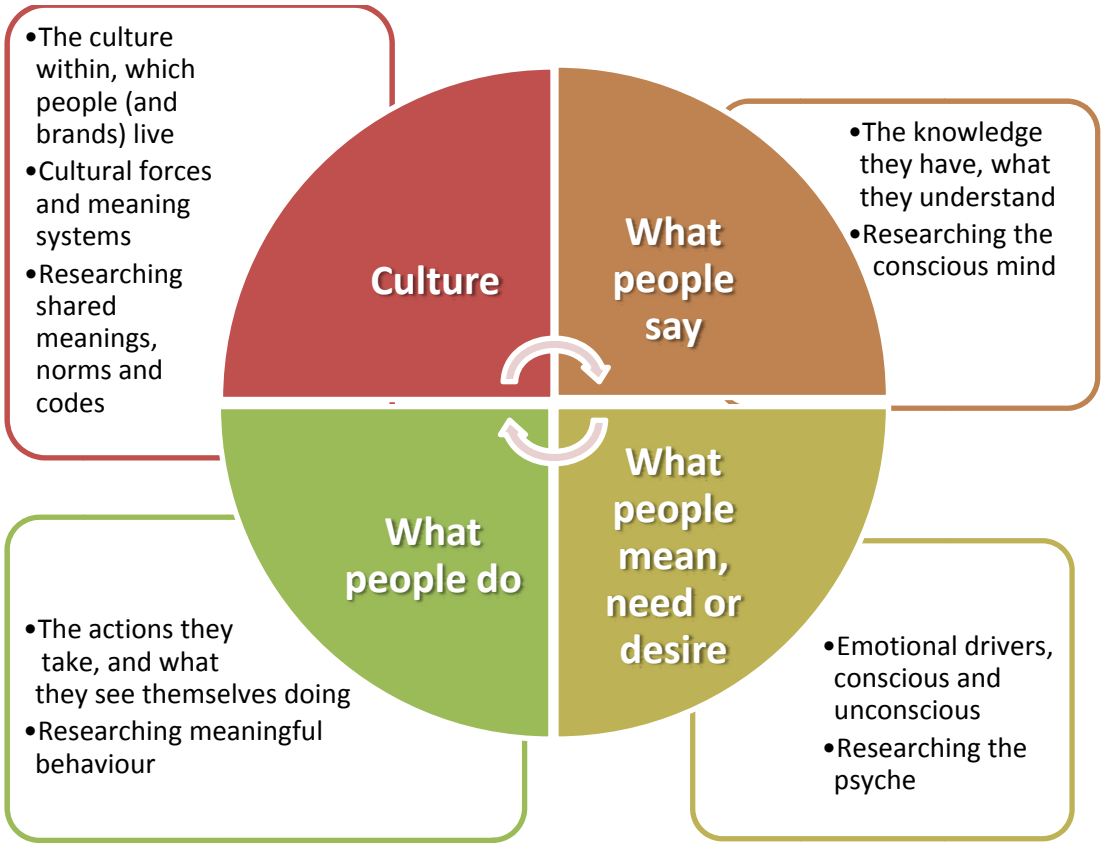


Figure 7.4 The adapted figure of multiple focal points of qualitative research

Taylor (2005a) led the paradigm selections for qualitative research, the results of which are the methods listed below.

1. A process of inquiry in a naturalistic setting
2. In-depth person-to-person interviews to understand a lived experience or social or human problems
3. Qualitative procedure to analyse data
4. Developing complex, holistic, descriptions derived from co-researchers.

7.3.4 Qualitative methods for IFPC

To summarise, this method employed in-depth interviews and group discussions to encourage the participants to express their views and opinions with regard to their understanding of the phenomena of the barriers and drivers to eLearning for healthcare professionals, particularly in rural Thailand.

The Interviews

The interviews aim to achieve in-depth information from the participants. As Denscombe (2005a) concluded, '*interviews are a reasonable option to pursue in terms of the desirability of the particular type of data they produce*.' The main task in interviewing is to understand the meaning of what the interviewees are saying (Kvale, 1996a). The qualitative research interview seeks to describe the meanings of the central themes in the lives of the subjects. The interviews are also particularly useful for eliciting the story behind a participant's experiences, and the interviewer can pursue in-depth information around the topic. Interviews may be useful as a follow-up to a certain respondent's questionnaire, e.g. to further investigate their responses (McNamara, 1999). Interviews shows how people think, behave, and solve problems.

Thus, this research conducted further interviews with 20 participants to investigate the impacts of eLearning courses. This number was chosen since Kvale (1996b) suggested that, in general with interview studies, the number of interviewees tends to be 15 ± 10. This study needed the participants to cover an issue of sampling, which need four groups of healthcare professionals to identify the barriers and drivers of the four domains in the IFPC model. Thus, this study was drawn from administrators, lecturers, and webmasters (see Table 7.1).

Table 7.1 Details of the participants interviewed from Thai Higher Educations

Position	Quantity	Areas
Administrators	4	One each from a Thai Higher Education institution in the North, in the North East, in the South, and in Central Thailand
Lecturers	12	Three each from a Thai Higher Education institution in the North, in the North East, in the South and in Central Thailand
Webmasters	4	One each from a Thai Higher Education institution in the North, in the North East, in the South and in Central Thailand

The approach of the interviews

The semi-structured questions were drawn from Chapter 4 Barriers and Drivers of eLearning, and discussed in more detail in Chapter 6 Discussion of IFPC model. The questions were designed to probe the impact and relationship between IFPC factors within the eLearning environment. The outline and summary of the interview structure are shown in Figures 7.5 and 7.6 as follows.

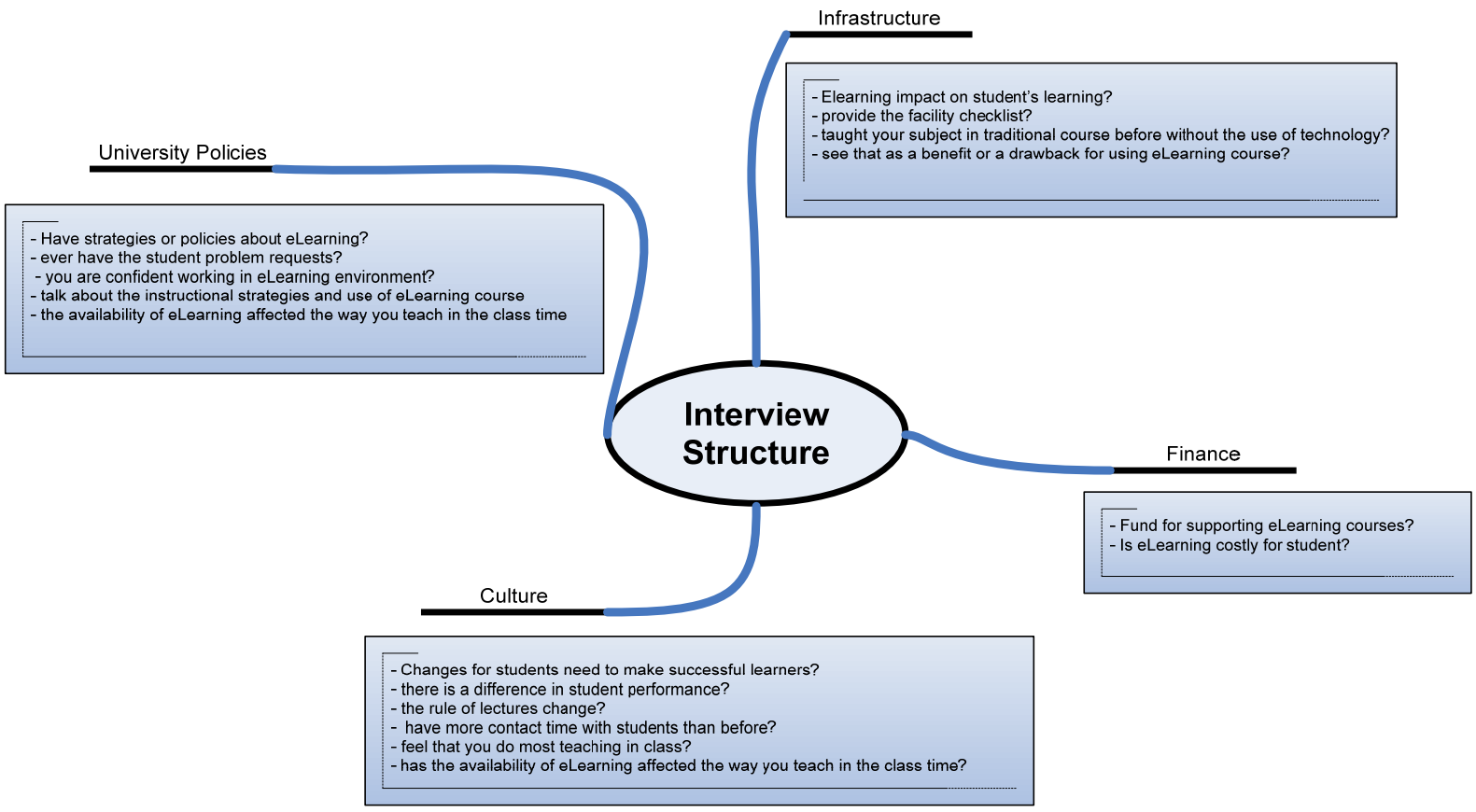


Figure 7.5 The map of IFPC outline interview questions

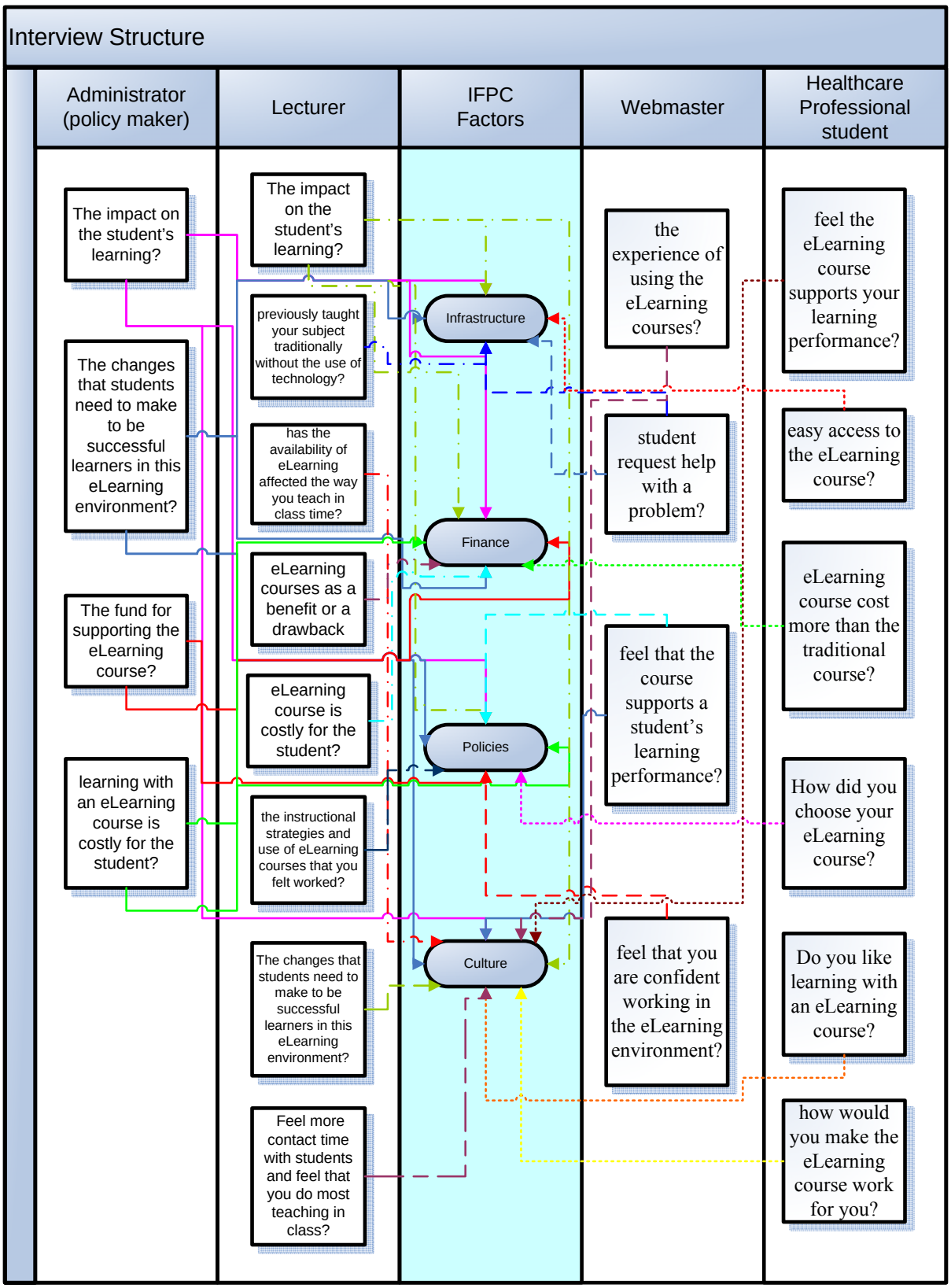


Figure 7.6 Diagram of semi-structured questions based on IFPC factors

Group Discussion

This technique aims to elicit the information from healthcare professional students. The group comprised 5 students in each university, giving 20 participants in total. According to Kitzinger (1995) '*The idea behind the focus group method is that group processes can help people to explore and clarify their views in ways that would be less easily accessible in a one-to-one interview*.' This technique aimed to encourage participants to explore the issues that are important to them. As mentioned in Chapters 4-6, there was discussion about the culture of Thai society that might affect face-to-face interviews, especially when the interviewers are more senior to the students. For those reasons, group discussion is the best way of eliciting answers, as it can stimulate them to give more information about their opinions. The details of questions for group discussions are shown in Table 7.2

Table 7.2 The Group discussions protocols

No.	Questions
1	How do you feel about the experience of using the eLearning courses? a. Did you feel that the course supports your learning performance? b. How did it support it?
2	Do you have easy access to the eLearning course? a. If yes or no, please explain. b. How did you deal with it?
3	Does the eLearning course cost more than the traditional course? a. If yes or no, please explain. b. How did you find out about it? c. What are the benefits of eLearning for you?
4	How did you choose your eLearning course? a. For example: Did you choose for yourself , or were you influenced by the school? b. How did you find it?
5	Do you like learning with an eLearning course? a. Please explain your answer.
6	Can you give your opinions on the following: '*how would you make the eLearning course work for healthcare professionals, especially personally?*'

7.4 Research Strategy

This research uses the mixed methods approach. The mixed methods design, based on Johnson and Onwuegbuzie (2004), is shown in Figure 7.7 below. In the diagram, the numbers represent the Steps, which are now described. The research questions are broken down into a number of stages, as follows.

Step 1: The initial step was a literature review and some exploratory fieldwork. The literature review divided into three topics: eLearning in context (Chapter 2), eLearning for healthcare professionals in Thailand (Chapter 3), barriers and drivers to eLearning (Chapter 4). The fieldwork was the pilot study: eLearning at work (Chapter 5). This step would go some way to answering in part the research questions '*What are the barriers and the drivers in regard to eLearning for healthcare professionals in rural Thailand?*' and '*How does the motivation of eLearning affect by the barriers of eLearning?*' However, to make the answers and questions complete, further research was required, derived from the fieldwork (Step 3).

Step 2: The second step was a critique of the main barriers and drivers to eLearning. This included discussion and a summary of the results from both the literature and the pilot study (Chapter 6). The output from this step was the IFPC model (see Figure 7.9). This step would also answer, in part, the research questions '*How does the attitude of the use of computers affected by the barriers of eLearning?*' and '*How do healthcare professionals make the best use of the drivers?*' However, the complete answer from the research depends on the results from the fieldwork (Step 3).

Step 3: This step was fieldwork – the elicitation of information on eLearning from healthcare professionals a wider range of sites in rural Thailand. The study was designed to work with two mixed research methods: quantitative techniques (questionnaires) and qualitative techniques (interviews and group discussions).

Step 4: This step was an analysis phase, to test the relation between the variables of the IFPC model to find answers to the research question '*What is the relationship between the factors of infrastructure, finance, university policies, and culture within eLearning environment?*'

The remaining four steps are self-evident from the flow chart in Figure 7.8.

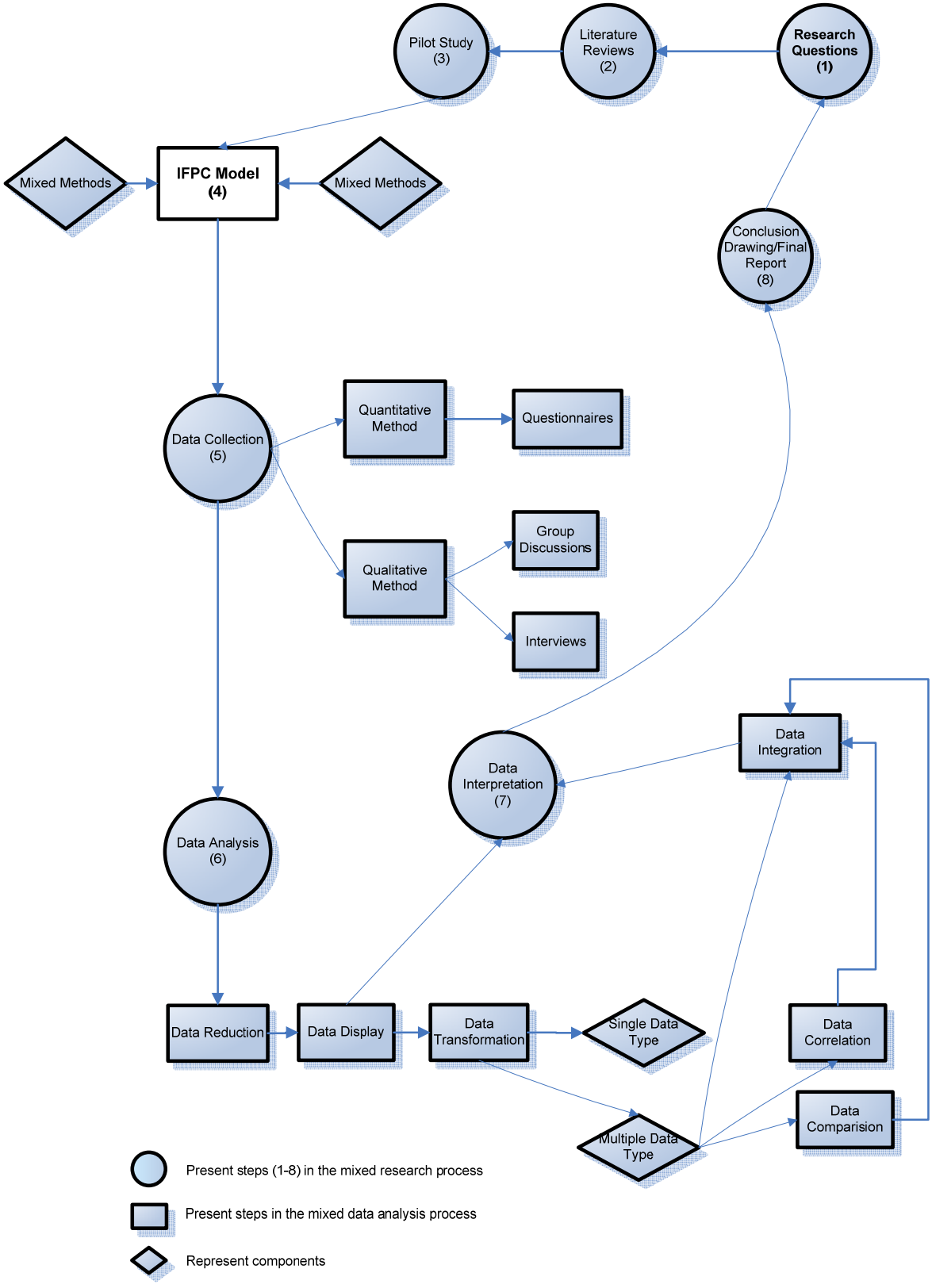


Figure 7.7 The mixed methods strategy for the IFPC research model

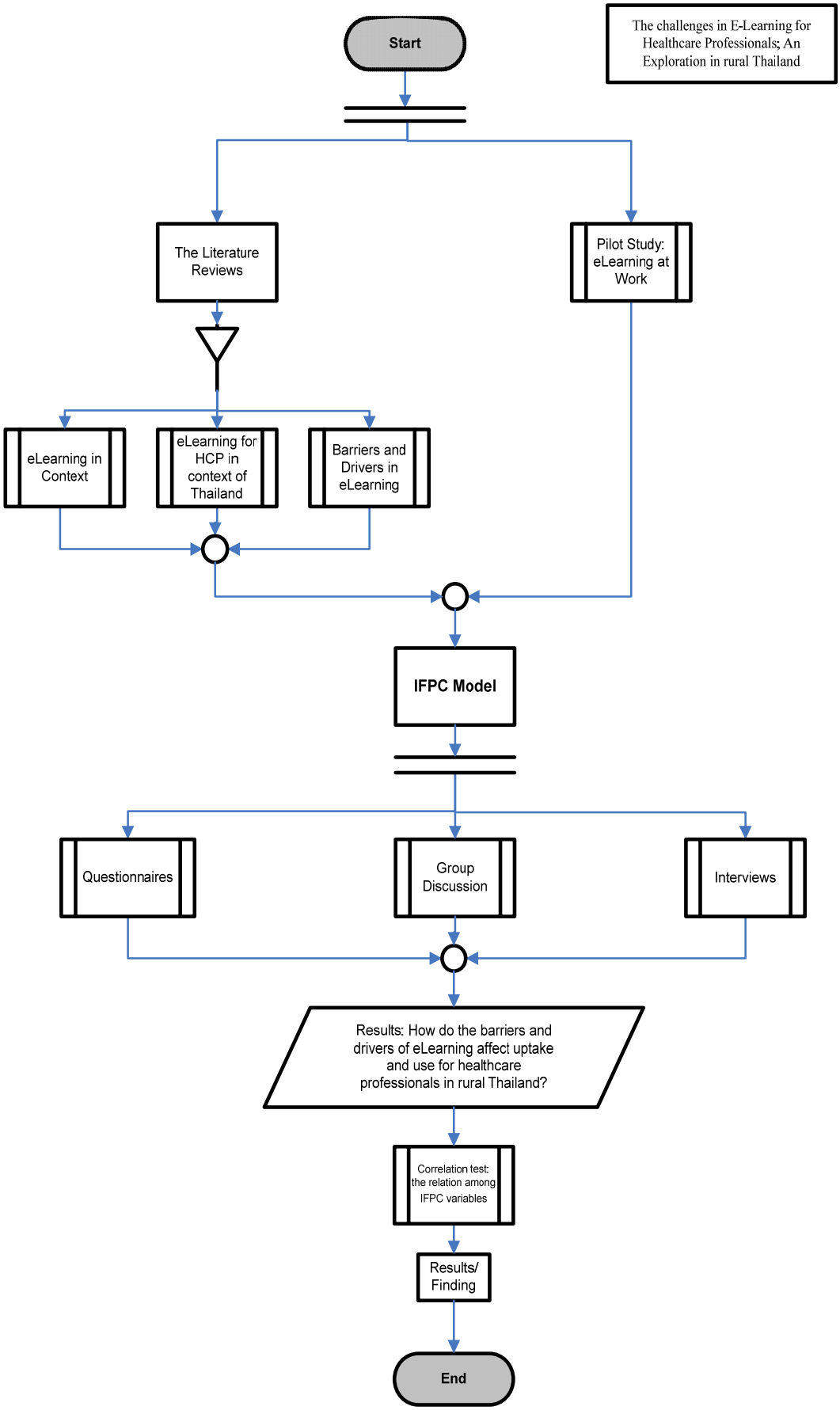


Figure 7.8 System Flowchart

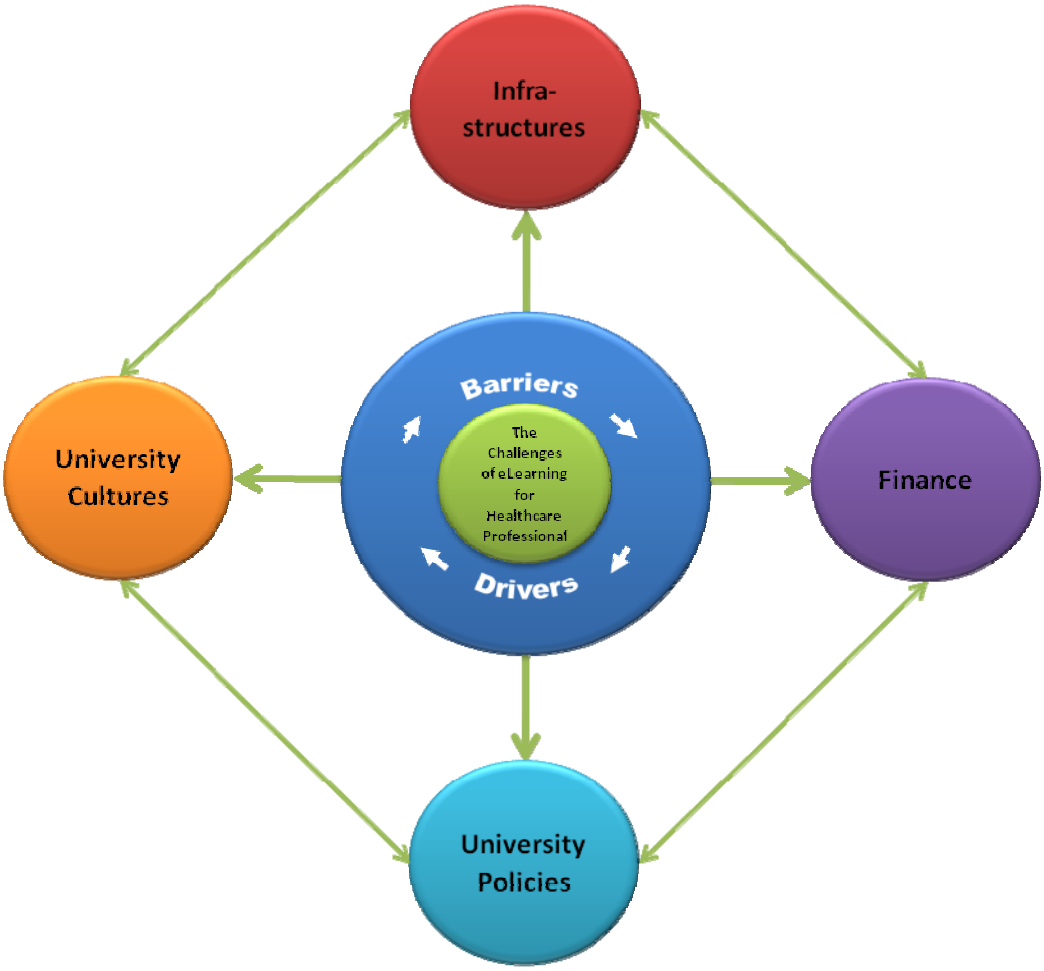


Figure 7.9 IFPC research model for investigating the Barriers and Drivers of eLearning for healthcare professional students

7.5 The Participants

The intention was to select participating higher education institutions in rural areas within the four regions of Thailand. In the event, two institutions were included from North region, and one each from Northeast and South regions. An institution was identified in Central region, but it did not prove possible to complete data collection there. Each institution was selected because it had been using an eLearning programme for healthcare professionals.

In Thailand, there are 67 public higher education institutions and 56 private higher education institutions[5]. The institutions were selected from the websites of the

[5] Office of the Higher Education Commission of Thailand (http://www.stat.mua.go.th/eDoc/)

universities that appeared to be using online teaching in 2009. The purposive sampling method identified by Miles and Huberman (1994) stated that qualitative samples tended to be purposive, rather than random (see also Coyne (1997) and Patton (2002)). Several institutions indicated that they have continued using eLearning courses. However, some institutions did not continue with their eLearning courses. Table 7.3 shows details of the institutions that used eLearning tuition for healthcare professionals and were candidates for inclusion in the study.

Table 7.3 Institutional websites using eLearning for healthcare professionals as at 2010

Institutions' website	Courses Continuing	Represen-tative for study	North	North East	Central	South
eLearning.kku.ac.th (Khon Kaen University)	Yes	No		√		
learning.nu.ac.th (Naresuan University)	No	No	√			
ncourse.buu.ac.th (Burupha University)	No	No			√	
tsl.tsu.ac.th (Thaksin University)	No	No				√
cmuonline.cm.edu (Chiang Mai University)	Yes	Yes	√			
d4lp.sci.ubu.ac.th (Ubon Ratchathani University)	No	No		√		
61.7.235.248 (Boromarajonani College of Nursing, Lampang)	Yes	Yes	√			
www.scphtrang.ac.th (Sirindhorn College of Public Health, Trang)	No	Yes				√
61.19.124.205 (Sirindhorn College of Public Health, Ubon Ratchathani)	No	Yes		√		

The number of participants who took part in this study is shown in Table 7.4. Interviewees were identified by the 'number of interviews' method (Kvale, 1996a). Individuals, who qualified in terms of specified selection, were used as the starting points for the sample chains at each institution. Initial contact was made through lecturers who had responsibilities associated with eLearning at their institution. These

were first contacted by email to arrange for the gathering of information and permission to collect the data.

This research classified the sample into four groups: Administrators, Lecturers, Webmasters, and Healthcare professional students. The research data was gathered from participants connected with the eLearning courses. The details of the respondents are also shown in Table 7.4.

Table 7.4 The number of participants

Participants	**Number**	**Research Method**
Administrators of four HE institutions	4	Interviews
Lecturers of four HE institutions	12	Interviews
Webmasters of four HE institutions	4	Interviews
Healthcare professional students of HE institutions	20	Group discussion
Healthcare professional students of HE institutions	200	Questionnaires
Total	240	

The sampling method was designed to ensure that the information gathered reflected the range of influence on eLearning courses at each institution. The roles and responsibilities of those individuals who were participants in the study are listed below with their titles.

1. The administrators of the institution, such as the Dean and the Deputy Vice Chancellor who have responsibility for the initiatives concerned with the policies and strategies supporting the eLearning courses.
2. The lecturers from the institutions who conducted the eLearning courses.
3. The webmasters of the institutions who supported or promoted the eLearning courses.
4. The healthcare professional students who were recipients of the eLearning courses.

There were at least ten participants from each institution for the individual interviews. However, in the group discussions, there were at least 5 healthcare professional students from each institution. Typical interviews and group discussions lasted between 30 and 50 minutes.

Participants were offered a transcript of the interview, and were assured that all data would be made anonymous in the report and analysis. Subjects were offered individual copies of the final thesis and the opportunity of a follow-up discussion at the institution to explore the points that emerged from the whole study.

Participants were asked a series of semi-structured questions designed to help the researcher understand the organisational structure within each institution, and to explore the barriers and drivers to eLearning in the area of healthcare professionals.

The interviewees all appeared to be comfortable with the process, responding openly and being helpful and forthcoming. Some institutions no longer continued their eLearning programme. Further questions in respect of the fieldwork are shown as Figure 7.10.

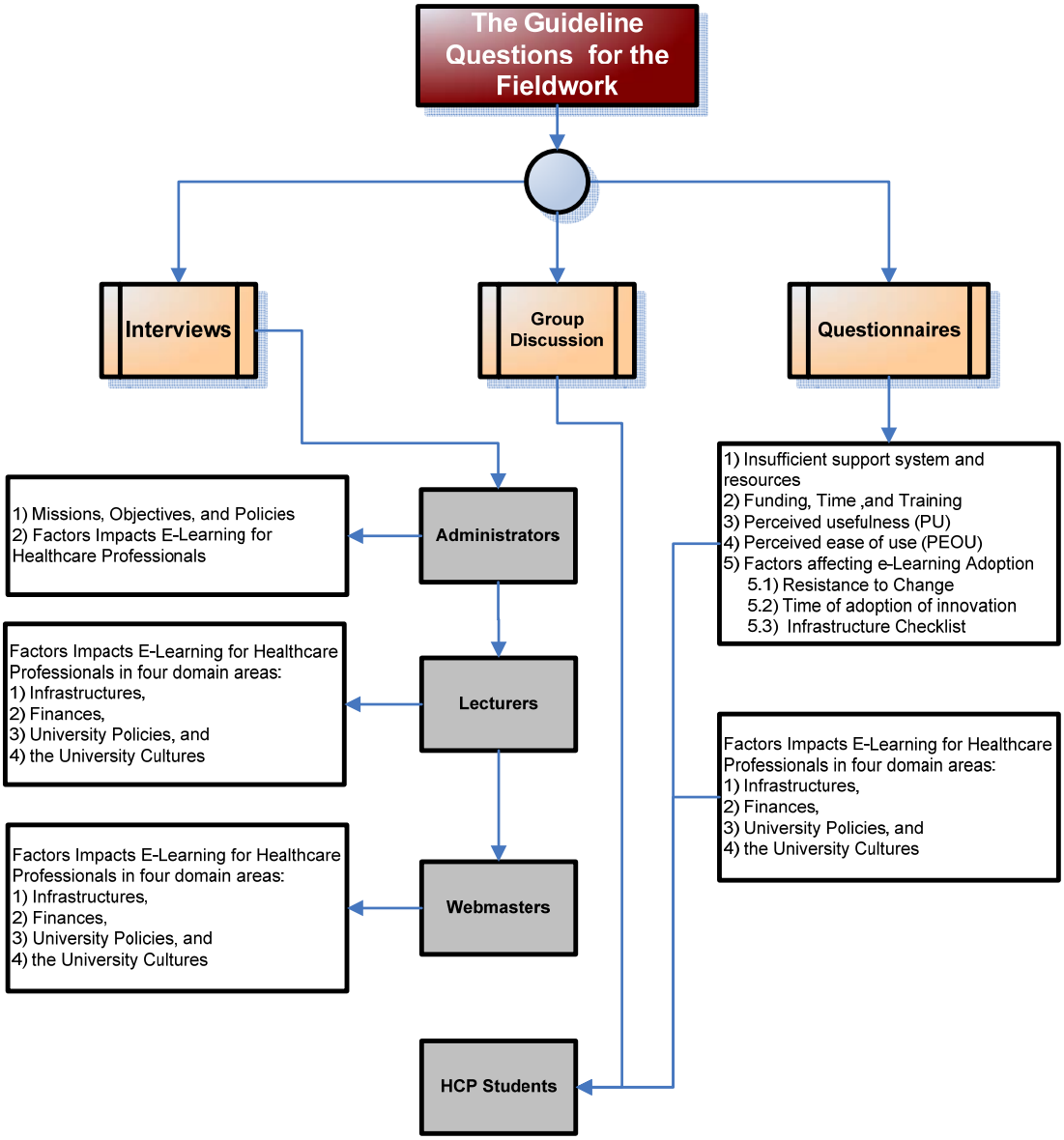


Figure 7.10 The Guideline for the Questions for the Fieldwork

7.6 Ethical Approval

Under current arrangements for governing the conduct of research in both the UK and Thailand, researchers are required to demonstrate that a study meets required ethical standards. These include putting in place adequate safeguards so that the study ensures the informed consent of subjects, the confidentiality of personal information that it would not be appropriate to publish, and the avoidance of harm to those who take part. Consequently, approval was sought for this research from the Ethical Committee of the School of Electronic and Computer Science at the University of Southampton.

This covered the concerns of purpose, professionalism and practice. Ethical approval was granted under reference number E/09/12/003. Subsequently it was found that the four participating higher education institutions would also require the project to be submitted to their own research ethics committees for approval. This was undertaken and in each case approval was granted. Documents prepared to comply with ethical requirements are included as appendices: Consent Form (Appendix D) and Best Practice (Appendix E).

7.7 Research Fieldwork

The fieldwork involved travelling around Thailand to collect the data from rural areas. The initial stage was to identify the institutions that had established eLearning courses. This was achieved by searching through information on the institutions' websites. The detail of the journeys undertaken follows.

7.7.1 North Region

Three institutions were found in the North, which appeared to show eLearning courses for healthcare professionals on their websites. All institutions were contacted by email to arrange the gathering of information and permission to collect the data. The institutions were Chiang Mai University, Narasuan University, and Nakorn Lampang Boromrajonani College of Nursing (Kelang Nakorn Campus). Narasuan University was unable to provide information, as their eLearning courses was not ready to teach online, and no students had applied for their courses. Thus, Chiang Mai University and Nakorn Lampang Boromrajonani College of Nursing (Kelang Nakorn Campus) were contacted and research access was agreed. Before the fieldwork could begin, it was necessary to apply for ethical approval from these institutions, as some questions involved obtaining confidential information from the participants. The Ethical Approval granted by the University of Southampton, the questionnaires, interview questions, and the group discussion protocol, were all translated into Thai and submitted to the Thai universities' ethics committees, which then approved them.

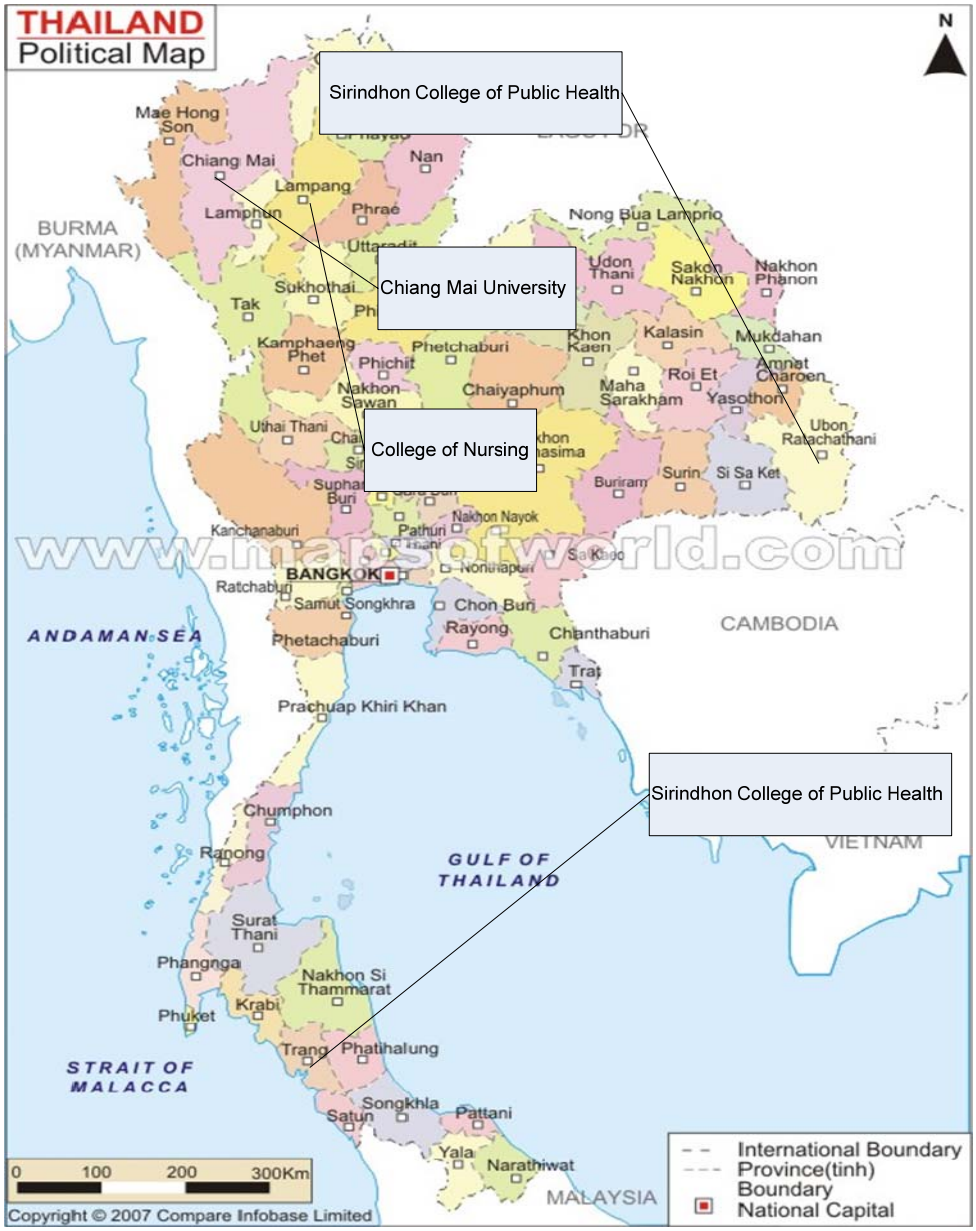


Figure 7.11 Map of the journeys around Thailand for the collection of data[6]

The questionnaires were sent to the lecturer in each university. They had a dual role as they were also the head of IT. The lecturers volunteered to collect them the week before the fieldwork. Although the exact numbers of students applying for eLearning courses was unknown, 100 questionnaires were sent to the lecturers. The questionnaires were collected from students with good, medium and poor academic grades; these were selected at random from the classes.

[6] Source: www.mapsofworld.com/thailand/thailand-map.html

7.7.2 North East Region

Similar to the North region, three institutions in this part of the country were contacted by email for permission to collect the data. Unfortunately, two of the institutions did not reply to emails requesting further information. Thus, Sirindhon College of Public Health in Ubon Ratchatanee province was chosen as the one institution to carry out the fieldwork. However, the eLearning courses there were stopped in 2009, six months before this study, because of political changes at the institution and changing infrastructure for the eLearning computer servers. Despite this, all participants from this group were very welcoming and provided detailed information of what had taken place on their eLearning courses.

As in the Northern region, it was decided to administer 50 questionnaires to a sample of students, but the university did not provide an email account for students. Thus, the collection of data by online questionnaire was very difficult, if not impossible. The questionnaires from the participants in the interviews and group discussion were completed on the same day as the fieldwork, which started very early in the morning.

7.7.3 Central Region

This area was dealt with in the same way as the North and the North East. The Faculty of Public Health from a university located in a rural area of Central Thailand was contacted by email. This seemed to be a very good first contact as the relevant staff were able to provide further information, and the research aims and the research tools were then sent to the participants. Unfortunately, communication between the respondents and the researcher broke down by the time the data was due to be collected, because the staff member who was responsible for their eLearning courses did not reply to further emails until after the date of data collection. Thus, it was decided to collect the data by online questionnaire, but this also failed, because, again, no university email account was provided for the students. Hence, the online questionnaire had few responses, and the fieldwork was unable to conduct the interviews and group discussions.

7.7.4 South Region

The first stage in obtaining data from this region was to search for two institutions that had displayed their eLearning courses on their websites. These were the Faculty of Public Health at Thaksin University, and Sirindhon College of Public Health in Trang province. Thaksin University was unable to provide the information on their courses, because the eLearning courses had been discontinued due to lack of use. Their response suggested that they did not want outsiders to examine their courses. Therefore, Sirindhon College of Public Health in Trang was selected.

The questionnaire was not finished on the same day as the interviews and a group discussion, as most of the students were out of the college attending a Public Health training course. Hence, the questionnaire was sent to the students by the staff, and was received back a month after the fieldwork had been carried out. However, the participants who were there, the administrators, lecturers, and some students, participated in the interviews and group discussions.

7.7.5 Getting around the four regions

The fieldwork trips started from the south travelling by hire car from Phuket to Trang. It took about 4 hours to get to Sirindhon College of Public Health. The participants of this region were very hospitable and provided excellent information about their eLearning courses, even though their eLearning courses were being cut back.

The second field trip was to the North of Thailand. The first institution was the Faculty of Nursing, Chiang Mai University, which was also very welcoming, and provided additional information. They willingly participated in this research, even though they were very busy with the students' graduation day. The main university policymaker, who was in charge of the eLearning courses, was unavailable for interview on that day, although all the lecturers and the Deputy Dean were willing to be interviewed. In particular, one participant was interviewed at the ice-cream shop, because she had to look after her child on that day, as the school was closed owing to an epidemic disease outbreak there.

The third place from which data was collected, was the College of Nursing in Lampang, which is beautiful and has ceramic decoration all around the town. The interviews, group discussions and the questionnaire were arranged over a two-day period. On the first day, the questionnaires were administered to the healthcare professional students who had enrolled on the eLearning courses. On the second day, the interviews with the lecturers, an administrator of the college, and a group discussion with the healthcare professional students, were carried out.

The final trip was to the North East of Thailand. Ubon Ratchatanee is near the border with Laos, by the Maekong River. The eLearning courses here were discontinued in 2009. However, the participants were very happy to take part in the interviews and group discussions. The questionnaires were sent by post two weeks before the fieldwork, and a lecturer volunteered to collect them.

This fieldwork thus consisted of long and costly journeys between provinces. The best way to travel is by hire car, because there are no flights between the provinces; all internal flights have to go via Bangkok. In addition, the railway infrastructure is very poor with very few trains. This situation is very inconvenient; hence, most journeys were by road.

7.8 Summary

The choice of a mixed method approach is bound up with the choice of a theoretical paradigm. It appears that *mixed methods* choose from the full repertoire of methodological options at multiple points in the inquiry process, such as framing the purpose of the inquiry, deciding the overall design, methods and sampling, data recording, analysis and interpretation. This research investigated a process of construction of reality in the field of eLearning, including how participants negotiated and understood the meaning of technology-enhanced learning within the healthcare professional environment. Accordingly, it attempted to understand phenomena through the meanings that people assigned to them, within the context of the information technology system, and the process whereby the information technology system influences and is influenced by the context. This chapter has explained the research methodology for this study. The first stage was literature reviews, followed by drawing up the pilot study. This was combined into the third, the IFPC model, and then designing the use of mixed methods to sketch out the study. The fifth was carrying out

the data collection with the questionnaires, interviews and group discussions. The next chapter will present the analysis of the quantitative results.

Chapter 8

The Quantitative Results

8.1 Introduction

This chapter presents the results from the quantitative study component described in Chapter 7. First, the questionnaire and IT facilities data are presented (section 8.2). Secondly, the statistical analysis of the relations between the variables within the four domains of the IFPC model (section 8.3) is discussed.

8.2 Quantitative Data

The scope of the quantitative method, which used the questionnaire as source, was to answer the question "*What are the barriers and the drivers which affect healthcare professional for using eLearning?*" by exploring the challenges of eLearning within the four IFPC domains.

The questionnaire data were analysed using SPSS software. The hypothesis was tested through correlation statistics.

This section presents the results through descriptive statistics, using graphs and tables to illustrate findings. The section is divided following the structure of the IFPC model. The Culture (subsection 8.2.5) contains 'the perceived ease of use (PEOU) section' and 'the perceived usefulness (PU) section' of the eLearning courses.

8.2.1 Profile of Students

200 questionnaires were returned from healthcare professional students, a completion rate of 100%. Data included age, gender, field of study, the place where they lived, and self-rating of their computer abilities. The results revealed that healthcare professional respondents had an average age of 20.4, ranging from 18 to 38 years. The proportion of women to men was 91% to 9%. The distance they lived from the university is an average of 12 km, ranging from 0.1 km to 230 km. Most of them study on nursing courses (50.5%) (see Figure 8.1), and nearly half live in the North Region (46%) (see Figure 8.2).

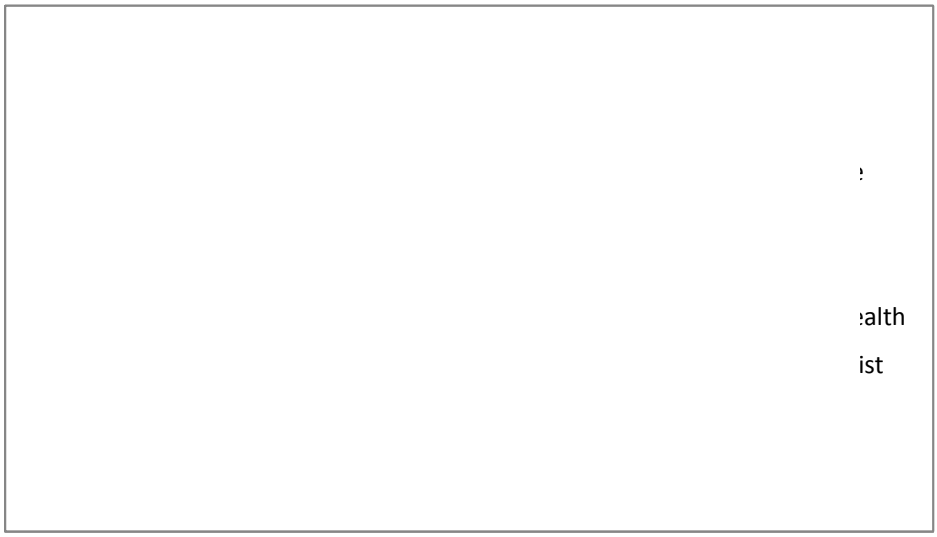


Figure 8.1 Study discipline distribution of respondents

Figure 8.2 Regional distribution of respondents

Students judged that their abilities with the computer are fair (66%) (Figure 8.3). Figure 8.4 illustrates the internet activities they perform weekly. 574 activities were identified by the participants, of which the common activities were education (29.6%), using the social web (25.6%) and communication (23.7%).

Figure 8.3 Respondents' self-rating of their computer abilities

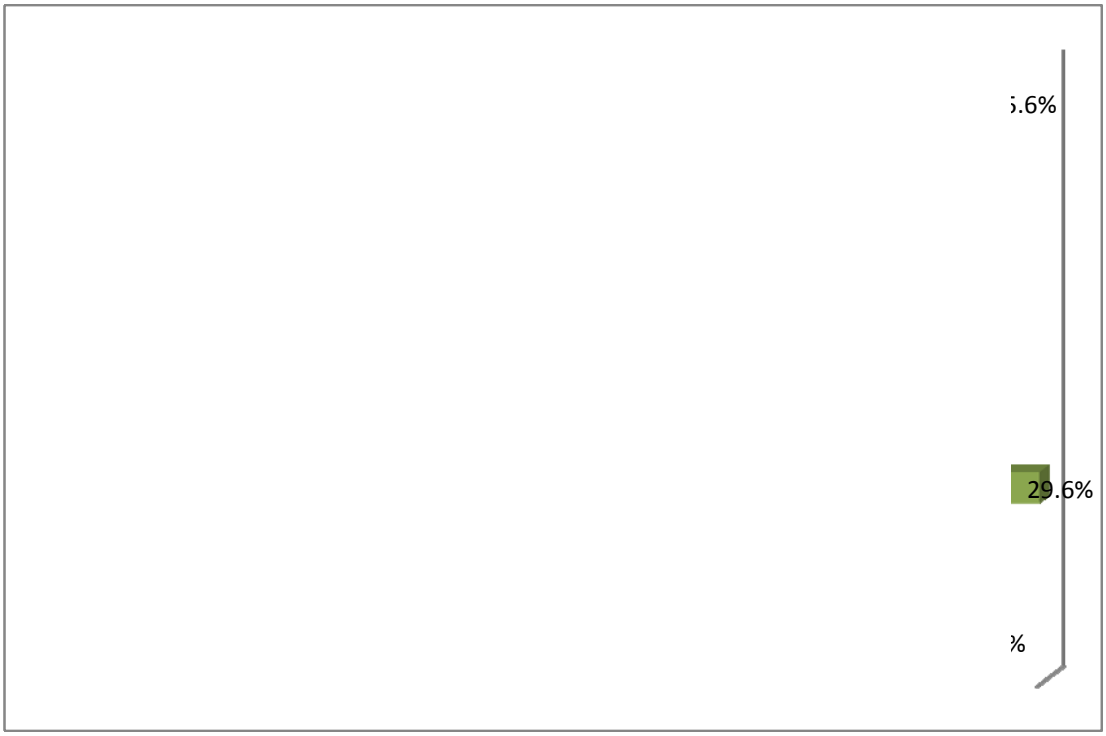


Figure 8.4 Internet activities that respondents perform weekly

8.2.2 Infrastructure

Healthcare professional students were asked to indicate what type of infrastructure was in place to support their eLearning. 76% of them had their own computer at home and nearly all of them (94%) have used computer laboratories on the campus.

78 healthcare students (94.5% of students) stated that the reasons for using the computer laboratories on the campus were

- comfortable to use, such as close to where they are living, free of charge, save money against using an internet café, and faster than computer at home
- because student does not have own computer
- to study eLearning courses
- to use email and social webs
- to search for data, such as for homework, news, jobs, and entertainment, e.g. games
- because sometimes they cannot use their laptop

12 students (5.5%) did not use university computer, because

- access to the internet from the university computers is too slow
- the computers are too slow and have viruses
- they have to wait a long time to use the computers in the lab, since too many students use them.

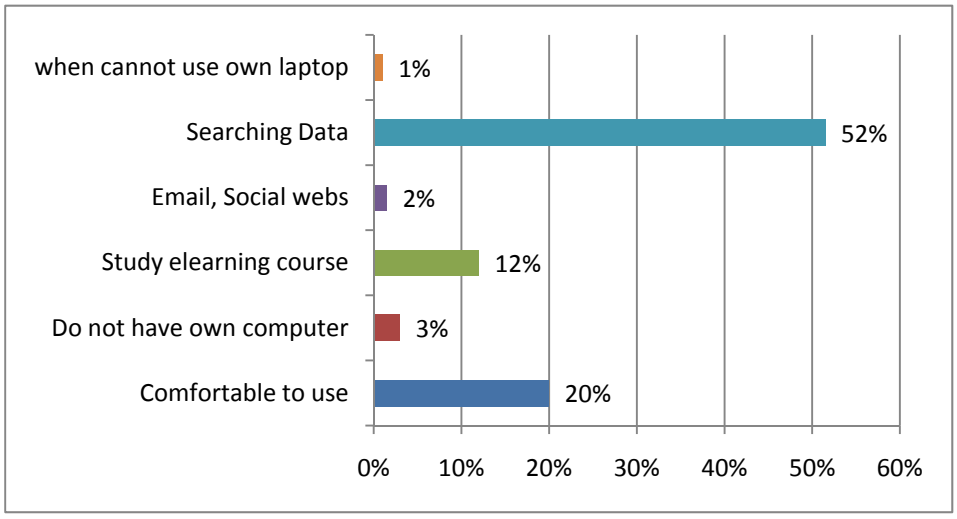


Figure 8.5 The reasons respondents used computer labs on the campus

The survey asked where the students mainly accessed the internet. 30.8% used an Internet café and 28% accessed the web from home. Other means of access included from the university where they study and via their mobile phone (see Figure 8.6).

Figure 8.6 Where healthcare professional students mainly accessed the internet

For students with internet access at home, a further question probed the type of connection used from home. Of 162 students who answered this, half of them used a mobile phone, e.g EDGE, GPRS (see Figure 8.7).

Figure 8.7 Type of internet connection for those accessing from home

8.2.3 Finance

Five questions were asked relating to finance of eLearning around the issues of time, training and cost for healthcare professionals on the eLearning courses.

First, respondents were asked how many hours a day they spend on a computer. The largest group (52.6%) spent less than three hours per day using computers. However, 2.5% spent more than 8 hours per day (Figure 8.8).

Secondly, two questions were asked about the amount of time students received on training for the eLearning courses. 56.5% received training before they started their eLearning courses. The amount of time spent on training varied from 1 hour to 36 hours, with an average about 3.6 hours.

What costs are incurred in eLearning, which would influence healthcare professionals? Healthcare professional students paid to access the internet for eLearning courses, with monthly charges of: 677 baht on average, ranging from 100 baht to 1,500 baht. This is a large amount when compared to average earnings in Thailand. The minimum wage (2010) paid per day varied by region. For example, the highest was in Bangkok with 206 baht, and the lowest in places in the North, such as Payoe, Pijit and Prae with 151 baht. The national minimum wage is 169.11 baht per day[7].

72% found studying on an eLearning course cost them more than traditional face-to-face study.

[7] Human Resource Law And Management at www.hrlawman.com/index.php?Id=538688126

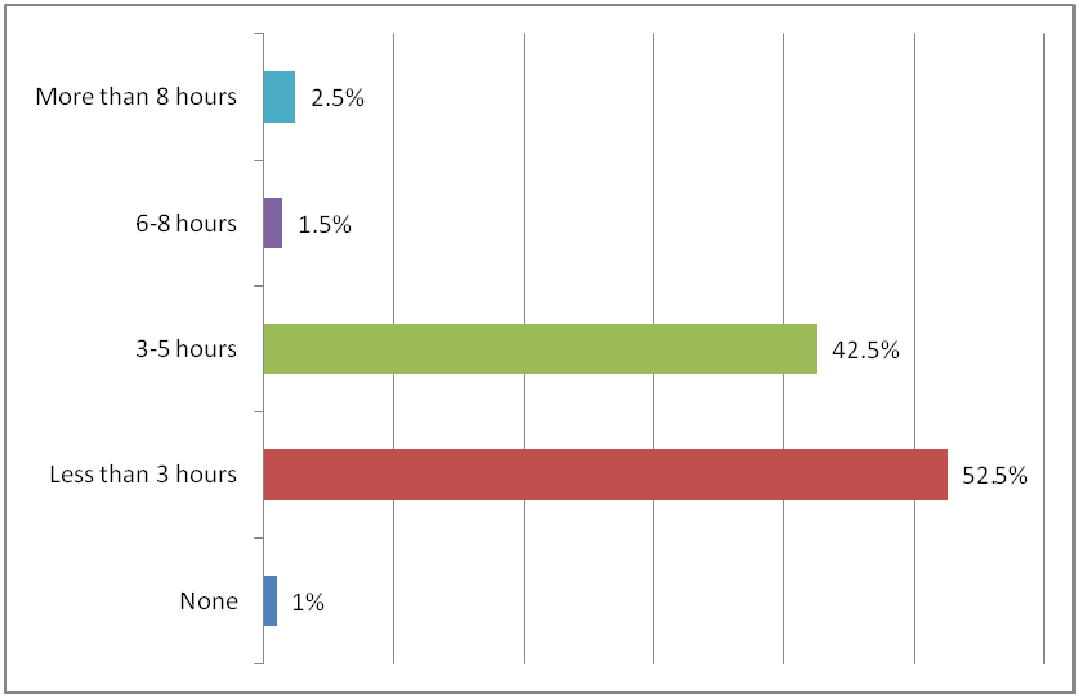


Figure 8.8 Time healthcare professional students spend on a computer each day

8.2.4 University policies for eLearning courses

The survey next addressed the type of policies put in place by the university to support eLearning courses. Figure 8.9 indicates that the courses were supported by policies such as technical help policies, student code of conduct policies, course syllabus policies, student privacy policies, software standard policies, and assignment policies. However, it was interesting that 66.5% of students said they had received no information on policies regarding the provision of email from the university.

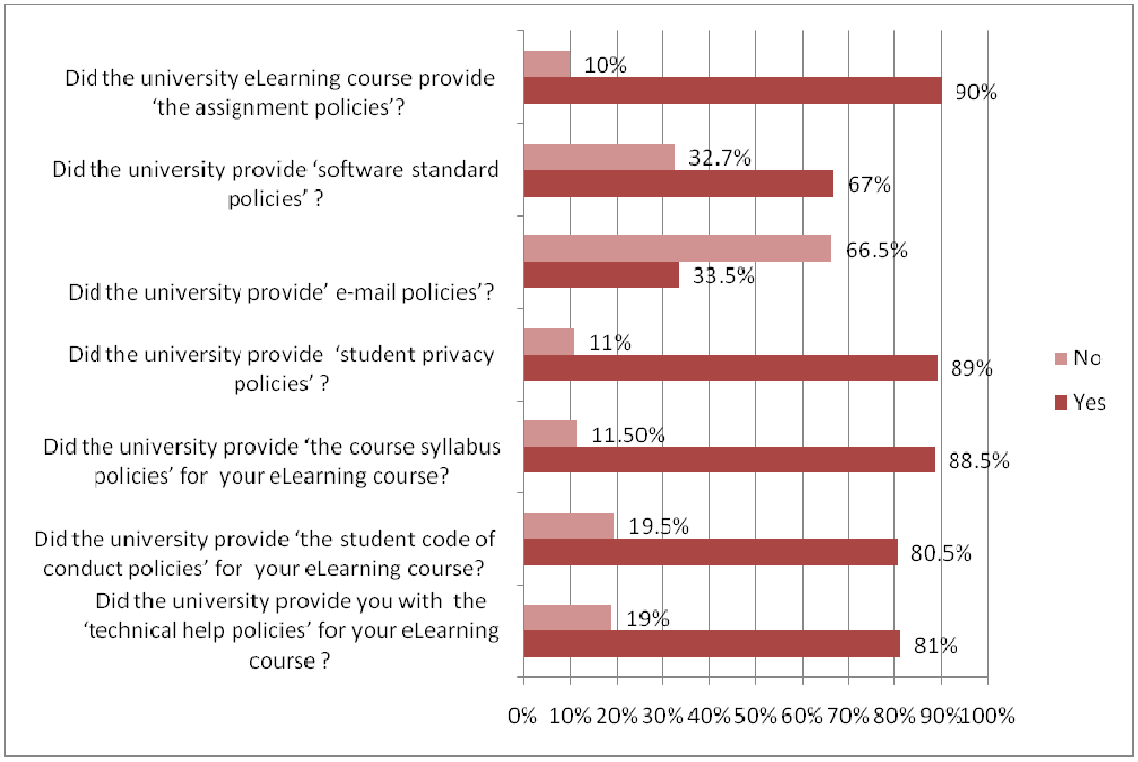


Figure 8.9 University policies providing for eLearning courses

Regarding their reasons for choosing the eLearning courses, 38% of healthcare professional students reported that they selected the courses by themselves, while 29.5% chose on their tutor's advice, and a similar number had selected such courses because this was required by university policies (Figure 8.10)

Figure 8.10 How healthcare professional students chose their eLearning courses

8.2.5 Culture

This group of questions revolved around culture: students' views (attitudes) towards the use of computers and their motivation for pursuing eLearning courses.

First, the students were asked for their views on the use of computers, particularly for eLearning courses. Figure 8.11 indicates that students agreed with the usefulness of the computer in eight of the ten items. Two items with which they disagreed were "*Learning on a computer limits the communication I have with other people*" and "*I feel more independent learning on a computer than in a traditional face-to-face format*."

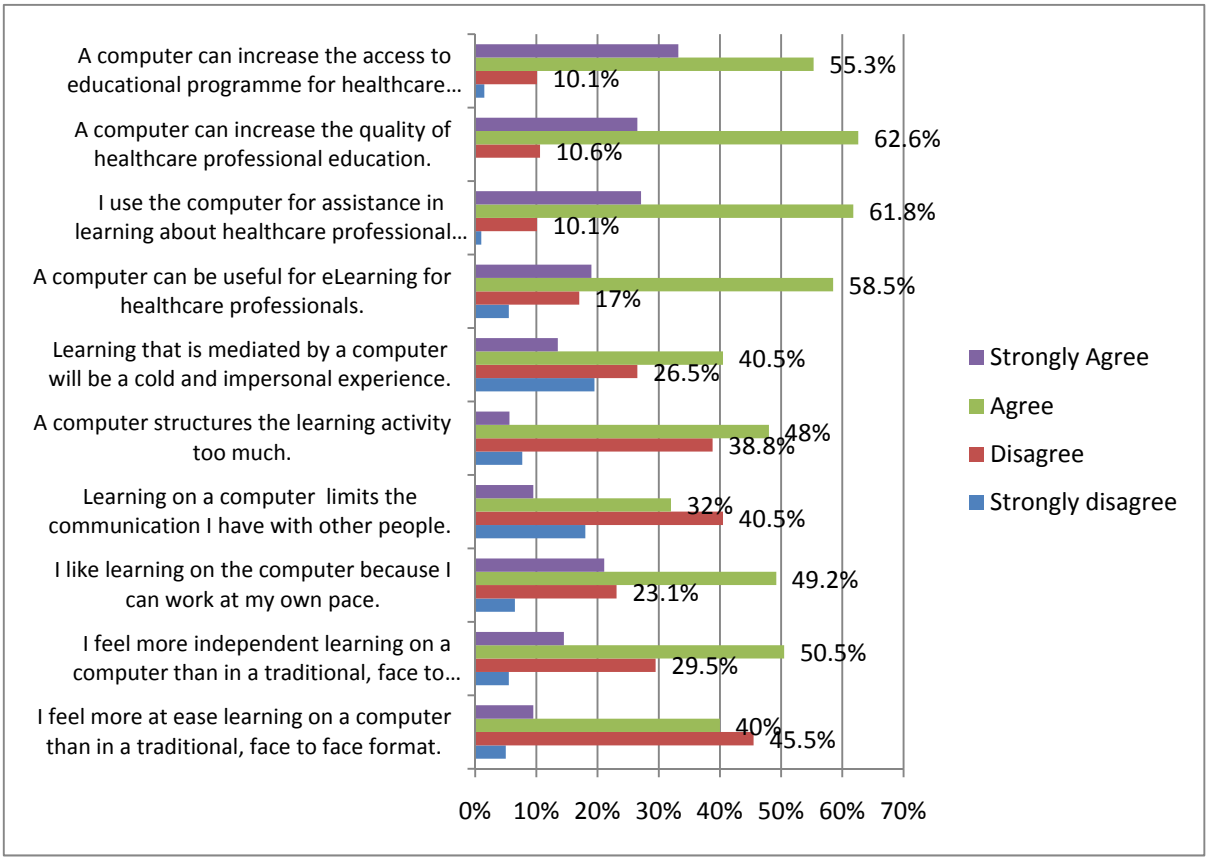


Figure 8.11 The views of healthcare professional students on the use of computer for the eLearning courses

Secondly, twelve items were used to inquire about respondents' motivation for pursuing eLearning courses. Figure 8.12 shows that healthcare professional students rated ten items as having an influence of moderate or above. However, two items "*To comply with my tutor's or employer's policy*" and "*To abide by the recommendations of someone else*," were viewed as having little influence on the perceived usefulness for eLearning courses.

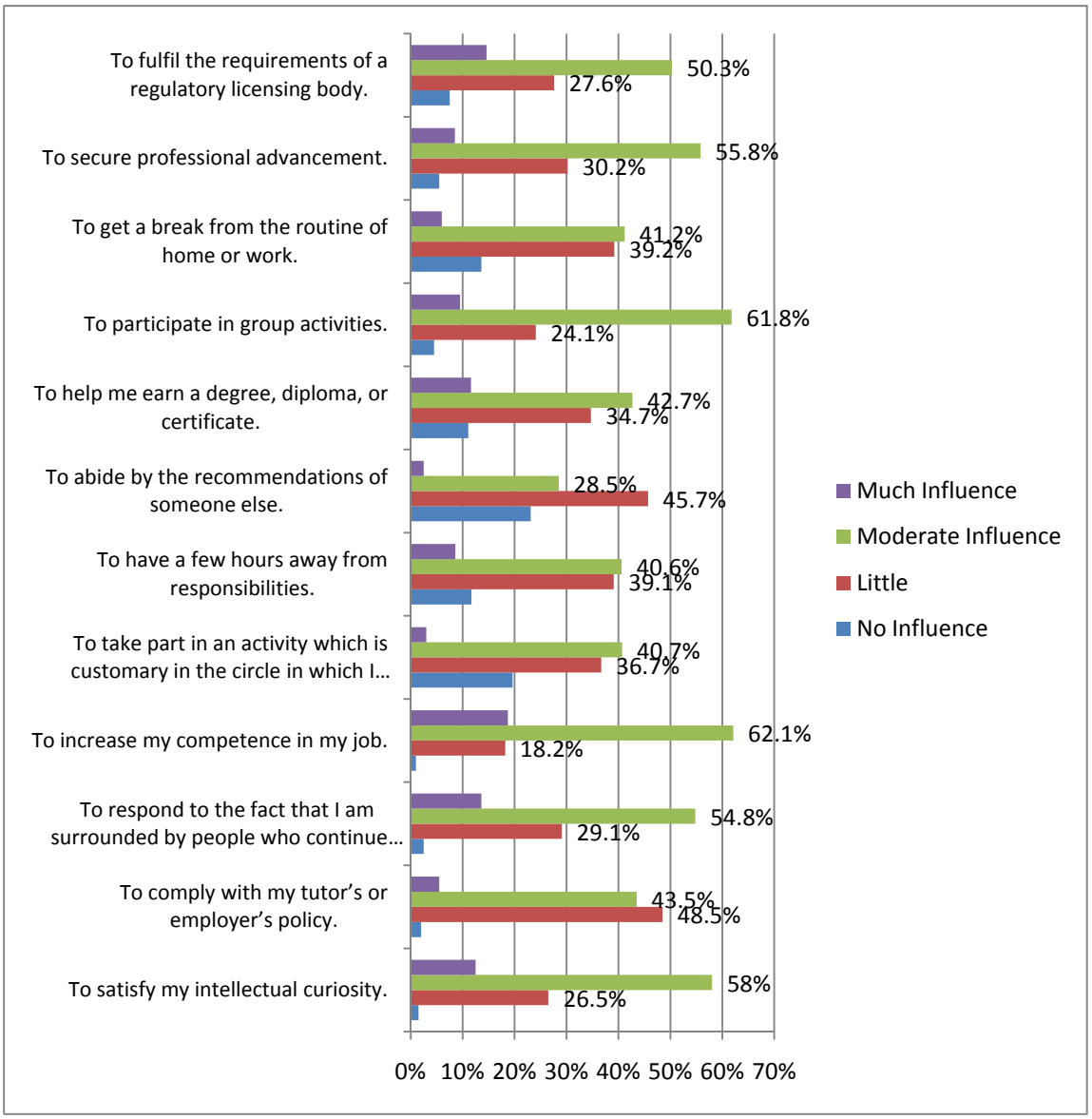


Figure 8.12 Motivation for pursuing eLearning courses

8.2.6 Facilities check list

This section asked webmasters from four universities to complete the facility checklist's form, which aimed to collect information about the server and the computer laboratory associated with the eLearning environment. Table 8.1 compares the results from four universities.

Table 8.1 Information on LAN servers from four universities

University	A	B	C	D
Operating System (OS)	Centos	Linux	Linux	Centos
Model	Generic	Tower IBM X3200 M2	IBM 3200	IBM 3200
CPU	Intel Pentium 4	Xenon	Xenon	Xenon
RAM	1 GB	1 GB	1 GB	1 GB
Storage	80 GB	40 GB	80 GB	40 GB
Backup System	None	Software backup	Software Backup	None
Web-Server OS	Centos	Linux	Linux	Centos
Model	Generic	Tower IBM X3200 M2	Dell Dore edge	IBM 3200
CPU	Intel Pentium 4	Xenon	Intel Xenon	Xenon
RAM	1 GB	1 GB	1 GB	1 GB
Storage available for each project	Generic	20 GB	20 GB	20 GB
Web server software product name	Drupal Apache	Fedora	Drupal?Apache	Fedora
Version	Generic	8.0	Generic	8.0
MIME type configured?				
Flash	Yes	Yes	Yes	Yes
Director	Yes	Yes	No	Yes
Java Script	No	Yes	Yes	No
Real Media	Yes	Yes	No	Yes
Database Connective	Yes	No	Yes	Yes
Cold Fusion	No	No	No	No
ASP	No	Yes	No	No
FrontPage Extensions activated or able to do so	No	Yes	No	No
Remote Access	No	Yes	Yes	No
FTP	No	Yes	Yes	No
Indexing Support				
Excite	N/A	Yes	No	N/A
Microsoft Index Server	N/A	Yes	No	N/A
Other	N/A	N/A	N/A	N/A

University	A	B	C	D
CGI Support	N/A	No	No	N/A
Real Network	N/A	No	No	N/A
NetShow	N/A	No	No	N/A
QuickTime	N/A	No	No	N/A
internet-based web delivery conferencing software package such as WebCT, Lotus Notes, Web Board	Web Board	Web Board	Web Board	N/A
Student Lab Hardware Type Windows OS	XP	XP	XP	XP
Model	N/A	N/A	Tower	N/A
CPU	Intel Pentium	Intel Pentium	Dual core	Intel Pentium
RAM	1 GB	1 GB	1 GB	1 GB
Storage	160 GB	160 GB	60 GB	160 GB
CD-ROM	Yes	Yes	Yes	Yes
Speed	48x	48x	52x	48x
Sound Capable	No	No	Yes	Yes
Head set/Speaker	No	No	Head set	Head set
Microphone	No	No	Yes	Yes
Colour Capable	No	No	No	No
Network	No	No	Yes	No
Lab network speed	N/A	N/A	10/100	N/A
Student Lab Software Type Windows	XP	XP	XP	XP
Brower type/version	Internet Explorer 7.0	Internet Explorer 7.0	Internet Explorer 7.0	Internet Explorer (?, #319)
Plug-in support Quick time	Yes	No	Yes	No
Shockwave Director/Flash; Authorware; Real time	Yes	Yes	Yes	Yes
Adobe Acrobat	Yes	No	Yes	No
Version of Acrobat	6	N/A	6	N/A
Net Show	No	No	No	No
Java enabled	Yes	Yes	Yes	Yes
Java script enabled	Yes	Yes	Yes	Yes
Cookies enabled	Yes	Yes	Yes	Yes

8.3 What are the *relationships* between the components of the IFPC model?

This section presents the results of investigating the factors that could affect healthcare professionals when planning to implement eLearning. Statistical analysis was used to investigate possible relationships between the four components of the model: Infrastructure, Finance, Policy and Culture (section 8.3.1). The variables were also tested with regression statistics to determine the relationship between students' motivation for starting eLearning courses and their views on use of computers (section 8.3.2).

8.3.1 Exploration of the relationships between IFPC variables

The initial test results used the variables as follows:

A1	Owns a computer at home (Infrastructure)
A11	Paid for accessing the internet (Finance)
SumBB	University policies (views of the university policies)
SumC	Attitude towards the use of computers for eLearning (Culture)
SumD	Motivation towards eLearning (Culture)

Figure 8.13 shows the distribution of the five variables (A1, A11, SumBB, SumC and SumD) using a scatterplot to explore the relationships among them. Pallant (2007) observed that a scatterplot will give an indication of whether variables are related in a linear (straight-line) relationship. Only linear relationships are suitable for correlation analysis. This result illustrates the presence of a single-line relationship (Yes) between sufficient infrastructure for online learning (A1), the financial effect (A11), the influence of university policies (SumBB), and the cultural domain (SumC and SumD).

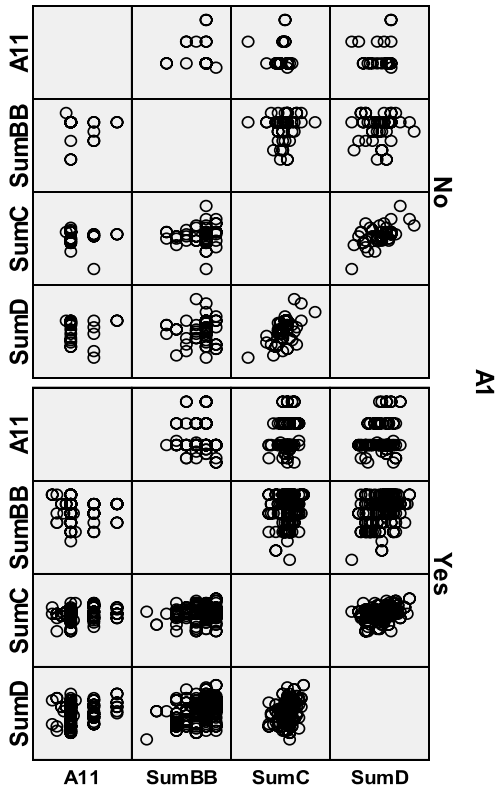


Figure 8.13 Scatterplot matrix of variables: A1, A11, SumBB, SumC and SumD

Bivariate profiling was used to examine the relationships between the five variables, a graph of data points based on a two metric variable (see Figure 8.14). The variables are used to define the horizontal axis and the vertical axis. The point on the graph represents the corresponding joint values of the values for any given case. The pattern of points represents the relationship between the variables. A strong organization of the highest points along a straight line characterizes a linear relationship or correlation. These were found between SumC and SumD (r = –0.435**), SumBB and SumD (r = –0.264**), and A1 and SumC (r = 0.197**). At the opposite extreme, the correlation just above the second line (A1 and SumBB, and A11 and SumC) show an almost total lack of relationship as evidenced by the widely dispersed pattern of points and correlations of r = –0.031 and r = –0.083. Finally the inverse or negative relationship (A1 and SumBB, and A11 and SumBB) are seen in the correlations of r = –0.031 and –0.057.

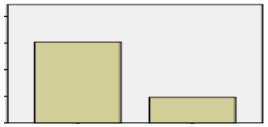
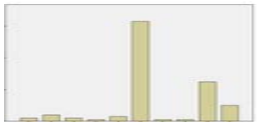
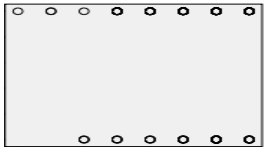
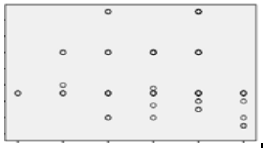
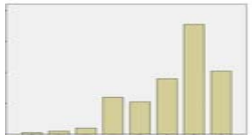
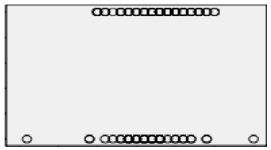
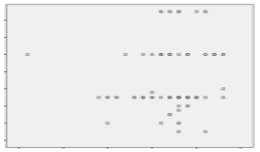
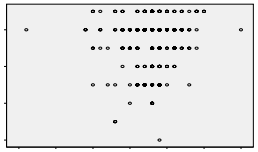
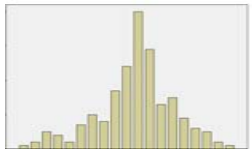
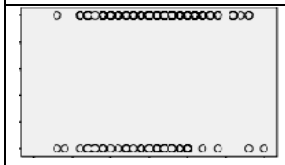
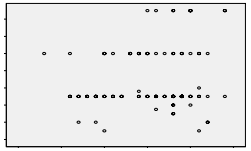
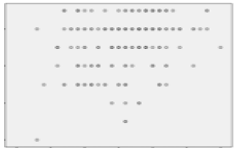
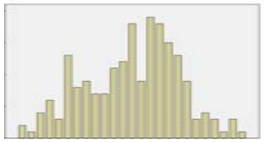
A1		r = 0.133	r = –0.031	r = 0.197**	r = 0.086
A11			r = –0.057	r = –0.083	r = –0.162
SumBB				r = –0.089	r = –0.264**
SumC					r = –0.435**
SumD					
	A1	A11	SumBB	SumC	SumD

Figure 8.14 Bivariate profiling of relationships between variables

*** Correlation is significant at the 0.01 level (2-tailed)*

8.3.2 IFPC Factors, Attitude to Using Computers and Motivation for eLearning

The factors of IFPC were further tested by correlation, to examine the relationship between the IFPC factors and both the attitude to use of computers and students' motivation for eLearning. Figure 8.15 represents the connections between variables that were tested.

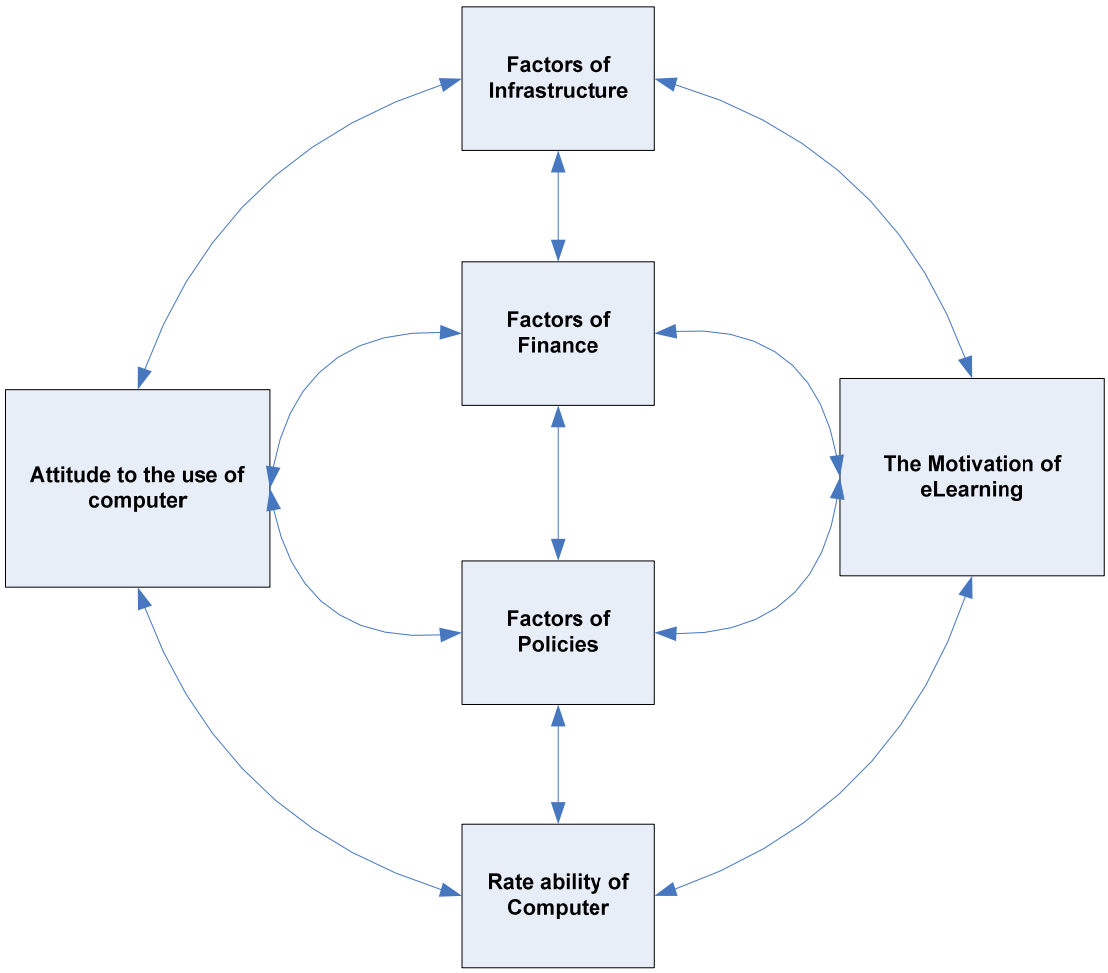


Figure 8.15 Model for testing relationships between the IFPC components and the motivation for eLearning

The group of variables were tested with correlation statistics. The statistical test was randomly drawn from a non-normally distributed, non-bell-shaped, population of values, thus nonparametric statistical tests were employed. Spearman's rho coefficient technique was selected to analyse the data. This method was identified by Conover and Iman (1981), who stated that nonparametric statistics are alternative tests of statistical inference that do not make numerous or stringent assumptions about the population

from which the data have been sampled. These techniques have been called *distribution-free* or *nonparametric* tests (Siegel, 1957). Further, this study applied Spearman's rho coefficient, as suggested by Fredricks and Nelsen (2007) that Spearman's rho coefficient is about 50% greater than Kendall's tau_b (T) in absolute value.

Results from the statistical correlation show significant relationships between Infrastructure, Finance, the University Policies, Rated ability to use computer, the Attitude to the use of computers, and the Motivation for eLearning.

a) Factors of Infrastructure correlated with both factors of University Policies at a significance level of (ρ) = 0.184 $p < 0.05$, and rated ability to use computer at a significance level of (ρ) = 0.379, $p < 0.01$

b) Factors of Finance correlated with rated ability to use computer at significance ($\boldsymbol{\rho}$) = 0.451, $p < 0.01$

c) Factors of university policies correlated with both the Motivation for eLearning at significance ($\boldsymbol{\rho}$) = 0.242, $p < 0.01$, and factors of Infrastructure at significance ($\boldsymbol{\rho}$) = 0.184, $p < 0.05$

d) Attitude to the use of Computer correlated with both the Motivation of eLearning at significance ($\boldsymbol{\rho}$) = 0.383, $p < 0.01$ and to Rated ability of Computer at significance ($\boldsymbol{\rho}$) = 0.164, $p < 0.05$

This diagram below shows the levels of statistical significance of relationships between the variables represented in the earlier Figure 8.15.

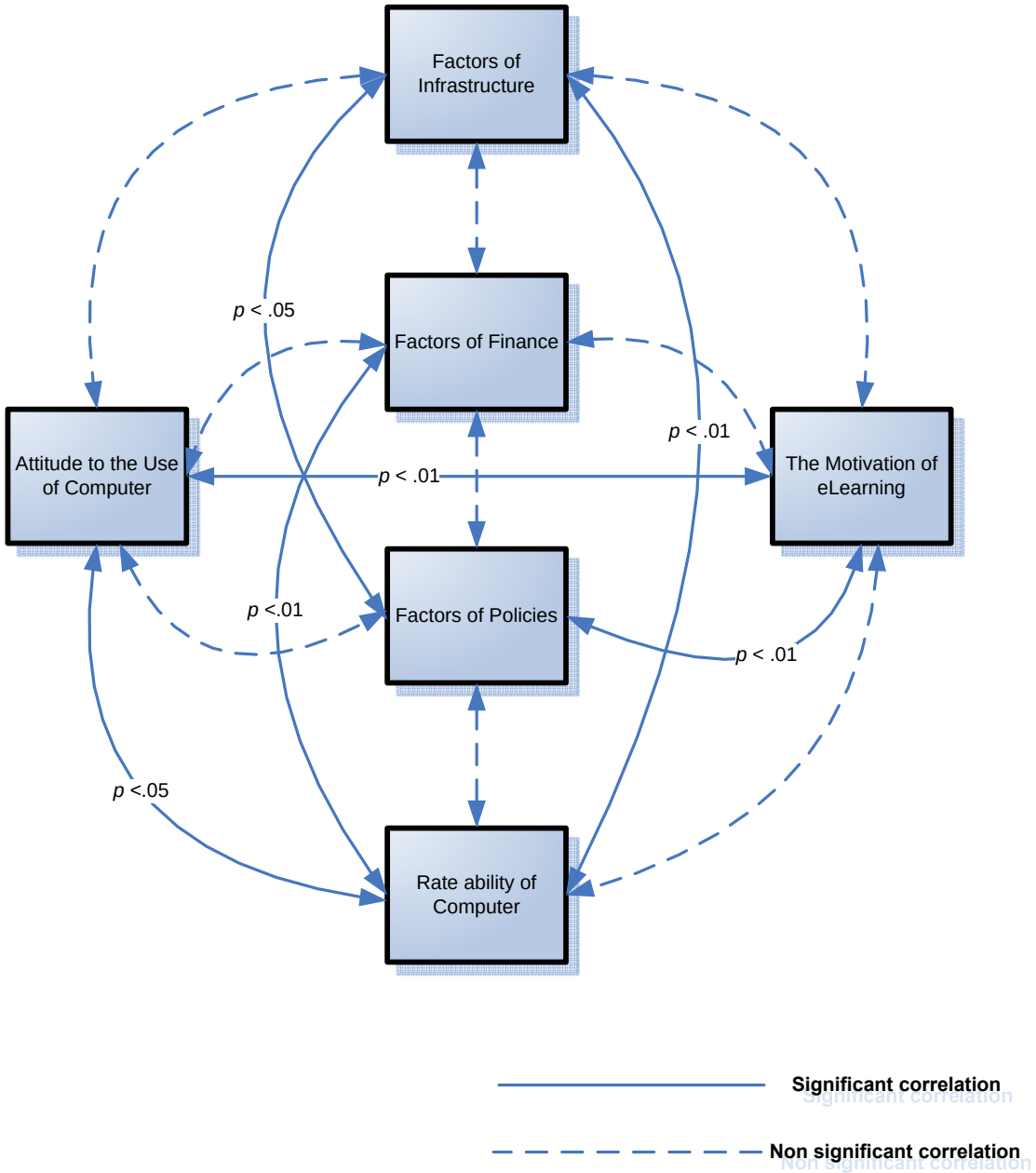


Figure 8.16 Strength of relationships between components of the IFPC model, attitudes to use of computers and motivation for eLearning.

The following tables show details of significant variables.

Table 8.2 Variables Correlated with Infrastructure

Variables	**N**	**Correlation (ρ)**	***p-value***
University Policies	152	0.182*	0.023
Rated Ability to use Computers	152	0.379**	0.000

Table 8.3 Variables Correlated with Finance

Variables	**N**	**Correlation (ρ)**	***p-value***
Rated Ability to use Computers	102	0.451**	0.000

Table 8.4 Variables Correlated with University Policies

Variables	**N**	**Correlation (ρ)**	***p-value***
Infrastructure	152	0.184*	0.023
Motivation for eLearning	199	0.242**	0.001

Table 8.5 Variables Correlated with Rated Ability to Use Computer

Variables	**N**	**Correlation (ρ)**	***p-value***
Attitude to the use of computers	200	0.164*	0.020
Infrastructure	152	0.379**	0.000
Finance	108	0.451**	0.000

Table 8.6 Variables Correlated with Attitude to the Use of Computers

Variables	**N**	**Correlation (ρ)**	***p-value***
Motivation for eLearning	199	0.383**	0.000
Rated Ability to use Computers	200	0.164*	0.020

Table 8.7 Variables Correlated with Motivation for eLearning

Variables	**N**	**Correlation (ρ)**	***p-value***
Attitude to the use of computers	199	0.383**	0.000
University Policies	199	0.242**	0.001

*** Correlation is significant at the 0.01 level (2-tailed)*

** Correlation is significant at the 0.05 level (2-tailed)*

8.4 Summary

The quantitative results from the questionnaire were tested with SPSS (Statistical Package for the Social Sciences) using both descriptive and inferential statistics. The descriptive statistics were used to prepare graphs and tables illustrating aspects of the IFPC model. This comprises: infrastructure, encompassing the facilities of eLearning environment (I); finance, encompassing time, training, and cost (F); university policies supporting eLearning courses (P); and the culture (C), encompassing the attitudes towards the use of computers and the motivation for eLearning. The results also show the significance of those variables for healthcare professionals as follows.

a) The variable of having one's own computer was significantly related to attitude towards the use of computers.

b) Responses on University policies are significantly related to the Motivation for eLearning.

c) Attitude to the use of computers is significantly related to Motivation for eLearning and its perceived usefulness.

d) Infrastructure is significantly related to University Policies and Rated Ability to Use Computers.

e) Rated Ability to Use Computers is significantly related to both Finance and Attitude to the Use of Computers.

The following chapter contains the detailed findings of the qualitative data, which included face-to-face interviews and group discussions.

Chapter 9

Encounters with Participants

9.1 Introduction

This chapter presents the findings from the interviews and group discussions, which were collected during the second part of the main study. Semi-structured interviews were conducted with respondents from four universities in rural areas of Thailand. Responses were recorded and data were transcribed in both the Thai and English languages before being analysed with the assistance of QSR Nvivo8 software. The findings as presented according to the IFPC model, and include perspectives on infrastructure (section 9.2), the influence of finance (section 9.3), the effects of the university policies (section 9.4), and the cultural effect on healthcare professionals within the eLearning environment (section 9.5).

The analysis commenced with 'open coding' of data (Miles & Huberman, 1994) (see Figure 9.1). Transcripts from the interviews were reviewed alongside researcher notes that had been made after the interviews (see Appendix F). The transcripts were translated from Thai to English and coded according to key concepts. The aim was to capture participants' opinions and their experiences within the eLearning environment. Codes were developed to identify aspects of Infrastructure, Finance, Policies and Culture. The interview accounts were searched for relevant passages that were then coded under headings such as: experience of teaching with eLearning courses, action on eLearning problems, and institutional policy and strategy. Other code categories were linked to other variables examined in the study. For instance: lack of computers, low speed to access the internet, cost of accessing the internet, strategies and policies for

eLearning, funding support, degree of confidence in online learning, motivation and Thai culture.

In the process of transcribing and marking up the data to identify emerging concepts, the concepts of the four focus domains were identified:

- Infrastructure supporting the eLearning courses
- Financial support effects
- The consequences of university policy on eLearning
- The effect of culture.

The remainder of this section considers data from the interviews concerning the four IFPC domains.

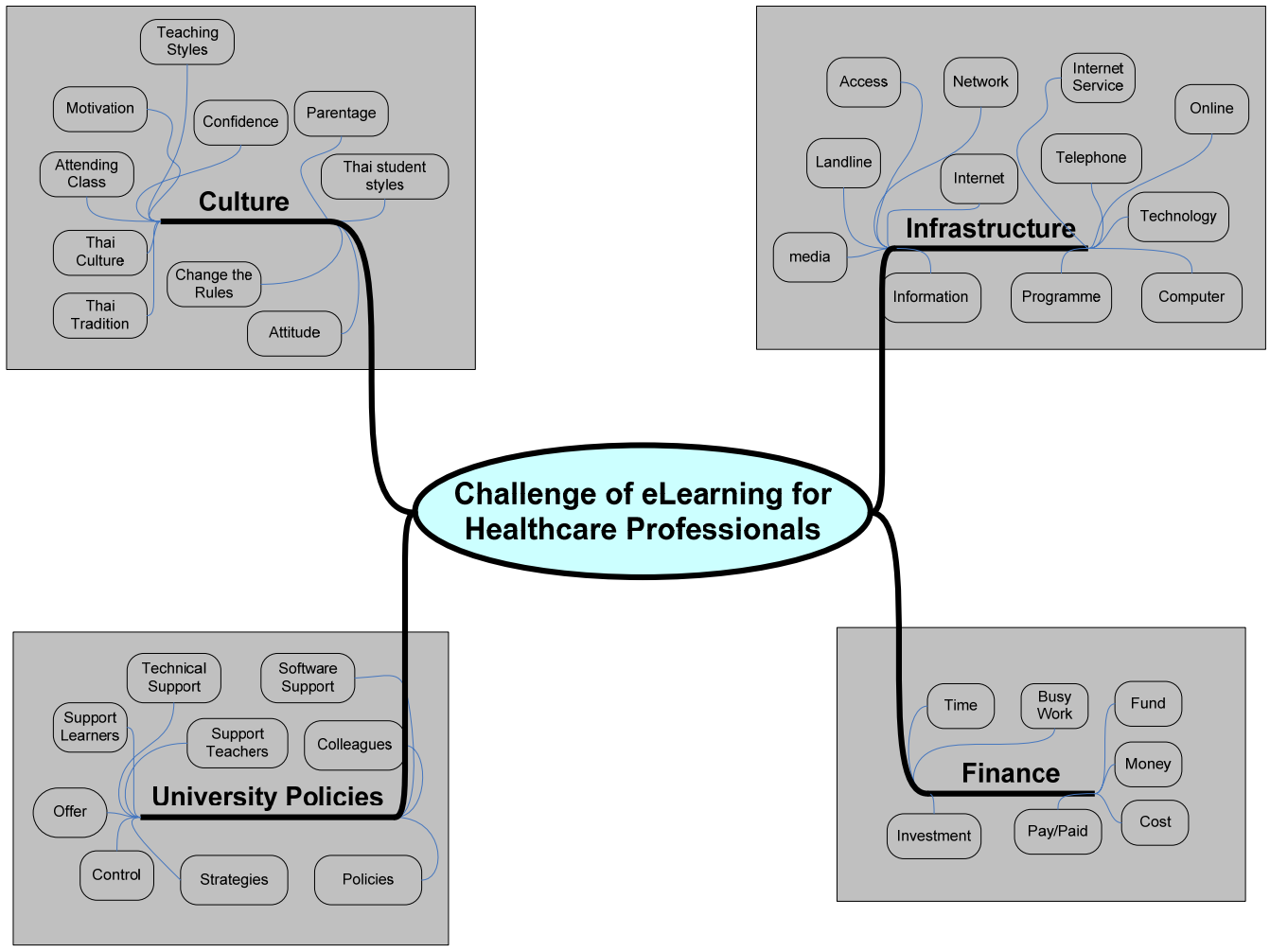


Figure 9.1 Preliminary concepts from the first open coding

9.2 Impact on Infrastructure for the eLearning courses

Figure 9.2 shows the infrastructure discussion topics, which emerged from the group discussions and individual interviews. The infrastructure topics were discussed as being either necessary or unnecessary for healthcare professionals within the eLearning environment.

Analysis of the transcripts using Nvivo software showed that four issues – *technology, information, internet, and computers* – came up repeatedly. Those participants who said that they thought computers, information and the internet, were necessary for the eLearning courses, also thought that technology, software and telephone had a natural effect on eLearning. Aditional views from a lecturer, who had been teaching using traditional methods for more than ten years, found that the eLearning courses had not only changed her students' attitudes but also that teaching with high technology helped students to update their learning and better supported their study. During extensive discussions, it was found that computers, the internet and information were certainly essential for the eLearning class room. For example:

Respondent 5: *I found that learning with technology had an impact on the students' attitudes. Actually, the computer is very difficult sometimes when it is first introduced into the curricula, so their attitudes changed a little, as they had never experienced high technology such as the computer. However, my students are now familiar with the computer. It is not only for learning in the university, but eLearning is also the way that people can access learning anytime, anywhere*.

In addition, another response on how eLearning facilities might change:

Respondent 5: *Actually, it is time things changed. We have lots of books in the library, which we don't need now, only the internet, so eLearning should have an emphasis on searching for more information*.

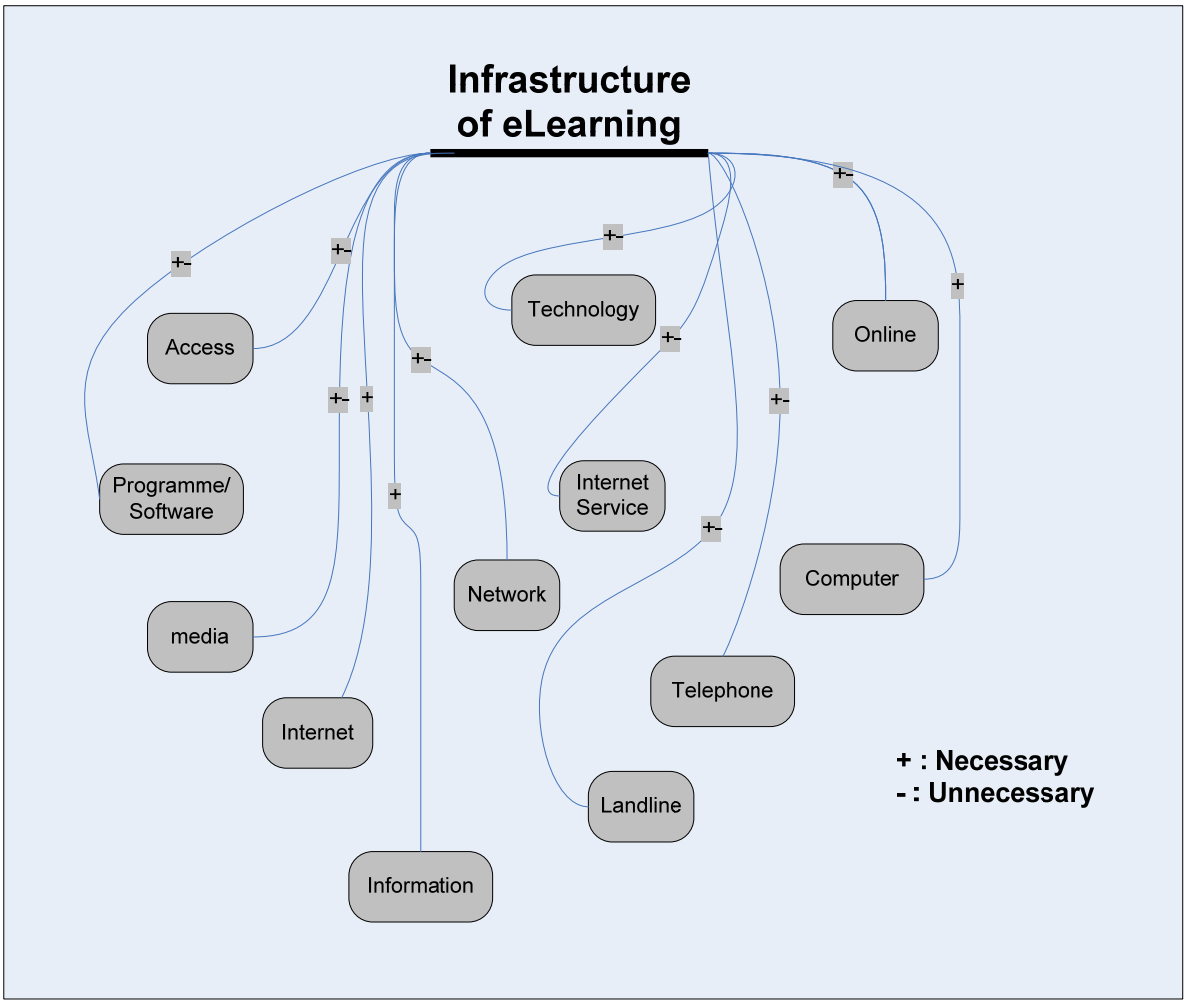


Figure 9.2 Healthcare professionals' opinions on the impact of infrastructure

However, the other topics and phrases connected with eLearning infrastructures such as *sufficient facilities for the eLearning*, *service* and *access to the internet* were also discussed. In all group discussions, the participants reported finding it '*hard to access the internet*.' Students who study at the College of Public Health and Nursing were struggling with internet access. The discussions highlighted the lack of internet points to access the World Wide Web. This was so even though some of the institutions had attempted to solve the problem of this barrier by setting up Wi-Fi points for access to the internet (in fact, 75% of the institutions who participated in these interviews had already installed Wi-Fi points). However, difficulties remained. Students who could afford to pay for their own laptop had an advantage over those who had to wait to use the institution's computer lab, whereas some of the other institutions had not yet set up Wi-Fi. Therefore, some students tried to sort out their problems by accessing the

internet from their homes and by using their mobile phones instead. The following are examples of responses in group discussions on the difficulty of accessing the internet.

Respondent 4: *The internet service system is not always available everywhere. However, if the policymakers decided to set up an eLearning classroom which could access the internet at all times, it would be more convenient for us*.

In addition, one webmaster discussed some other problems:

Respondent 2: *The first problem is the speed of the internet, which is still slow, especially when many students access it at the same time; and the other problems are viruses in the computers, and students forgetting their passwords*.

In the discussions with the participants, it was found that software or courseware for eLearning courses was still too costly for their budget and mostly written in English. This is a barrier for some Thai students and even for the lecturers who had to use the eLearning courses. Only a quarter of the institutions have their own software to establish their courses. The other 75% employed free software to create their eLearning courses. Not only did they need more practice to set up their courses, they also needed to spend more time to familiarise themselves with the other languages from the free software. For example:

Respondent 17: *This year (2010) we planned to set up a training programme by inviting a professional programmer from xxxxxxxx University to train the lectures on 'how to use 'Moodle' for setting up eLearning courses.*

Respondent 9: *I have been trained to use the 'Moodle' program, but none of my colleagues has ever been trained*.

Respondent 11: *I have been using eLearning for my courses for two years, and we used to train my colleagues to use the Editor programme for setting up our eLearning*.

A lecturer from the College of Nursing reported that:

Respondent 2: *With regard to technical support, I have received complaints from students that there are not enough computers to support their study; also they complained that they could not access the internet because the network was too busy. It was fine before xxxxxx (the person who was responsible for this duty retired), but when the college employed someone else to look after it, all my eLearning data disappeared and some students still complain that they cannot access the eLearning course.*

Issues related to the infrastructure of eLearning were raised in both interviews and group discussions. The infrastructure was a major influence in providing online courses, directly affected by a lack of computers and a struggle with accessing the internet. However, it appeared that healthcare professional students use alternative

ways to facilitate access to the internet, i.e. using mobile phones and connecting to Wi-Fi points via laptops. These are strongly recommended when considering setting up an eLearning course, which needs to be supported by a good infrastructure within the eLearning environment.

9.3 Financial support effects

The function of financial support was critical to everything. This extends not only to discussion on the eLearning environment; it also impinges on life and the cost of living, particularly for developing countries, when most of the budget needs go on basic daily living. Therefore, the topic of financial influence must investigate how the financing of an eLearning programme would affect the people within the eLearning environment. This is illustrated in Figure 9.3, which is based on the groups of people associated with the eLearning environment.

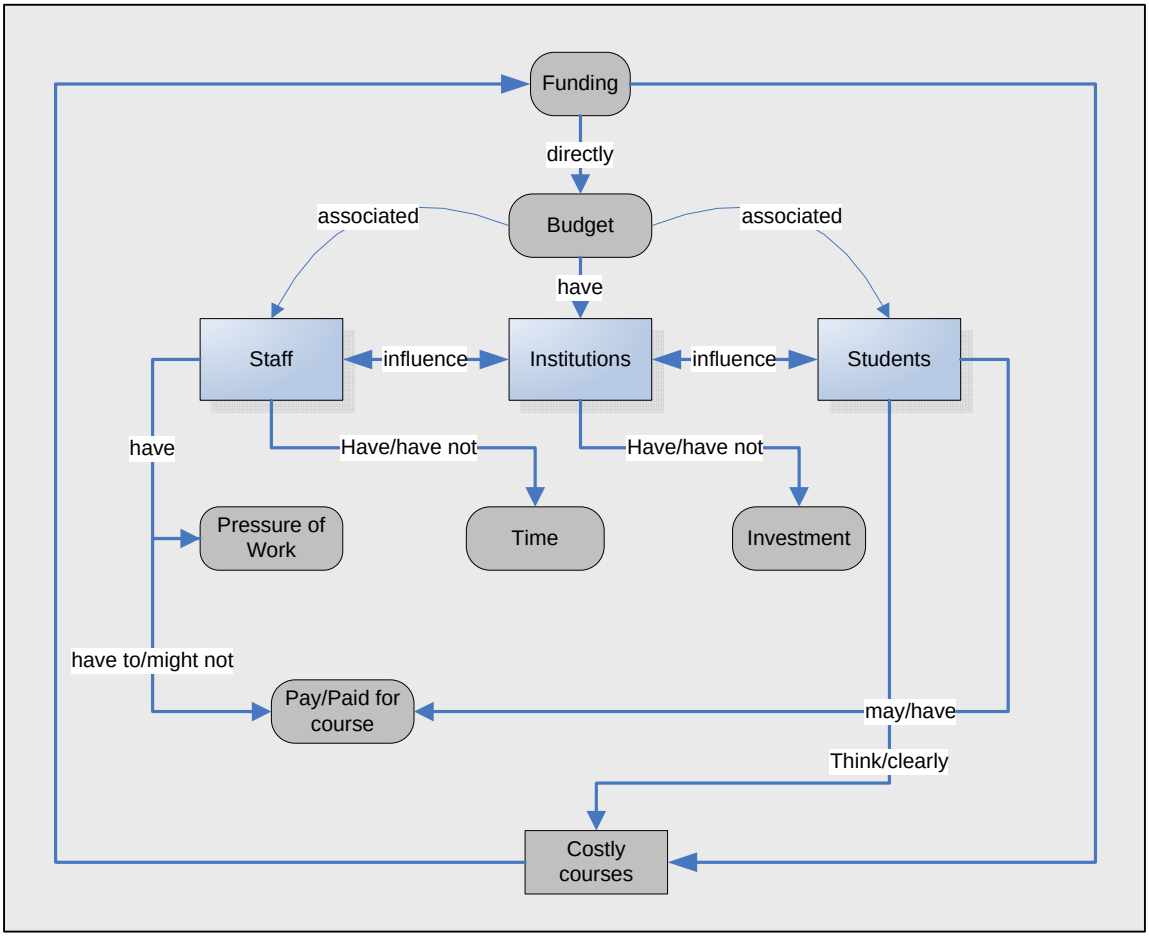


Figure 9.3 Financial influences on eLearning

Interestingly, the results show that the financial effects concern most participants, especially healthcare professional students. During the fieldwork, a group discussion was held about '*how they have to pay for access to the internet*.' At the beginning of an eLearning course, some students have been paid extra for their courses, which included paid for using the computer lab. Likewise, a lecturer mentioned that when she needed to set up eLearning courses for her students, she had had to apply to a private company for financial help because her institution had an extremely slow network and would not support it (they had even lost her tuition data in the past). Therefore, she had to find money to resolve the situation. She did this by writing a proposal for a research project in order to obtain funds from a private company that would help to pay for the courses.

During the discussion, it was discovered that another lecturer had paid to hire a private server as well. As she discussed:

Respondent 3: *I think the best way to solve this problem is that I will propose a research project in order to obtain funds for this project. I can then hire a server from a private company. This is the only way to acquire funds so that I can hire a server for my courses, because my college cannot support them. I know that xxxxxx (her colleague) has hired a private server in the town, so her eLearning course is doing well*.

A similar discussion occurred with a webmaster in which it appeared that his college was struggling with the budget for investment for the eLearning infrastructure. The college found the cost of a high capacity computer server too expensive to be affordable. It set up a server with a lower specification computer instead. Unfortunately, this affected the speed of the internet access. It was also found that the computer server was very unstable, because its workload was so large; it was overloaded. The server was not only used for the eLearning programme but also for the internet. As the respondent remarked:

Respondent 24: *They are correlated with both the computer system and the college because the college was not supported by a high capacity server, and we do not have the funds for this. Also, the cost of the server is too expensive, so we had to use the normal server instead of a high capacity server*.

Another remarked:

Respondent 23: *The server has to be used for many things, such as supporting the eLearning courses, and also the server for the internet. However, we have been talking about this for two years, but now we have new equipment and are preparing for the new eLearning project*.

In addition, a lecturer was concerned about the cost of developing eLearning courseware. This also involved university policy. She mentioned her eLearning programmes, which needed to be developed for updating on the new courseware. Unfortunately it proved too expensive and was not supported by the university. As she said:

Respondent 5: *At the beginning we used Bookder. We needed to develop that but it was too expensive. We thought about buying Blackboard, but the university could not support this, so we are coordinating with xxxxxx University to share their eLearning courseware. This university is connected to a university in Canada, which developed the Editor courseware, and they have also translated that programme from English to Thai.*

Other subjects were discussed with a lecturer who was interviewed in English, and came from a well-resourced university to which many students apply. She mentioned that the costs of the eLearning facilities would be affected by running the eLearning programmes, especially for healthcare professional students. She was interested and concerned about this issue. She commented that learning with high technology works both ways: initially, it would be costly but it would be worthwhile for people who already have the entire eLearning infrastructure in place, such as a computer and connection to the internet from home. She gave her opinion:

Respondent 4: *I am not sure, I can say Yes and No. 'Yes' means the students have difficulty accessing the internet from their office or from home or particularly if they are a long way from the server, because they need a way to communicate with the internet to access the eLearning course. It is expensive every time they need to buy a new computer or new laptop or even accessories. I can say 'No' for the students who already have their own computer or laptop, and have a very fast internet connection from their office or their home, so they can connect anywhere.*

She continued with her view that the cost of investment in teaching with high technology such as eLearning would affect the students. Nevertheless, she had never received complaints from the students.

Respondent 4: *I have heard that, but I don't think it is a complaint, I think it is just a story, because the computer can still be used for other things after the eLearning course has finished. Some students told me that their laptops can be used until they need updating. I don't know if that is a complaint or not.*

Value and demand for the development of eLearning courseware was widely acknowledged. All institutions pointed to the ways in which they had used funds for increasing their infrastructure, such as setting up Wi-Fi points and employing private companies to upgrade their internet speed. The effect of extra costs for the healthcare

professional students for access to the internet has been illustrated; the biggest concern is the struggle with the slow speed of the facilities of the eLearning infrastructure, which makes it more expensive in terms of time and money.

9.4 Perspectives of university policymakers

The perspective of the university policymakers on eLearning was investigated by discussion. The policymakers formulated their policies from several sources, including public documents. All institutions with announced eLearning policies were studied. Some of them had solely a technology policy for their eLearning programme; some had allocated funds for implementing the research policy; others had only an eLearning plan.

Figure 9.4 shows the subjects suggested by the participants in the fieldwork interviews. The findings indicated that the institutions provided those policies and strategies on the eLearning programmes, as well as offering or controlling the course. This needed technical support, software support, and support for both learners and teachers. The respondents also mentioned the influence of policies on colleagues.

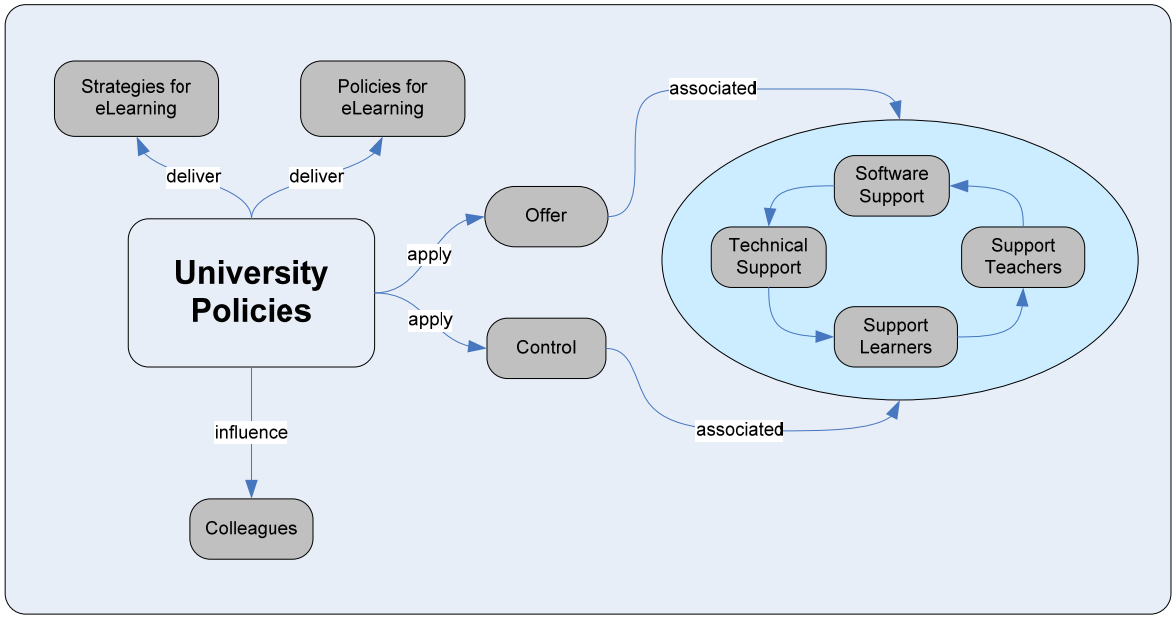


Figure 9.4 Impact of university policies on eLearning programmes

In some instances, the intensive teaching institutions, such as the colleges of Public Health and Nursing colleges, which are quality assured by the public sector

management quality award (PMQA), and controlled by the Institute for Health Workforce Development (Praboromarajchanok Institute for Health Workforce Development, 2008), are required to submit their learning and teaching strategies for funding approval. Those plans expect the institution to employ eLearning within research projects. This research found that all plans submitted by these institutions for their eLearning projects, including their research projects, were funded.

However, the policy of eLearning seemed to be difficult to deal with in isolation. It influenced relationships between colleagues, and specifying requirements in policy did not remove the problem that eLearning equipment is still too expensive. Two policymakers indicated a variety of different ways in which their institution had used funds to enhance the use of learning technology. The interviewees acknowledged the value of external funding sources in enabling them to take forward the agendas which they had identified in the institution policy and strategy.

Respondent 21: *The eLearning project was not clear and not many institutions used that method. We saw that they used technology to support learning but I have not seen them teach eLearning 100 per cent of the time. We had a problem when eLearning was first implemented, but it has now settled down. I don't think that eLearning works for Thai people; they are more used to being taught in the traditional classroom, especially when we don't have an administrator who is responsible for the project. I am concerned about the network being able to make the eLearning program successful. Also, I think that the IHWD should continue to support us with funding. However, we have own funds which we need to use each year*.

In a second interview with an administrator, it emerged that the eLearning policy was a planning document in the inspirational sense rather than a definite template for action. It was swept off course because of lack of resources and heavy staff workloads. Senior staff had tried to address this problem by requiring staff only to introduce one new eLearning course each term. The administrator gave the following information.

Respondent 20: *We tried to produce as many eLearning tutorial courses as we could, to give the students more opportunities for self-study. Unfortunately, we have a very heavy workload, thus making the creation of an eLearning tutorial difficult to achieve. In addition, we do not have the depth of knowledge to produce an eLearning course, including the basic use of a computer and the eLearning courseware. To address this problem, last year I made the policy that we needed one eLearning subject from each department. Since then, we have started training staff to produce eLearning courses*.

Interestingly, one lecturer that was interviewed talked at length about the problems of following government policies affecting the eLearning programme. She

was particularly concerned about the limitations of the national internet network, which struggles with low speed and has been affected by political uncertainty. After the 2006 coup, the Prime Minister in the ruling military council announced that the Telephone Organisation of Thailand (TOT, #292) and its main rival CAT Telecom would be merged, so as to operate a 'Telecom Pool', in which internet providers would rent access (as opposed to the previous arrangement of near-monopoly concessions). However, this attempt to inject competition into the system was not implemented and the 'Pool' idea was abandoned after the 2008 general election. One consequence, though, was to discourage telecommunication companies from making major investments in a period when future market share was hard to predict (see en.wikipedia.org/wiki/ Telecommunications_in_Thailand).

Respondent 7: *I think we have AOL (the telecommunication company) because TOT charged people more for the internet. But the truth is, the speed is still slow and struggling and we have to pay more to obtain a faster speed. This is because of the Ministry HUB for the whole country, and we know that TOT is a government body, who tried to influence the auction with the private companies, and that's not good. This affected the policy in the whole country. However, they did not succeed in the end. For example, there are problems with the network. I used to set up Skype and even bought a microphone and speaker for communication, but it didn't work, especially when it rained – it just stopped working*.

The interviews illustrated the limitations of the policies supporting the eLearning projects. Most institutions still struggled with internet access and most staff (including lecturers, students and webmasters) said that they needed more funding to make eLearning programs successful.

9.5 The cultural effects

The culture of the organisation affects many aspects of eLearning. The cultural effects within the eLearning environment, particularly for healthcare professionals, are the Thai culture itself, the influence of parents, Thai learning and teaching styles, and the confidence of the Thai students. These cultural influences, which are associated with the attitude and the motivation for eLearning courses, are shown in Figure 9.5.

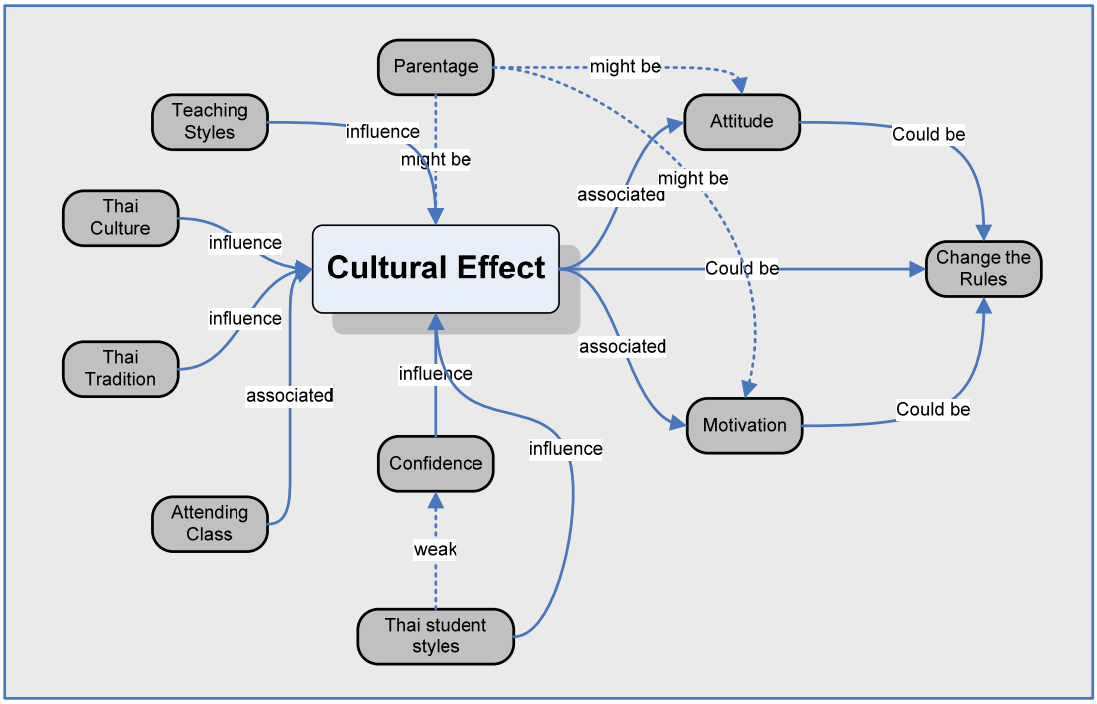


Figure 9.5 Aspects of Culture Affecting eLearning

Some of the many cultural aspects affecting eLearning are shown in Figure 9.5. The cultural effect needs to be considered for understanding the dynamics in the challenge of issues within the eLearning environment, particularly for healthcare professionals. The institutional frameworks within which courses were delivered represented the diverse nature of Thai culture and Thai styles, which affected the ways of using eLearning when teaching.

Respondent 11: *My opinion is that learning with the eLearning programme will change the styles of teaching. It can make teaching comfortable for both the teacher and the student. Sometimes when I taught students to search for information, and assigned them their homework, they seemed to lack the confidence to find the information. Then they struggled and, eventually, I had to give that particular paper directly to them. The eLearning programme seems to work like the media for the student. In particular, we need to have the same reference materials for when the student asks a question and requests information. This would help to support their learning as, with eLearning, they can learn anytime and anywhere.*

Respondent 12: *I thought it was worth helping students to search for the knowledge for their study. However, in my view, in the context of the Thai culture, the students have not been trained to learn by themselves. They have only attended classes in the classroom and then they go. If we have a full term of eLearning only, it will put pressure on the students but if we mixed the methods, it would probably be good for them. As students are not all the same, some might be quicker to learn than others, so*

eLearning might be another option for them to repeat what they should have learned in the classroom.

When teaching with eLearning based on existing institutional culture, there was a challenge and aspiration expressed by lecturers and administrators. This would be influenced by the subject area in which the professional was teaching. All lecturers who have been teaching across a faculty, such as Education or Nursing, found that there was a difference in teaching using eLearning according to the different professions. There is some evidence that students from the Education school seem to have greater success with the eLearning program than Health Sciences students (particularly on the nursing practice subjects). The following three examples demonstrate this.

Example 1: *In my case teaching with eLearning changed the style of learning, First, I like to do something different from the others. (How to make a difference). I have learnt from my children, who are teenagers now, so it inspired me when I see them access the internet. They like to find out different things, so I thought my students might be taught the same things as well. Secondly, on student individual confidence in learning, this needs the practical skills; it is not only the skill to use the eLearning course, but it is also the skill to engage in the learning process. For example, the student's learning perception, which has been indicated by many researchers and by my experience of teaching.*

Example 2: *I use the trick of the 'Challenge.' Teaching needs to find lots of tricks to engage the students. I have the opportunity of working between both the Faculty of Education and the Faculty of Nursing. The nursing student has more things to do than the education student. Nursing students have to train at the hospital (round the ward) and also study in class, the same as the other students. This depends on the nature of the profession. In Thailand, we have limited information on eLearning design, and also need to encourage students to ensure that they have the confidence to learn within an eLearning environment. However, the student from a Thai cultural background does not seem to like writing long passages. I have found that they write just short sentences in answer to my questions.*

Example 3: *In my case, I would comment on the skills, especially the nursing skills.*
A tutor might help a student to learn before the class or even revise after their class, but skills need to be practised. For instance, if a student needs to learn how to extract teeth, they need to learn both the eLearning tutorial and practical skills, and especially the skill of giving injections. I suppose the best way to teach the healthcare professional student would be a mixed method of face-to-face and online learning.

There was concern from the intensive lecturers about Thai teaching styles and Thai student styles, in particular about Thai students who are lacking confidence as this would affect their learning success. This demonstrates the cultural effect.

Respondent 8: *I have discovered that students are different in their basic way of learning and secondly in their behaviour. When I was teaching, some students were late attending class, and some were late in submitting their homework. This is also their attitude with regard to learning. They are not attentive when learning, so if I teach them by using eLearning I worry they might not take in the knowledge as they might when I teach them in the classroom*.

Another participant comments that:

Respondent 4: *I have attended conferences about eLearning and I thought it is worth helping students to search for information. However, in my view, in the context of the Thai culture, the students have not been trained to learn by themselves. They are only used to attending classrooms and then they are gone. If we do full term eLearning, it will put pressure on the student, but if we mix the methods, it will probably be good for them. As students are not all the same, some might be quicker to learn than others, so eLearning might be another option for them to repeat what they have learnt in the classroom.*

As well as the discussion with the students, there were different views. eLearning seems to take more time, as students have to wait for their teachers to respond to a question. This comment would seem to indicate that students prefer teaching in a traditional classroom setting, where they can have immediate feedback from their teacher as soon as they pose a question.

Respondent 13: *The difference between studying with eLearning and traditional classroom study is about the communication. Study in the traditional classroom will get a response back from teacher in the class, especially when we need to ask questions. For eLearning, we have to wait until the teacher logs in, although the teacher may have arranged a time to discuss problems. I had to wait longer than in the face-to-face classroom*.

This supports the view of the experienced lecturer quoted earlier, who had organised tried and tested eLearning courses, that she needs to consider how to make allowances for Thai culture. Another respondent suggested that a positive attitude in gaining the knowledge would be associated with the skills of using computer:

Respondent 6: *I can say that they have a good attitude in gaining knowledge and skills and that their attitude is good on the topic of "trying to learn." Through the computer, I mean computer skills and computer technology, they can gain the knowledge from the video clips that I prepared for them; they can find more information themselves and connect to the internet as much as they wish. It is about gaining knowledge. The skill is to study more, learn more, and practise more, together with the need to connect to the web board. All I can say is the impact of skills on student learning is all positive.*

The overall picture is that Thai culture influences the way an institution implements an eLearning programme. The culture affects both students and teachers.

The important cultural factors are the influence of parents, the confidence of students, their willingness to engage in an online class, and traditional emphasis on rote learning rather than independent study.

9.6 Summary

Qualitative data from interviews and group discussions were analysed to investigate the impact of the four domains of infrastructure, finance, policies and culture. From respondents' accounts regarding infrastructure, the key factors that influenced eLearning programmes were a lack of computers and struggling to get access to internet points. However, modern information technology appears to assist in overcoming the students' problems of access to the internet, e.g. by using mobile phones and setting up Wi-Fi points for internet access via laptops.

All the HE institutions studied pointed to the ways in which they had increased expenditure for updating their infrastructure. This also applied to healthcare professional students, who would pay extra for access to the internet. Emphasis was placed on their concerns around struggling with the slow speed of the facilities used in the eLearning infrastructure, and the high cost in time and money of improving the situation.

Policy affected staff, students and policymakers in different ways. Lecturers, webmasters and students all said that they needed more help with funding to make eLearning a success, whereas the policymakers offered support in principle for eLearning programmes but sometimes lacked the necessary resources to carry this through.

Understanding Thai culture is essential to successful implementation of eLearning courses. The key to this is improving the confidence of students to work independently.

Chapter 10

Discussion

10.1 Introduction

This chapter brings together research results concerning the barriers and drivers within the four domains: Infrastructure within the eLearning environment, Finance of eLearning courses, Universities' Policies for eLearning courses, and Cultural diversity within the eLearning environment (IFPC). Some of the results and findings obtained from the previous chapters merit further consideration. Certain statistically significant paths have been identified within the IFPC model (Chapter 8). It became clear in the course of the interviews and group discussions, from both the pilot study (Chapter 5) and from the main study (Chapter 9), that the domains represented by the IFPC model affect healthcare professional students' ability to use the eLearning environment.

This chapter discusses these results and examines closely how these findings applied to eLearning, especially for healthcare professionals in rural Thailand.

10.2 Overview of the results and findings

This research addressed the following primary research question:

'How do the barriers and drivers of eLearning affect uptake and use for healthcare professionals in rural Thailand?'

The results and findings from the previous chapters illustrated how certain variables from the domains represented in the IFPC model were correlated with each other. Such variables influenced healthcare professionals within the eLearning

environment. This is discussed below and the main relationships are represented in Figures 10.1 and 10.2.

The advantage of reviewing research results and findings at this point is that the theoretical exposition of earlier chapters can be linked more conclusively to concerns raised in the analysis. Relating results and findings back to IFPC issues raised in the reviewed literature is of particular importance in this respect. The variables making up the IFPC model have been investigated separately, especially in relation to the crucial issue of understanding how technology enhances learning, particularly in rural areas. An initial review of the literature on eLearning for healthcare professionals, in the context of Thailand, was presented in Chapter 3, followed by a review of relevant treasure on the barriers and drivers affecting eLearning generally (see Chapter 4). The reviewed literature showed that the factors affecting eLearning for healthcare professionals were: Infrastructure within the eLearning environment, the Financing of the eLearning courses, Universities' Policies for eLearning courses, and Cultural diversity within the eLearning environment, all of which are abbreviated to 'IFPC' and were summarised in Figures 4.4 and 4.5. The importance of the factors incorporated in the IFPC model was confirmed through the results and findings of the pilot study (Chapter 5).

In addition, infrastructure at the university, such as the internet connection, the use of personal mobile telephones, and fast speed broadband at home, were raised as both concerns and enablers to the potential use of eLearning. These are also crucial factors, generally, for developing countries such as Thailand, and were shown to be barriers that such countries need to overcome. Of course, infrastructure is not just a factor relevant for eLearning, but is also vital for developing the national economy by improving transport links, the built environment, and so on.

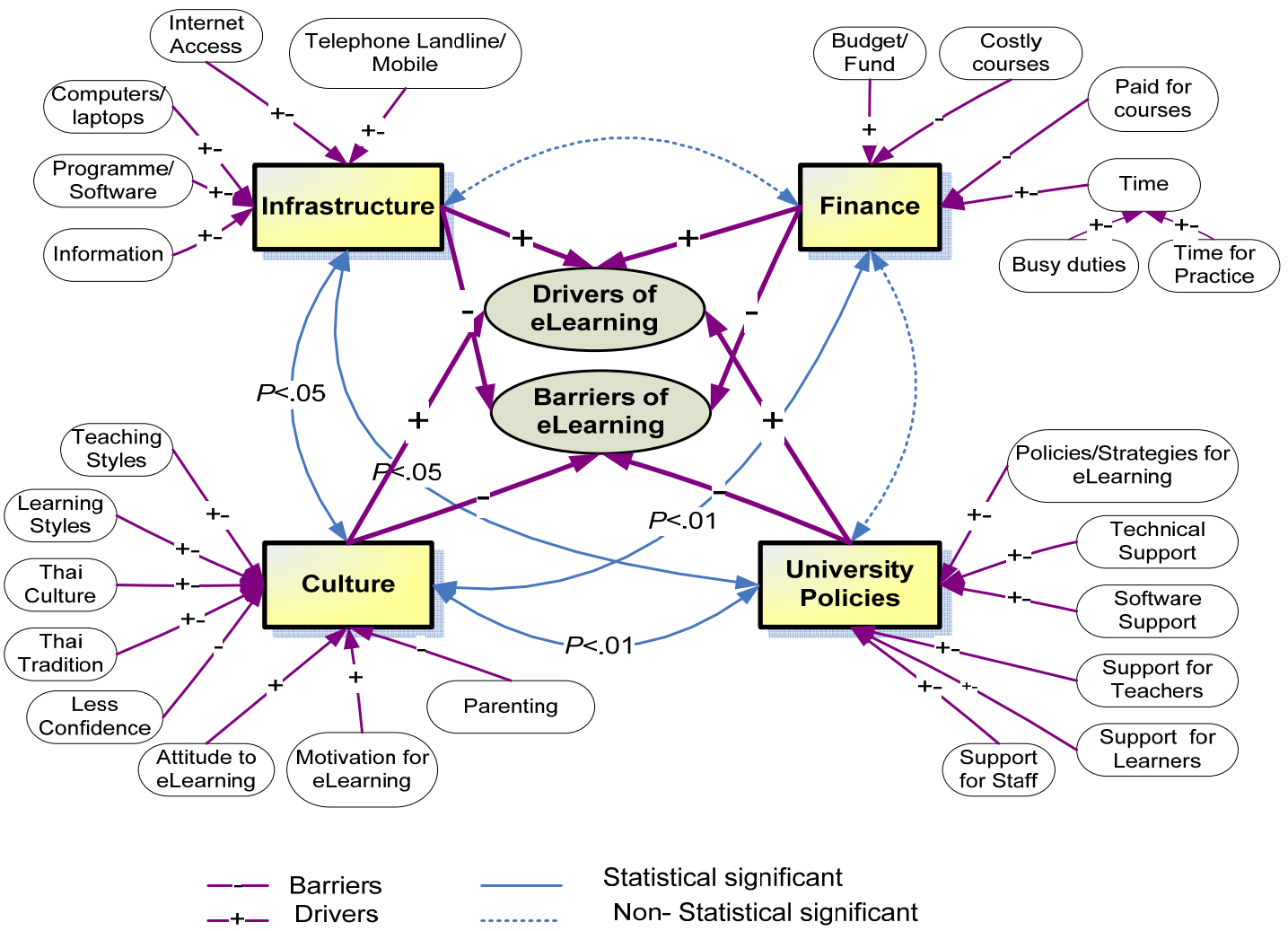


Figure 10.1 Influences on the domains of the IFPC model

Not surprisingly, the issue of infrastructure was related to that of the financial systems within eLearning. This linkage was identified in Figure 4.4, and subsequent discussions about the funding required to support investment in eLearning courses, in particular, the cost of preparing materials and course delivery. Adequate financial resources are related to human resources and time, and are essential for developing good eLearning courses and materials. The importance of identifying the costs of maintaining eLearning activities within the organisation was not always recognised by HE institutions. At the time of the pilot study, the university involved had no clear idea of the costs for the organisation and management of its eLearning activities. These included both the cost of materials that were being provided by teachers, and the cost of the time and effort required for teaching online. Teaching face-to-face was an established teaching and learning method and was funded on a clearly understood historical basis, but online learning was not.

Another finding, that came through strongly, was that of funding technology-enhanced learning. The use of technology to help the learning process, as in eLearning, is a political and policy issue. In developing countries, this is dependent on the policies of the government of the day and whether or not they have clear strategies and policies for eLearning programmes, including supporting the staff who will use eLearning.

Interestingly, the Thai culture regards students and staff in higher education in a respectful light. Thai people have great respect for older people, for social seniors and for religion (as discussed in Chapter 5). This respect for elders and those in senior positions needs to be taken into account when considering the cultural effects on education. The ideas, values, customs and religious beliefs, attitude and behaviour that make up Thai culture are reflected in notions like *Kreng Jai*, *Bhun Khun* and *Kam Lang Jai*, which affect students' orientation to the learning process. Such notions would seem to result in a lack of confidence when in comes to independent study (a finding from the main fieldwork study). It is crucial, therefore, to design effective learning strategies to be used in conjunction with the relevant technology, which support students and overcome these cultural barriers.

10.3 Answering the research questions

How is the attitude to the use of computers affected by the IFPC factors?

The statistical tests, which computed the variables of the factors in the IFPC model, tested the relationship between the attitude to the use of computers and the IFPC variables. They show that this attitude was correlated with the motivation to use a computer and aptitude to do so, as shown in Figure 8.16 and Table 8.7. These results demonstrate that both healthcare professionals and healthcare professional students, who have a highly positive attitude to learning with technology, also have a better attitude in the use of a computer, see Figure 8.16. This figure also shows that a large number of healthcare professionals and students agreed that a computer can increase the quality of the education of a healthcare professional. 89.6% also agreed that the use of a computer was of assistance in healthcare professional studies and in taking healthcare professional courses. Further, the high correlation (> 0.5) of motivation and attitude to the use of a computer suggests that healthcare professionals and students will be successful when using technology to advance their learning, see Table 8.2. Figure 8.12 indicated that healthcare professionals and students use the computer to participate in their group activities. There was a deep concern, found from group discussions and shown in Figure 9.5, that healthcare professional students preferred to attend classes to get answers to questions, because it took a longer time to get a response to questions when using the eLearning system. This concern, about finding an almost immediate answer to their questions, grew in proportion to their lack of confidence in using computers. However, lecturers from healthcare professional schools had no such concerns and were confident in using computers. The findings in section 8.4 indicated that students from health sciences courses seemed to be less successful at eLearning courses than students from other disciplines.

How is the attitude to the use of computers affected by the motivation for eLearning?

The exploration of statistical relationships from the research (Figure 8.12) indicated that there is a linear relationship between attitude to the use of a computer and motivation for eLearning. In addition, Figure 9.5 supports the view that attitudes to the use of the computers were influenced by the motivation for eLearning. This is detailed in Figure 8.16 and Table 8.6, which show that healthcare professional students feel they

achieve independent learning more on a computer compared with a traditional face-to-face situation. The findings on perceived usefulness of eLearning show that healthcare professional students perceived usefulness to include the adequacy of the course in being able to satisfy their intellectual curiosity. It was also found that 89.4% of healthcare professional students agreed that using a computer can increase the quality of a healthcare professional's education, see Figure 8.11. Figure 8.12 also shows that 80.1% of students agreed that the perceived usefulness of eLearning courses increased as their own job competence increased. However, the findings in section 9.5, regarding Respondent 11, suggest that attitude and motivation may be more problematic. Lecturers on the eLearning courses were concerned that the confidence of Thai students was influenced by Thai student culture, including the perceived need to attend the classroom in order to be successful in an eLearning process (Figure 9.5).

How is the motivation for eLearning affected by the IFPC factors?

Section 8.3.1 explored the relationship between the variables contained in the IFPC model. The relationship between motivation and university policies was a strongly linear, Figure 8.16. Figure 8.16 showed that the motivation for eLearning was correlated with attitude to the use of the computer and the universities' policies. This influence is also shown in Table 8.6. These findings seemed to confirm that good motivation and a highly positive attitude to eLearning courses is associated with having strategies and policies of eLearning, which provide good support to healthcare professional staff. Arguably, good policies correlates with all the remaining IFPC factors. For example, providing good policies for eLearning courses implies a requirement for good and effective support for the infrastructure for eLearning, including financial support, ICT facilities and support for those staff who teach within the eLearning environment. This result comes also from the findings of Chapter 9, shown in Figure 9.5.

What is the relationship between the IFPC factors within the eLearning environment?

Chapter 8 gives the results of the correlation tests on the relationships between the IFPC factors. It shows that the IFPC factors are related to each other and this is presented in Figures 8.13 and 8.16. This result was also supported by the findings from Chapter 9, which are now discussed.

- The result of the test on infrastructure (I) to support the eLearning courses showed statistically significant relationships with several variables, as reported in Chapter 9. Infrastructure was correlated with both the universities' policies (P) and an aspect of culture (C) (the ability to use the computer). This result confirmed that providing adequate eLearning strategies and policies for eLearning normally co-existed with better infrastructural support. This was also corroborated by the qualitative findings from Chapter 9 (Figure 9.4), which revealed that the interviewees (such as lecturers) saw a need for policy to support the eLearning infrastructure (section 9.3). Infrastructure also had statistically significant relationships with ability to use the computer. These results show that healthcare professionals and students who had their own computer (Figure 8.11) were more likely to use an eLearning system, as they felt more comfortable using a computer. This was also confirmed in the group discussions as recorded in section 9.1 and Figure 9.1. This figure indicates that healthcare professionals and students, who struggled to access the internet at their university, overcame this problem by using Wi-Fi points at local Internet cafés and other points of access (hotspots) outside the university using their own laptops, as well as accessing the World Wide Web with their mobile phones (Figure 8.7).

- There was a statistically significant correlation between finance for eLearning courses (F), and the cultural effect of ability to use a computer, see Figure 8.16 and Table 8.3. This result was also confirmed in the findings of the pilot study (Chapter 5) which revealed that healthcare professionals who did not own a computer needed to spend time and money on Internet cafés and travel to the points of access (hotspots) in order to gain access to the World Wide Web. This finding is consistent with the data from the main study (described in Chapter 9) which shows finance is influenced by ease of access to a computer and the internet (Figure 9.3). Chapter 5 (Chart 5.3) indicates that the price of ICT in developing countries is higher than in developed countries, particularly when one considers that the monthly payments for access to the internet, especially for eLearning courses, would be high when compared with the minimum wage (section 5.3.3).

- There were statistically significant relationships between the universities' policies, the infrastructure and the cultural motivation. These results are shown in Figure 8.16 and Table 8.3, and the linear correlation in Figure 8.16. These results are supported by the qualitative findings in Chapter 9. It emerged that the strategies and policies of eLearning are influenced by the level of support for the facilities for the eLearning program (see Figure 9.4). In addition, it was felt that policymakers attempted to support their staff, for example by having university policies and strategies for eLearning, as reported by Respondent 21 (section 9.3). Unfortunately, the research found that staff from most of the institutions were still struggling with lack of infrastructure and lack of support for it. This finding was discussed in Chapter 9 (section 9.3).

10.4 The dynamics of the IFPC model

The results and findings are summarised in Figure 10.1. This presents the association and understanding of the dynamics of the IFPC model for eLearning as perceived by healthcare professionals: administrators (policymakers), teaching staff and students (see Figure 10.2).

10.5 Summary

This chapter has discussed the impacts of eLearning for healthcare professionals and healthcare professional students. The original hypotheses from the desktop study were that the main barriers and drivers of eLearning were:

- Infrastructure within the eLearning environment
- Finance of the eLearning courses
- The Universities' policies for the eLearning courses
- Cultural diversity within the eLearning environment.

The importance of these factors was supported by an exploratory investigation, in the form of the pilot study, to understand the impacts of eLearning for healthcare professionals and healthcare professional students in the rural areas of Thailand. The

pilot study took place in a single institution, a university in North Eastern region. The pilot study investigated the major impact of eLearning in terms of: infrastructure, financial support, clear policies for the eLearning programme, and the importance of cultural effects when learning with high technology. For example, the uptake of eLearning would be affected by the learning attitude and motivation of healthcare professionals and healthcare professional students.

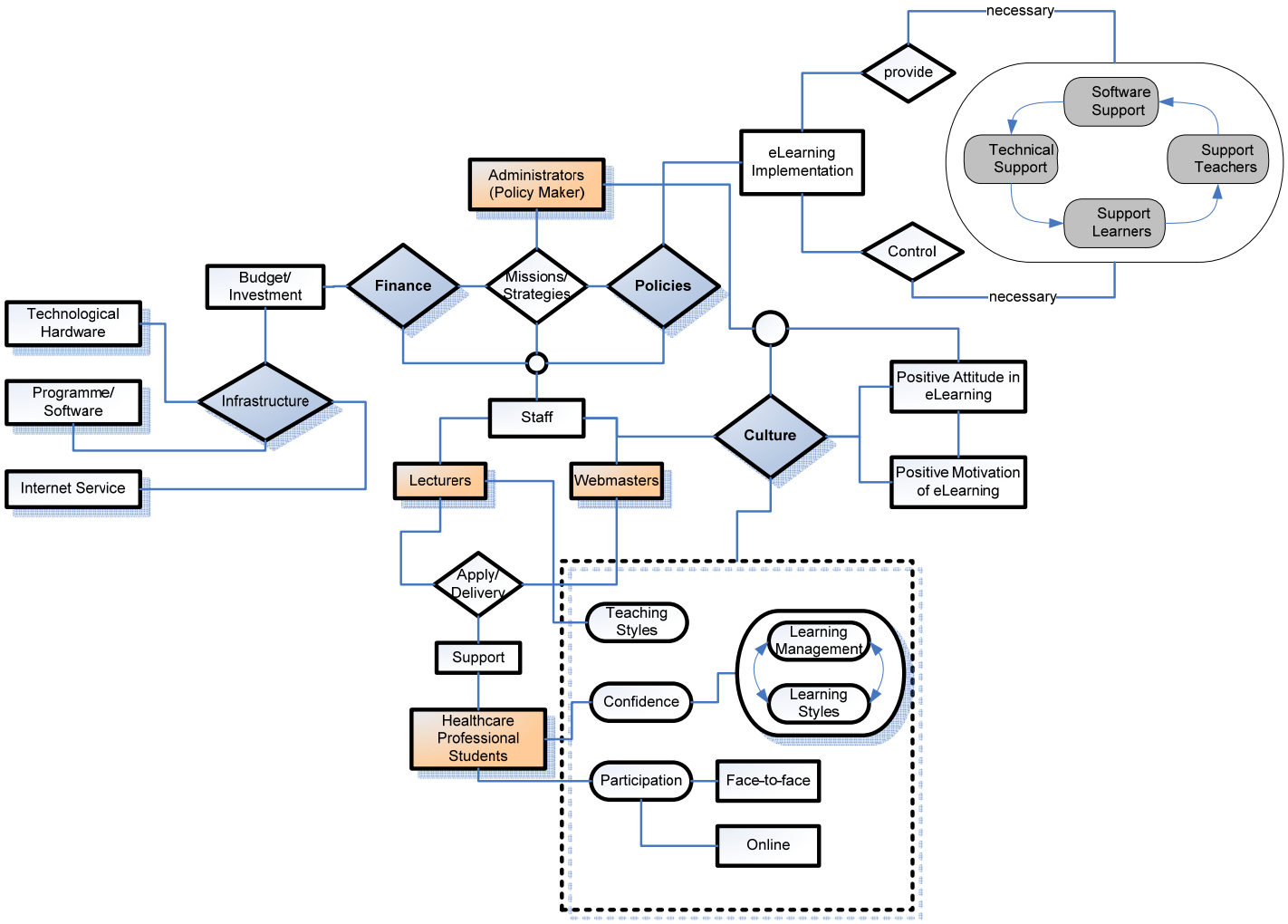


Figure 10.2 Dynamics of the IFPC model for Healthcare Professionals

Further results, obtained through the larger study of four rural universities in Thailand, indicated that these domains impacted the uptake of eLearning for healthcare professionals and healthcare professional students, as represented by the IFPC factors. The following results were statistically significant.

1. Healthcare professionals and healthcare professional students who own their own computers perceived that eLearning was useful to their professional development as healthcare professionals.
2. The healthcare professional student's view and understanding of the university's policies on eLearning affected their use of the eLearning infrastructure and their motivation to undertake eLearning courses.
3. The healthcare professional students' view of the usefulness of eLearning courses was affected by both their motivation and their ability to use a computer.
4. The state of the infrastructure for eLearning was related to the healthcare professional students' views on their university's policies for eLearning and their ability to use a computer.
5. The healthcare professional students' ability and attitude to their use of computers was correlated with the issue of finance.

The findings show that the four domains, as represented by the IFPC model, influenced the healthcare professionals' and healthcare professional students' uptake of eLearning. The important lessons for policymakers are that good organisation is essential for the uptake of eLearning. For instance, clear policies, funding to support and maintain infrastructure, and an articulate plan (roadmap) for delivery of infrastructure, are all essential. For senior managers, it is crucial to encourage and motivate staff to implement eLearning courses and encourage students to participate in them. For example, providing unambiguous eLearning policies would influence those supporting and funding the eLearning infrastructure, and will encourage healthcare professionals and healthcare professional students to continue updating their healthcare knowledge for the benefit of all those with whom they have professional contact.

Chapter 11

Conclusions and Future Work

This chapter provides an overview of the study. The research began with an investigation into eLearning in Thailand, focusing on healthcare professionals and healthcare professional students, especially in the rural areas. Chapter 2 discussed eLearning from a different perspective, namely, developed and developing countries. It included the impact of eLearning around the world. In particular, when implementing eLearning courses for healthcare professionals and healthcare professional students, there is a need to carefully evaluate the courses' impact. As some rural healthcare professionals and students are part-time, being shift workers, and may live many kilometres from their university, often they may not have local colleagues with whom to share their experiences of eLearning.

The research also examined the current literature on the drivers and barriers in eLearning. It became evident that relatively few articles in the academic sphere examine the risks associated with eLearning developments. The review identified certain drivers and barriers in eLearning, which were also found in the pilot study. However, it is important to realise in eLearning, and specifically in the field of healthcare, that it is not just motivating the learner that is important. Providing adequate tools, processes and infrastructure are also vital. Indeed, understanding the drivers and barriers in eLearning would help to engage participants and encourage the uptake of eLearning among all healthcare professionals, including students, teachers, and policymakers. A new model of IFPC factors has been proposed to assist planners and implementers of eLearning for healthcare professionals in rural Thailand.

An example university in Thailand was selected for the pilot study. It was found that Maha Sarakham University's eLearning course was an ambitious effort to use new techniques to reach ill-served healthcare professional students in rural Thailand. Over a period of nine months, the project partners were unfortunately unable to deliver the second semester of the planned eLearning course. The online courses for the Masters Degree in Public Health were, therefore, discontinued. This pilot study helped identify the key factors associated with this failure. In the pilot study, the survey questionnaire showed that computer applications related to eLearning were mostly used to access the internet from the participants' workplaces, and then only used for checking e-mail and obtaining online learning materials for printing. In particular, the results showed that accessing the internet from home using a telephone landline is an extremely slow process and the main problem, overall, was gaining access to the internet.

The results from the reviewed literature and pilot study raised various issues concerning the barriers and drivers in eLearning affecting healthcare professionals, especially in rural Thailand. These issues were explored further and categorised in four main domains: Infrastructure; Finance; Policies; and Culture (IFPC). Chapter 6 discussed why these four factors needed analysing and considered how, and if, the domains were related. Findings were given in more detail on '*why do we need to critically assess these factors?*' and '*how are the factors in each domain related?*' in the context of healthcare professionals who work in the rural areas of Thailand. These results showed that eLearning would not be the only factor to change the policy of a university. Other forces are at work, including changing governmental and professional requirements, economic development, technological change, changing employment patterns and opportunities, and the changing expectations of students.

Although the reviewed literature had shown many positive benefits of eLearning, none had addressed the impact in the four domains represented in the IFPC model. Consideration of these is crucial. While these areas have been investigated separately, particularly when implementing learning and teaching at a distance, they have not been researched together. In particular, this lack of assessment as a whole applies to those who use computer information technology (for instance healthcare professionals in developing countries) to update themselves, continuously, in order to provide better care for their patients.

This research therefore undertook a mixed methods inquiry to show the reality of eLearning for particular groups of participants, including the impacts of technology-enhanced learning within the healthcare professional environment. It also attempted to understand phenomena through the meanings that people assign to them, within the context of the information technology system and the process whereby the IT system influences and is influenced by the context. This research involved a process with eight stages (see Figure 7.2).

The results obtained from a major study of four HE institutions in rural Thailand, demonstrated that the IFPC domains impact the uptake of eLearning for healthcare professionals and healthcare professional students. The results of statistical testing confirmed that healthcare professional students with their own computers, perceived that eLearning was useful to their professional development. In addition, it showed that universities' policies on eLearning affected the use of the eLearning infrastructure, the participants' motivation to undertake eLearning courses, and that eLearning course-uptake was affected by both healthcare professionals' motivation and their ability to use a computer. The subject of financing of eLearning courses was directly correlated to the level of computer skills held by the healthcare professional students and their attitude towards their own use of computers.

Moreover, these quantitative results were supported by the findings from the qualitative study, which showed that the four factors of the IFPC model, influenced the healthcare professionals' uptake of eLearning. This aspect of the IFPC model is not only related to healthcare professional students, but also influences the people who are associated with the eLearning environment (policymakers, lecturers, and webmasters). In turn, this correlated with (perceived) good organization, positive attitudes and good motivation within the eLearning environment. Clearly, this is crucial for the formulation of policies and provision of funding to support and maintain infrastructure. It is also important to encourage and motivate staff, who are at the leading edge of implementing eLearning courses and who are supporting students to engage with online courses. This would encourage healthcare professionals to continue updating their healthcare education and familiarity with relevant information.

11.1 Research Objectives

The main aim of this research was to discover the answers to the research question '***How do the barriers and drivers of eLearning affect its uptake and use for healthcare professionals in rural Thailand?***'

The research question was split into five components:

(Q1) What are the barriers and the drivers to eLearning for healthcare professionals in rural Thailand?

(Q2) How is the attitude to the use of computers affected by the IFPC factors?

(Q3) How is the attitude to the use of computers affected by the motivation for eLearning?

(Q4) How is the motivation for eLearning affected by the IFPC factors?

(Q5) What is the relationship between the IFPC factors within the eLearning environment?

The principal aim has been discussed in Chapter 10, using the results and findings from the mixed research methods discussed in both Chapter 9 and Chapter 10, which indicated that the IFPC factors influenced the uptake of eLearning for healthcare professionals. The results and findings were confirmed with the sub-research questions as follows.

The first objective was to investigate the barriers and the drivers in regard to eLearning for healthcare professionals in rural Thailand, which is set out in Chapter 4. This led to the grouping of the barriers and drivers into a set of four categories (summarised in Figures 4.4 and 4.5). The barriers and drivers were mapped to the areas of Infrastructure (I), Finance (F), the universities' Policies (P), and the culture (C). The pilot study was undertaken to further investigate the impact of eLearning for healthcare professionals. The pilot studied showed that the categories were correct. The main study was then undertaken to find the relationship between these categories. In particular, Chapter 6 discussed the main variables in the IFPC.

The other objectives were discussed in Chapters 9 and 10. These chapters demonstrated that IFPC factors influenced healthcare professionals within the eLearning environment. In addition, the results have shown that a number of individual

factors in the IFPC model were correlated with each other. Further, the relationships between IFPC factors are not only statistically significant in the realm of attitude to the use of computers, but they are also statistically significant in the perception of motivation for eLearning.

11.2 Contribution

This research addressed the question '*How do the barriers and drivers of eLearning affect uptake and its use for healthcare professionals in rural Thailand?*'

A review of current literature, which explored the issues around eLearning, was presented, with a focus on developing countries. The pilot study confirmed these issues as being important. The findings from the current literature review and pilot study were used to develop a model for examining the barriers and drivers for eLearning. The model is the main contribution of this work. This study confirmed the model can be used to evaluate the impact of eLearning in rural Thailand. It will help policymakers and those implementing eLearning to identify the issues they need to address in order to produce successful eLearning courses.

The main study also confirmed:

- Barriers and drivers of eLearning within the IFPC model were related to each other; this was established not only by the quantitative results (Chapter 8), but also by the results from the interviews and group discussions (Chapter 9).
- The choice of eLearning infrastructure (I) shows that limitations to internet access were the main barrier to learning and teaching online. This was found in both the pilot study (2006) and the second-stage study (2010), both of which were discussed in Chapter 10.
- Finance (F) is relevant to healthcare professionals in connection with eLearning courses and was the major influence on healthcare professionals when comparing the 'paid-for' information technology infrastructure and the minimum wage for Thai people (Chapter 8 and Chapter 9).
- The area of culture (C) was a crucial issue for Thai people, especially when information technology is used in their learning. The study reported that the Thai cultural style of teaching is '*passive learning in a traditional face-to-*

face classroom teaching situation.' In addition, the level of confidence of the students varied between universities. This research found that nursing students required more support than public health professionals when accessing eLearning.

This research has contributed to other published research outputs:

- Turnbull, N., Wills, G., Gobbi, M. O. (2010). The four-status model challenge eLearning for healthcare professionals: a critique on developing world**.** In**:** *International Conference of Education, Research and Innovation (ICERI 2010)*, 15-17 November 2010, Madrid, Spain (Appendix H).
- Turnbull, N., Wills, G., Gobbi, M. O. (2011). The challenge of four-status model of eLearning: Principles Toward a New Understanding for Healthcare Professionals. In: *International eLearning Conference (IEC2011)*, 13-14 January 2011, Bangkok, Thailand (Appendix HI.

11.3 Future Work

This research proposed the IFPC model, which included essential concepts that are believed to be important when implementing eLearning in rural Thailand. However, it would be useful to explore details of IFPC factors further in other parts of the world, especially in developing countries. For example:

- Infrastructure: different results were found between the pilot study and the second-stage study. The latest results show that healthcare professionals seemed to have more facilities to access the internet. For example, they had overcome one barrier to eLearning by using their mobile phones and Wi-Fi points to access to the World Wide Web. This could be explored further in a concentrated experiment on the eLearning tools and programmes to measure satisfaction among healthcare professionals.
- Finance: this model asked limited questions and was unable to explore this aspect in depth with the participants. It would be useful to consider research on the effects of financing to support eLearning, as this may be vital for the case of the developing countries.

- Policy effect: this could be investigated further as those same developing countries may benefit from examining the experience of policymakers in other countries.
- Cultural effect: this may best able to make a further contribution in providing guidance to policymakers, so that they may understand that gaining a better insight into social issues may well enhance the successful take-up of eLearning. It would be useful to compare one culture with another on how the IFPC model is viewed in different parts of the world.
- The IFPC model: this research showed that IFPC influences eLearning courses, particularly in a developing country, such as Thailand. However, it could be investigated more intensively, and the exact problems for eLearning programme could be better understood.
- The IFPC model: this could be further tested to create a stronger model by using Structural Equation Modelling (SEM) statistics, as this would help to confirm that the variables of IFPC are correlated.
- Participants suggested the use of blended learning for healthcare professionals, rather than full time online learning. This seems to be suggest a line of new research, which would use this method, by investigating the effect within the IFPC model.

In addition, there seem to be some academic areas of the healthcare professions which were not covered in equal depth by this study. It would be useful to compare each specific healthcare occupation (for example medicine, dentistry, and nursing) to see whether membership of a specific healthcare occupation affects the uptake of eLearning. This could enable resources to be concentrated on any perceived problem areas.

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Appendix A Pilot survey

A pilot study questionnaire

Introduction

The main aim of this research is to investigate how health care professionals use electronic information. The result of this research may use to be developing in Public Health e-Learning Module of health care professionals at Mahasarakham University. This research is under direction of the School of Computing, University of Portsmouth. I would appreciate your responses to the following questions. Your information will be used for this research purpose only. Thank you very much for your time in completing this questionnaire.

Niruwan Oprachai

Part I Profile of Respondents

1. Student ID ……

2. Gender

☐ Male ☐ Female

3. Age ……..

4. Study programme

☐ Behavioral Sciences and Health Promotion
☐ Environmental Health
☐ Health Systems Management
☐ Health Informatics Management

Part II Information Applications

5. How do you access the internet? (Choose as you wish)

☐ From your home computer
☐ From your office
☐ From Internet café
☐ From other places (Please provide the place that you use from)

……
……

6. If you access the Internet from your home what kind of internet connection do you have?

Modem	ISDN	DSL	LAN	Others: (Please specify)
☐	☐	☐	☐	……

7. How many years have you been using the Internet?

…… (Years)

8. In the past year, about how often did you look on the Internet for information?

Everyday	More than once/wk	About once/wk	Once/month	Every 2-3 month	Less than every 2-3 month
☐	☐	☐	☐	☐	☐

9. Which information do you always use? (Choose as many as you wish)

- ☐ Online Data Base from Ministry of Public Health
- ☐ Tele-medicine
- ☐ Tele-conference and Tele-education
- ☐ MIS of health care between public health facilities and the Ministry of Public Health
- ☐ Tele- Consultation and Appointments
- ☐ Online Learning
- ☐ e-mail
- ☐ check the weather
- ☐ sports information
- ☐ game online
- ☐ shopping
- ☐ internet banking
- ☐ chat rooms
- ☐ Web discussion
- ☐ Report trading stocks online
- ☐ check the news
- ☐ Others (Please provide examples)

  ……

  ……..

10. (from 10) How many times do you always use the best as you wish Information?

More than once/day	About once/day	Once/week	Every 2-3 week	Less than every 2-3 week
[ ]	[ ]	[ ]	[ ]	[ ]

11. a) Have you had technical problems with accessing?

Yes, at home	Yes, in the PC-Pool	No
[ ]	[ ]	[ ]

12. b) If yes, which problem?

……

……

……

13. Do you seek usually support to help you with any difficulties encountered?

Always	sometimes	Never
[ ]	[ ]	[ ]

Please provide examples of what support you needed and who you contacted

……

……

……

14. a) How easy is it to find time to use the Internet?

……

……

……

15. b) Alter another difficulty in using accessing the Internet?

……

Part III Perceived Usefulness

Reminder; the electronic Information means the information that you choose in No. 9 and Arrangement in No. 10

16. Using the electronic Information improves the quality of the work I do.

Huge improving	Good improving	Neutral	Less improving	No improving
☐	☐	☐	☐	☐

17. Using the electronic Information gives me greater control over my work.

Very good	Good	Neutral	Not so good	Not good at all
☐	☐	☐	☐	☐

18. The electronic Information enables me to accomplish tasks more quickly.

Very quick	Quick	Neutral	Slow	Huge slow
☐	☐	☐	☐	☐

19. The electronic Information supports critical aspects of my job.

Huge supports	Good supports	Neutral	less supports	Not supports at all
☐	☐	☐	☐	☐

20. Using the electronic Information increase my productivity.

Huge increase	Very increase	Neutral	Less increase	Not increase at all
☐	☐	☐	☐	☐

21. Using the electronic Information increase my job performance.

Huge increase	Very increase	Neutral	Less increase	Not increase at all
☐	☐	☐	☐	☐

22. Using the electronic Information allows me to accomplish more work than would otherwise be possible.

Huge accomplishment	Very accomplishment	Neutral	Less accomplishment	Not accomplishment at all
☐	☐	☐	☐	☐

23. Using the electronic Information enhances my effectiveness on the job.

Huge enhancement	Very enhancement	Neutral	Less enhancement	Not enhancement at all
☐	☐	☐	☐	☐

24. Using the electronic Information make it easy to do my job.

Very easy	Easy	Neutral	Not so easy	Not easy at all
☐	☐	☐	☐	☐

25. Overall, I find the electronic Information useful in my job

Very useful	Useful	Neutral	Not so useful	Not useful at all
☐	☐	☐	☐	☐

Part IV Perceived ease of use

26. I find the electronic Information cumbersome to use.

Very useful	Useful	Neutral	Not so useful	Not useful at all
☐	☐	☐	☐	☐

27. Learning to operate the electronic Information is easy to for me.

Very easy	Easy	Neutral	Not so easy	Not easy at all
☐	☐	☐	☐	☐

28. Interacting with the electronic Information is often frustrating.

Very often	Often	Neutral	Not so often	Not often at all
☐	☐	☐	☐	☐

29. I find it easy to get the electronic Information to do what I want to do.

Very easy	Easy	Neutral	Not so easy	Not easy at all
☐	☐	☐	☐	☐

30. The electronic Information is rigid and inflexible to interact with.

Very rigid	Rigid	Neutral	Not so rigid	Not rigid at all
☐	☐	☐	☐	☐

31. It is easy to me to remember how to perform tasks using the electronic Information

Very easy	Easy	Neutral	Not so easy	Not easy at all
☐	☐	☐	☐	☐

32. Interacting with the electronic Information required a lot of mental effort

Very effort	Effort	Neutral	Not so effort	Not effort at all
☐	☐	☐	☐	☐

33. My interaction with the electronic Information is clear and under stable

Very clear	Clear	Neutral	Not so clear	Not so clear at all
☐	☐	☐	☐	☐

34. I find it take a lot of effort to become skilful at using the electronic Information

Very effort	Effort	Neutral	Not so effort	Not effort at all
☐	☐	☐	☐	☐

35. Overall, I find the electronic Information easy to use

Very useful	Useful	Neutral	Not so useful	Not useful at all
☐	☐	☐	☐	☐

Appendix B The pilot study Interview Guide Questions

Student ID……Date/Month/Year……/……/……Time……Place……..……

Information wanted / Questions					
Part I **1. What information do you always use?** *a) non electronic information*	Journals……. …… …… ……	Magazines…… …… …… ……	Newsletters…… …… …… ……..	Newspaper…… …… …… ……	Documents/ So on…… …… …… ……..
b) electronic information	Etc. websites				
2. How do you search for information? *a) non electronic information*					
b) electronic information					
3. What difficulties do you find in searching or using information?					

Information wanted / Questions					
a) non electronic information					
b) electronic information					
4. Do you find it easy using some information more than others?	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……
Part II *Factor at acting, searching & using information & electronic information*					
1. What factors for using electronic information?	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……

Information wanted / Questions					
	…… ……	…… ……	…… ……	…… ……	…… ……
2. What factors for searching electronic information?	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……
3.					
Part III E-learning environment	Excellent	Good	Fair	Poor	N/A/Comments …… ……
1. Instructional team a) Instructors					
b) Tutors					
c) Discussion facilitator					
d) Copyright Coordinator					
e) Guest speaker					

Information wanted / Questions					
2. Learner Support a) Technique support	Excellent	Good	Fair	Poor	N/A/Comments …… ……
b) Library support					…… ……..
c) Counseling service					…… ……..
Part IV Motivators 1. Time/location flexibility?	Strongly agree & (Comments)	Agree & (Comments)	Neither agree Nor disagree & (Comments)	Disagree & (Comments)	Strongly disagree & (Comments)
2. Personal interaction					
3. Learning community?					
4. Learn new technology?					
5. Easier to use course?					

Information wanted / Questions					
Part V What's Learning style (samples) **1. Visual style** a) I typically prefer information to be presented visually	Very Little Like Me	A Little Like Me	Like Me	A Lot Like Me	
2. Auditory style a) I follow directions better than written ones	Very Little Like Me	A Little Like Me	Like Me	A Lot Like Me	
3. Tactile style a) I work skillfully with my hands to make or repair things	Very Little Like Me	A Little Like Me	Like Me	A Lot Like Me	
Part VI Comment about MSU-e learning course **1. Benefit of Module**	…… …… …… ……				
2. Drawback	…… ……				

Information wanted / Questions					
	…… ……				
3. Improvement	…… …… …… ……				

Interviewer Sign……

Date/Month/Year……/……/……..

Appendix C Fieldwork questionnaire

Introduction

The main aim of this research is to investigate the barriers and drivers of eLearning regarding for healthcare professionals in rural Thailand. The research explores the challenges of eLearning in four domains: infrastructure within the eLearning environment, finance of the eLearning courses, university policies for the eLearning courses, and cultural diversity within the eLearning environment. The research would contribute knowledge as to how healthcare professional in the developing countries, such as, Thailand would be affected and how they would respond to eLearning. This research is under direction of the School of Electronics and Computer Science, University of Southampton. I would appreciate your responses to the following questions. Your information will be used for this research purpose only. Thank you very much for your time in completing this questionnaire.

Niruwan Turnbull

Part I: About your facilities of eLearning

1. **Do you own computer at home?**

   □ Yes

   □ No

2. **Do you use computer labs on campus?**

   □ Yes

   (Please provide the reasons)

   ……

   □ No

   (Please provide the reasons)

   ……

3. **How do you access the internet?** (Tick all that apply)

   □ From your home computer

   □ From your office

   □ From Internet café

□ From other places (Please provide the place that you use from)

……

4. If you access the Internet from your home what kind of internet connection do you have?

Modem	Broad band	Mobile Phone	LAN	Others: (Please specify)
□	□	□	□	……

5. Which of the following Internet activities do you perform on weekly? (Tick all you have apply)

□ Games

□ Research

□ Purchasing something

□ Educational

□ Communication (e.g. e-mail)

□ Social Web (e.g. Facebook, Twitter, MSN live, Hi5)

□ Other (please list):

□ Designing web pages

□ Other (please list):

……

……

6. **On average, how many hours per week do you spend on a computer?**

□ None

□ Less than 3 hours

□ 3-5 hours

□ 5-7 hours

□ More than 7 hours

7. How would you rate your own computer abilities?

□ No experience

□ Poor

□ Weak

□ Fair

□ Good

□ Excellent

8. Have you received any training on how to use the eLearning before you applied for the eLearning courses?

□ Yes

□ No

9. **If Yes, How many hours of training did you receive ?**.....hours

10. **Did you have to pay for accessing the Internet particular for eLearning course?**

    □ Yes (*Continue to question 11.*) □ No (*go to question 12.*)

11. **If Yes How much did you pay for it?**.....

12. **Did the eLearning courses cost you more money than traditional face-to-face study?**

    □ Yes □ No

13. **How did you choose the eLearning course? (current eLearning that you have been study)?**

    □ By my self
    □ Tutors advices
    □ Under the Faculty policies
    □ Under the university policies
    □ Others *(please specify)*……...

The following questions need you to provide the information about your eLearning courses. Please tick the relevant box.

14.	Did the university provide the '*technical help policies*' for the eLearning course for you?	□ Yes	□ No
15.	Did the university provide '*the student code of conduct policies*' on your eLearning course? (e.g. behaviour in electronic communications, attendance, self-motivation and self-direction, cheating and plagiarism)	□ Yes	□ No
16.	Did the university provide '*the course syllabus policies*' on your eLearning course? (e.g. course goals, course schedule, identifies course texts and other required materials, and the contact instructor outside of scheduled class activities)	□ Yes	□ No
17.	Did the university have '*student privacy policies*' for you?	□ Yes	□ No
18.	Did the university '*provide e-mail policies*' for you?	□ Yes	□ No
19.	Did the university provide '*software standard policies*' for you?	□ Yes	□ No

20.	Did the university eLearning course provide '*the assignment policies*' for you?	□ Yes	□ No

Part 2: Views on the Use of Computer for eLearning for healthcare professional Programming

Since computers are being used more and more for the delivery of eLearning courses, we are interested in learning about how healthcare professionals feel about using computers in educational courses in general, as well as specially deserve for healthcare professionals.

Please respond to the following statements by circling the applicable number:

The numbers are: *1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree*

Items	Titles	*Strongly disagree*	*Disagree*	*Agree*	*Strongly agree*
21.	I feel more at ease learning on a computer than in a traditional, face-to-face format.				
22.	I feel more independent learning on a computer than in a traditional, face-to-face format.				
23.	I like learning on the computer because I can work at my own pace.				
24.	Learning on a computer is limited the communication I have with other people.				
25.	A computer structures the learning activity too much.				
26.	Learning that is mediated by a computer will be a cold and impersonal experience.				
27.	Computer can be useful for eLearning for healthcare professionals.				
28.	I use the computer for assistance in learning for healthcare professional courses.				
29.	Computer can increase the quality of healthcare professional education.				
30.	Computer can increase the access to educational programme for healthcare professionals.				

Part 3: Motivation

ELearning for healthcare professional courses have various reasons for participating in educational programmes. These reasons influence whether or not we enrol in a particular educational activity. Please help us to understand 'what do you think about your eLearning courses?

Please respond to the following statements by circling the applicable number:
The numbers are: *1 = No Influence, 2 = Little , 3 = Neutral, 4 = Moderate Influence, 5 = Much Influence*

Items	Titles	*No Influence*	*Little*	*Neutral*	*Moderate Influence*	*Much Influence*
31.	To satisfy my intellectual curiosity					
32.	To comply with my tutor's or employer's policy					
33.	To respond to the fact that I am surrounded by people who continue to learn.					
34.	To increase my competence in my job					
35.	To take part in an activity which is customary in the circle in which I move					
36.	To have a few hours away from responsibilities					
37.	To abide by the recommendations of someone else					
38.	To help me earn a degree, diploma, or certificate					
39,	To participate in group activities					
40.	To get a break from the routine of home or work					
41.	To secure professional advancement					

Items	Titles	*No Influence*	*Little*	*Neutral*	*Moderate Influence*	*Much Influence*
42.	To fulfil the requirements of a regulatory licensing body					

Part 4: Personal Information

In order for us to link your responses to important factors in evaluating eLearning for healthcare professional priorities, please volunteer this information.

1. Your Age: ……
2. Gender:
   - Male
   - Female
3. What is your field (profession, #513) of study?

   ……..……..……..
4. How far do you live from the campus? ……Kms
5. Residency (Please provide your province) ……..…..……..

Part 5: Please fill in your e-mail address if you want to be part the prize.

E-mail:……

UNIVERSITY OF Southampton
School of Electronics and Computer Science

Appendix D Consent Form

(Version 1)

Study title: THE CHALLENGE OF E-LEARNING FOR HEALTHCARE PROFESSIONALS; AN EXPLORATION IN RURAL THAILAND

Researcher name: NIRUWAN TURNBULL

Study reference: DR. GARY BRIAN WILLS

Ethics reference:

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (January 2010/version:1) and have had the opportunity to ask questions about the study ☐

I agree to take part in this research project and agree for my data to be used for the purpose of this study ☐

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected ☐

Name of participant (print name)……

Signature of participant……..

Name of Researcher (print name) …NIRUWAN TURNBULL……

Signature of Researcher……..

Date…….

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Appendix E Best Practice

The Challenge of eLearning for Healthcare Professionals: An exploration in rural Thailand

January……, 2010

You are being invited to participate in a research study about the challenge of eLearning for healthcare professionals. This research project is being conducted by NIRUWAN TURNBULL (nee OPRACHAI) a PhD student, Learning and Societies Lab, School of Electronic and Computer Science, University of Southampton. The objective of this research project is to attempt to understand the barriers and drivers of e-Learning for healthcare professional students in a rural part of Thailand. It is being conducted in over 4 universities in rural areas throughout Thailand. The survey is being given to current students of the Healthcare students all these universities.

There are no known risks if you decide to participate in this research study, nor are there any costs for participating in the study. The information you provide will help me understand what exactly barriers and drivers of eLearning regarding healthcare professionals. The information collected may not benefit you directly, but what I learn from this study should provide general benefits to healthcare students, the universities, and researchers.

This survey is anonymous. If you choose to participate, do not write your name on the questionnaire. No one will be able to identify you, nor will anyone be able to determine which university you come from. No one will know whether you participated in this study. Nothing you say on the questionnaire will in any way influence your study with your university. Your participation in this study is voluntary. If you choose to participate, we have two options for you:

1. Online Survey: http://app.sgizmo.com/survey_.....
2. Place your completed questionnaire in the white locked box outside the class room. No one at your university has a key to open this box.

If you prefer, you may mail the survey to: Niruwan Turnbull (nee Oprachai), Assistance Professor, Faculty of Public Health, Maha Sarakham University, Maha Sarakham Province, Thailand 44150 or Learning Societies Lab, School of Electronics and Computer Science, Building 32 Room 3069, University of Southampton, Highfield, Southampton, UK SO17 1BJ.

UNIVERSITY OF Southampton
School of Electronics and Computer Science

If you have any questions or concerns about completing the questionnaire or about being in this study, you may contact me at (0044) 07954159817 or at nt08r@ecs.soton.ac.uk, niruwan_o@yahoo.com

The School of Electronics and Computer Science has reviewed my request to conduct this study. If you have any concerns about your rights in this study, please contact: Jo Axtell of SEC Secretary, IAM office Building 32, Room 4053 or email: jca2@ecs.soton.ac.uk.

Appendix F The tables of details of significant variables

Case Processing Summary

		N	%
Cases	Valid	188	94.0
	Excluded[a]	12	6.0
	Total	200	100.0

a. Listwise deletion based on all variables in the procedure

Reliability Statistics

Cronbach's Alpha	N of Items
.821	22

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I feel more at ease learning on a computer than in a traditional, face to face format.	56.36	54.284	0.290	0.544	0.818
I feel more independent learning on a computer than in a traditional, face to face format.	56.17	55.907	0.133	0.503	0.825
I like learning on the computer because I can work at my own pace.	56.07	54.658	0.215	0.377	0.822
Learning on a computer limits the communication I have with other people.	56.60	56.444	0.059	0.167	0.831

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
A computer structures the learning activity too much.	56.39	54.400	0.294	0.265	0.818
Learning that is mediated by a computer will be a cold and impersonal experience.	56.43	54.267	0.198	0.263	0.825
A computer can be useful for eLearning for healthcare professionals.	56.02	52.973	0.400	0.366	0.813
I use the computer for assistance in learning about healthcare professional courses.	55.75	53.547	0.436	0.494	0.812
A computer can increase the quality of healthcare professional education.	55.74	53.884	0.437	0.525	0.812
A computer can increase the access to educational programmes for healthcare professionals.	55.71	53.278	0.429	0.495	0.812
To satisfy my intellectual curiosity	56.07	54.546	0.310	0.352	0.817
To comply with my tutor's or employer's policy	56.38	54.248	0.353	0.360	0.815
To respond to the fact that I am surrounded by people who continue to learn	56.11	52.534	0.484	0.518	0.809
To increase my competence in my job	55.91	52.981	0.489	0.457	0.810
To take part in an activity which is customary in the circle in which I move	56.64	50.466	0.597	0.554	0.803
To have a few hours away from responsibilities	56.45	53.232	0.340	0.382	0.816
To abide by the recommendations of someone else	56.84	52.417	0.437	0.464	0.811
To help me earn a degree, diploma, or certificate	56.37	50.941	0.523	0.474	0.806

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
To participate in group activities	56.15	51.372	0.623	0.592	0.803
To get a break from the routine of home or work	56.52	52.903	0.376	0.381	0.814
To secure professional advancement	56.23	52.255	0.501	0.604	0.808
To fulfil the requirements of a regulatory licensing body	56.19	50.947	0.560	0.651	0.805

Appendix G Paper published in ICERI 2010

THE CHALLENGE TO THE FOUR-STATUS E-LEARNING MODEL FOR HEALTHCARE PROFESSIONALS: A CRITIQUE ON A DEVELOPING WORLD CASE STUDY

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Abstract

This paper presents the critical reviews of the advantages and disadvantages of eLearning for health professionals. The impact of eLearning on healthcare professionals is explored; the focus is on health professionals in rural Thailand. Literature suggests that there are four main topics related to the drivers and barriers in eLearning, they are: Infrastructure; Finance; Policies; and Culture (IFPC). Because of the reports of online learning success and the growing use in all areas of higher education, understanding of successful implantation is limited, especially for healthcare professionals in developing countries. The model of barriers and drivers is being adopted as a template for the design of all eLearning, to the exclusion of other ideas. An evaluation of the adoption of e-learning in Thailand is presented along with a discussion on the findings. This paper suggested that the four-status model would help understand how to successfully implement an eLearning course. This has interesting consequences for the implementation of e-learning especially in developing countries.

Keywords: e-learning, Online Learning, Healthcare professionals, e-learning model, technology enhance learning, higher education.

1 INTRODUCTION

Since the turn of the 21st century technology for eLearning has been generally available in Thailand. There have been many technological challenges due to globalization and a technological revolution especially in the educational sector. For example, advances in Information Technology (IT), hardware process subsystems and telecommunications make it possible to share information in an integrated way within the learning environment. The learning process generally covers a range of topics, involves communication between people, and uses many types of media to engage the students. That was the beginning of 'eLearning'. Learning with technologies such as eLearning has spread widely including in the healthcare sphere.

E-Learning can meet the needs of a knowledge based society which is one of the aims of Thailand for the year 2010 (Suanpang et al., 2004). ELearning is nothing new today in Thailand. Previously most people at all levels were not aware of it, but are now rapidly becoming familiar with eLearning. Some of the universities in Thailand such as Rhamkhamhaeng University, Sukhothai Thammatirat University, Rajabhat Suan Dusit University, Assumption University, Mahidol University, Suansunandha Rajabhat University and Asian Institute of Technology of Thailand, have developed some courses in online learning. Fortunately, technology has become much more accessible to people and electronic communications have suddenly become a saviour in terms of bridging the gap between knowledge and the public. Moreover, the government in Thailand embarked upon substantial education reform with the 1999 National Education Act (NEA) (Suanpang et al., 2004). The key aspects of this reform focussed on improving efficiency and effectiveness of learning. Students were encouraged to become critical and creative thinkers, to acquire the facility of information technologies, and to develop their learning and individual potential base on the philosophy of 'student-centred' learning. In 2002, the Thai government announced plans to install computers connected to the internet in all high schools, and to make the internet and 'ELearning' or 'Online learning' the technology of choice for the Thai higher education system (Suanpang et al., 2004). 'The era of ELearning has started' (Sirinaruemitr, 2004 #29).

However, Thailand is quite slow in deploying the eLearning service including the necessary infrastructure, and transformation in the ways of using technologies for learning, especially in the rural areas. Thai students shown a significant lack of self-motivation and independence of learning and of creative and critical thinking, this result found from Tetiwat and Huff (2003) that reading is not a common habit of Thai students. Rote learning and learning by example are common ways of learning in Thai culture. ELearning, on the other hand, requires a high level of discipline from the learner which is often simply not the case for Thai students as Thai students have less of a sense of participation as an attitude toward learning. Face-to-face interaction between academics is the preferred method of learning and teaching rather than virtual interaction (Tetiwat & Huff, 2003). Therefore, the eLearning system for Thai students has to take these differences into account and offer appropriate help and support.

Like many forms of education, healthcare professional education is increasingly competency-based (Hersh et al., 2006a). A growing concern among healthcare professionals is the need to continually update knowledge and skills in order to enhance clinical practice. In some cases, to maintain the professional requirements, eLearning in particular can help with registered healthcare professionals who have to keep up-to-date with the knowledge base of their professions (NHS Executive, 2004). It is recognized that there are major concerns about recruitment and retention of staff within health care, and an increasing need for greater emphasis on valuing the existing workforce (Gill, 2007). At the same time, there is growing use of eLearning technologies, which can be linked to competencies via emerging eLearning standards (Hersh et al., 2006b).

Several studies have found both advantages and disadvantages to implementing eLearning in healthcare organisation. Tse and Lo (2008) found that the nursing students were able to understand, rather than memorize, the subject content, develop their problem solving and critical thinking abilities when using a Web-based eLearning course, entitled Integration of Pathophysiology into Pharmacology in Hong Kong. Furthermore, when a US study changed the traditional 2-day nursing classroom 'Dysrhythmia' course to an eLearning platform, they found that nursing staff development and the clinical nurse specialists proved to be driving forces for the transformation of the course, reinforcement of learning, and promotion of future educational technology see Elkind et al (2008). Moreover, Gill (2007) contributed to the debate about the role of eLearning in conjunction with continuing professional development (CPD) and personal professional development. He described how healthcare professionals utilized an innovative, self-managed, pick-up and put-down distance learning module delivered online or by CD-ROM. The results indicate that participants showed some improvement in all categories (Gill, 2007).

Indeed, eLearning is an interesting method for hospital staff who works on shift patterns that cover seven days a week, 24 hours a day. E-Learning helps to solve the different time and different place clash typically encountered by healthcare professional (Rutkowski and Spanjers, 2007). Also, it enables the heath care professionals to maintain core skills including the ability to use electronic libraries, critically appraise evidence for healthcare, and provide health information for service users (Wilkinson et al., 2009).

Rural communities in Thailand are dispersed over large areas with limited transport and technology infrastructure. For healthcare professionals from such rural communities it is very difficult to attend training courses at a University and to keep up to date with current healthcare practice. When a rural healthcare professional does attend training courses it usually involves much time and expense in travelling as well as depriving the community of healthcare support by that professional, and for some communities that will be the only support. One solution being adopted is to make use of eLearning facilities as used in other parts of the world. There are challenges in running and attending eLearning courses in rural communities with limited technology infrastructure.

The study aimed to determine the factors of impact of information for healthcare professional students within e-Learning environment in Thailand. This present the background of MSU (Faculty of Public Health, #354) eLearning module with the history of the module, the methodologies to be used in the paper which mixed both qualitative and quantitative methods, and the research finding and discussion, the paper also includes the model of four main areas which influences eLearning environment calling IFPC model as shown in the figure of discussion.

2 BACKGROUND

2.1 The MSU eLearning Module

The Faculty of Public Health at Maha Sarakham University Thailand has obtained its full Faculty status under the motto "*Learning at the Workplace and Lifelong Learning*". It has set its mission on the development of well-trained public health personnel and promotion of well being among the Northeast community in Thailand (http://www4.msu.ac.th/public_health/web2/index.asp). At the same time, the Faculty has a commitment to increase the numbers of high quality graduates and post graduates as healthcare professionals. Thus, teaching and training courses should be within high technology environments. This

mission includes the goal to fulfil the new trends of teaching curricula. This includes consideration to use Information Communication and Technologies (ICT) to utilize their ability. Students, trainees and educators should be able to access new modern technologies anytime and anywhere (http://www4.msu.ac.th/public_health/web2/index.asp).

The Faculty has about 200 healthcare students annually needing to take the eLearning course. While the course is based at the main campus in the Maha Sarakham province, students come from all parts of Thailand. There are also satellite campuses around Northeast of Thailand, such as, Nakhonpranom, Nakhonratchasrima, Sisaket, Burirum, Udonthani, and Surin. By offering the courses for healthcare professionals in the Northeast part of Thailand, it will provide a means by which they can engage with advanced knowledge and information which should help them to improve their professional competency.

These initial experimentations with online provisions of learning materials and learning activities can be considered as a tentative step in the direction of learning object paradigm. The main aims of the MSU eLearning project is that students could access available materials repeatedly and opportunities to work beyond the basic requirement of the module, where online material supports this.

2.2 The Co-Operative between the University and the Ministry of Public Health

As stated earlier, learning at the work place and lifelong learning is the motto of the Faculty, the program of MSU eLearning course was developed in 2002 through collaboration between the Ministry of Public Health and the Faculty of Public Health at Maha Sarakham University. The course was first established on two university campuses which were at Nakhorachasrima province and at the main campus, Maha Sarakham province. This was first introduced into a few modules which were: Health and Management, Applied Epidemiology, Public Health Research Methodology, Applied Statistics to Public Health Research and Public Health Policy. These modules offer the MSU courses through a blended eLearning mode.

3 METHODOLOGY

This study was conducted utilizing a case study research design. The study was a mixed method design employing both quantitative and qualitative approaches in two phases; phase 1 used a survey and phase 2 used in-depth interviews, group discussions, and observation. The study was located in the Maha Sarakham University in the North-eastern region of Thailand which has selected two campuses to take part in the study. There were Maha Sarakham main campus and Saraburee campus. This study utilised the purposive sampling strategy to recruit 23 healthcare professional students to participate on both in quantitative and qualitative methods.

4 RESULTS

The ‘Maha Sarakham University eLearning (MSU)’ course was an ambitious effort to use eLearning to reach the underserved healthcare professional students in Thailand with quality accredited educational opportunities in a health career. Over the period of 9 months, project partners unfortunately failed to deliver at the second semester. The online Masters degree for Public Health courses in Maha Sarakham University, was stopped.

Key factors associated with these results were that the courses met a number of different problems. At the first phase of study, the result of survey questions showed from information application that most students were accessing the Internet from their office by use of a modem both for checking email and for online learning. In particular the result illustrated that accessing the internet from a telephone land-line is an extremely slow connection, and the main problem was to access to the internet. The results illustrate the details as two topics as follows.

4.1 The Survey

With the Perceived Usefulness and Perceived Ease of Use survey section, it was found that electronic information was useful for the healthcare professional and also that information was easy to use. Interestingly, most results of PU are significant, having regard to the expected results, such as ‘Using electronic information improves the quality of the work they do, ‘Using electronic information increases their job performance’, ‘Electronic information supports critical aspects of their job’, ‘Using electronic information increases their productivity’, ‘Using electronic information enhances their effectiveness on the job’, ‘Using electronic information gives them greater control over their work’, ‘Using electronic information allows them to accomplish more work than would otherwise be possible’, and overall, they found electronic information useful in their job’. The addition of the statistics test (*t-test*) ($p<0.05$) found four results significant to PEU, they include; Interacting with electronic information requires a lot of mental effort, they find electronic information cumbersome to use, the interaction with electronic information is clear and stable, and Interacting with electronic information is often frustrating.

4.2 Understanding the structures and factors

The second phase study has shown profound factors; these include the interviews, group discussion, and observations which were from the facilities and policies that they have at their work place. The lack of facilities shown, such as few or no computers in their offices to access the internet to search for information, no landline to access the internet, this also included, in particular, a lack of time to search for, or use information.

4.2.1 The results from the interviews found:

1) Students do not have time to search for information;
2) Student found hard to find out some information which included;
    - Live too far from source;
    - Didn't know how to search their topics;
    - Lack of data especially for public health or some special topic e.g. Bird Flu;
    - The books or journals are too expensive for them;
3) Cannot access to the internet e.g. no computer, no landline, not many computers in their office, they have to wait their turn in a queue.
4) The quality of content in the eLearning module added no new data, it was hard to download and the content could not be read (Blur)
5) The chat room and web-board were not updated. The following comments are illustrative of their experiences.

Student A: said '*I live too far from the source of information such as the library and the book shop so I have to take time travelling to go there*.'

Student B: commented '*My place does not have IT at all, so sometime if I need to search from the internet, I have to go to the town to find the internet café for searching and I have to pay for it*.'

Student D: said '*I don't find it easy at all, because I feel uncomfortable while I use the computer, and I have never tried to search electronic information*.'

Student E: commented '*Sometimes it's hard to access the cyber-class (MSU eLearning), the video tuition is quite slow, and also the information from the subject is inadequate e.g. few links to search, not many websites to find more information on that content*.'

4.2.2 The Group Discussion

The one group discussion was under taken with three open topic questions: the facilities for access to the internet; the design and content in eLearning module; and the communication of the course e.g. chat room, web-board. Three healthcare professional students gave their opinions as follows.

Student A: commented '*we are interested in this program (MSU eLearning) which enables us to find out more information, but the problem is that some courses have no content at all, also some contents are not updated, and when we access some courses, we cannot find anything, also when we have a problem we cannot find anyone who can help us to resolve it there is no communication from the web-board or chat room, or even a contact address*.'

Student B: said '*The contents in the course should contain; 1) a practice test, 2) related links to help students find out more information about the course, and 3) accessing, logging into and downloading eLearning courses should be made easier, and easier links made to the library*.'

Student C: commented '*One problem is we have never met the tutors or teachers in the communication room on the MSU eLearning courses such as on a web-board or chat room, thus the Faculty should make a policy to ensure they (tutors or teachers) are ready to teach in the visual learning courses*.'

4.2.3 The Observation

At the beginning of the eLearning course, some students worry about '*How they can learn? How can they be successful on this course?*' Learning from the internet is a new concept for them. At the beginning, when we gave them the questionnaire and asked: '*Are they ready to learn online?*' another student said '*they should have chance to choose whether they would like to learn online or by traditional class room. They should not be pushed into studying this course just to follow the new policy*'. However, some of them were excited to learn the new technology, they said '*it is a good chance to learn, we can use internet a lot, and*

why shouldn't we get the benefits from it'. Before the class started we gave the healthcare students two days training on how to use the MSU eLearning Module. This training included basics of computers, accessing the Internet, and searching for information from the Internet. During the term time course, healthcare professional students were prevented from using the MSU eLearning course because no lecturers participated with them online. They only accessed the online courses when they needed to print some documents e.g. PowerPoint.

As well as in the initial implementation of eLearning courses, the administrator decided policies that gave the opportunity for healthcare professional to study by eLearning. He therefore met the designers and then implemented changes in the eLearning course on the Masters Public Health degree. His policy included funding for the lecturers to translate courses into the MSU eLearning module, and to support on-line learning. This seems to create more opportunities for healthcare professional people, especially those living too far from the campus, and who do not want to leave their work to attend the university. Unfortunately, this policy did not go well because of a change in the administration of the course. Thus when a person (who supported this policy) left, it seemed that nobody wanted to continue this policy, therefore, the program stopped.

Furthermore, five lecturers had been chosen to teach online because their subjects were compulsory for the course. We then gave a training course for those lecturers, showing them how to manage their online courses. During the term time we spoke with some lecturers who were responsible for the course. Some of them did not seem to like to use the internet for teaching. They do not have time to discuss with students in the chat room or web-board room. They have many other classes to teach, too many other things to do. It was not only teaching, but also research, and so on. Thus online students could not gain much from the online course. Thus, some topics in the eLearning course were taught in the traditional classroom.

Beside that we asked a librarian to connect the library's website for students when they are off the campus which means they can access online facilities such as journals, online books, and some documents in the digital library. Unfortunately, it seemed to be hard to manage. Therefore online students have to do the same as traditional students, they cannot access information from these areas. The reason for this being there is not enough staff to manage the library computer servers, and most of them do not know how to manage them. The pedagogies or curriculum was observed; we looked at pedagogies in five courses which are already in the MSU eLearning module. Most of contents were scanned from books which were pdf files (old version, very large files). Furthermore, some of them could not be read because they were too dark and blurred. Some topics were put on to a video clip in the module, however, they seemed to be hard to download, and most of the videos were only introductions to the course. The rest of the contents are PowerPoint presentations from their lectures. Unfortunately there were no useful links that related to the topics, no assignments for students, or messages from the lecturers or tutors who are responsible for the topic.

5 DISCUSSION

The aim of this study was to explore the factors impact of information for healthcare professional students within e-Learning environment in Thailand. This presents the background of MSU eLearning module with the history of the module. The major conclusion is that the MSU eLearning programme had terminated. The finding indicate that some student opinions showed the module needed to be developed, and continued, and the Faculty of Public Health needs to have courses like this for the whole curriculum of the master Public Health courses. Moreover, the results from the MSU eLearning environment had shown that they thought the instructors and tutors were good, and that the discussion facilities, copyright coordinator, and guest were fair. The healthcare professional student thought that the support model, which included technical support, library support, and counseling service were fair.

In the motivation section, they were highly motivated to use new technology, but they neither agree nor disagree on time/location flexibility, personal interaction, and ease of use of the course. In addition from the researcher's observations of five groups of people within MSU-eLearning, such as 1) healthcare professional students, 2) administrators, 3) tutors or lecturers, 4) librarians , and 5) pedagogies or curriculum, revealed similar results as those from the questionnaires, interviews, and group discussions. Particularly, administrative' policy changes affected the funding in the eLearning course, for tutors and lecturers, and so on. It appeared that when the administrator changed, so did the funding policy towards the MSU eLearning course.

Additionally the cooperation with the university's staff, such as tutors, lecturers, librarians was essential and fundamental to the discussion. The results illustrated that some lecturers did not seem to want to be online teachers; their opinions showed they were too busy to sit at the computer and too much time was needed to manage the course. Teaching face-to-face seemed easier than being than online, and they needed IT training before starting online courses. A librarian suggested they needed specialist staff for managing the MSU eLearning course, especially for the help-desk or web-master.

However, these factors are different from what makes eLearning work anywhere else in the world, especially for developing countries such as Thailand. While there are still major difficulties to overcome and much work to be done, it is maintained that the results of this project provide strong evidence that eLearning can be a powerful approach for reaching particular healthcare professionals. The summary discussion of the results shows at table 2 and drawing in figure 1.

Table 2 The summary discussions of the impacts from the main results

Main factors	*Discussions*
1. Infrastructure variables	Problems with accessing to information technologies' facilities: 1) not many computer to support, 2) not many data in their career (e.g. health sciences), 3) not many internet accessing points, and 4) accessing the internet from telephone landline is an extremely slow connection These will be impacted to perceive of the usefulness information that they need to update their knowledge.
2. Finance	Students live far from information sources such as accessing the Internet points which had cost to receive information (e.g. travels and cost for internet café), particularly the cost of time and human of implementation.
3. Policies	The observation results indicate that policies main concerns for the strategies on missions and visions to investment for information technologies, for instant 1) have strategies for encouraging the teachers to have ambitions to develop eLearning courses, and 2) have the policies with cooperation among teachers, staff and the others (e.g. library).
4. Culture	The motivation show the per cent of opinions on the MSU eLearning courses are mostly neither agree nor disagree all parts of the questions which will be carefulness within eLearning environment, especially, the people within eLearning system must have high self-efficacy and the appropriate behavioural skills such as taking responsibility for learning (e.g. policy makers, lecturers, students and staff).

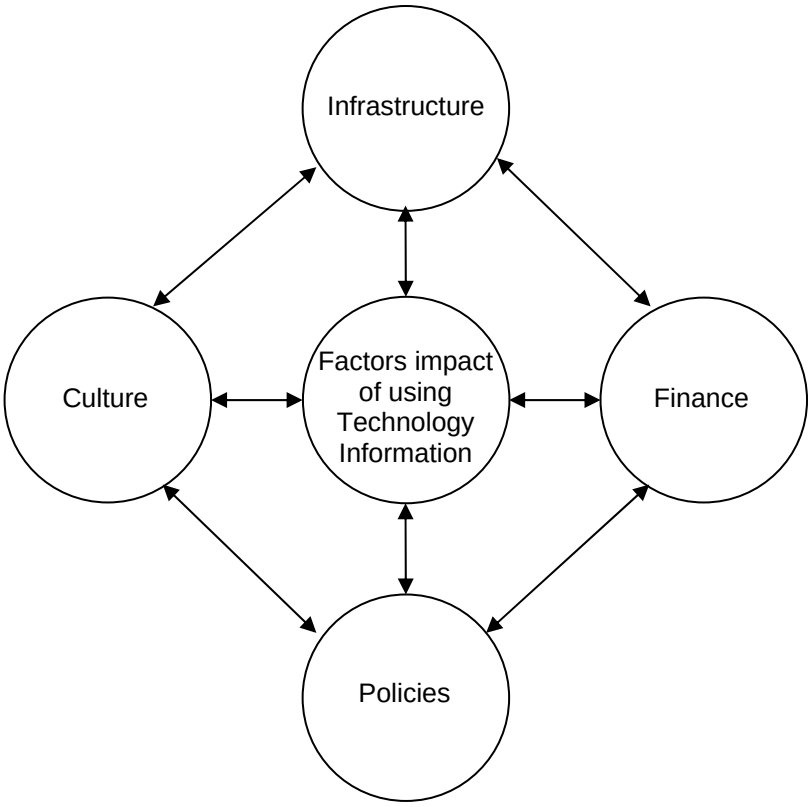

Figure 1. The main factors impact of using Technology Information for Healthcare professionals

Consequently, the result of a successful implementation of eLearning is one that engages all the stakeholders, especially the students and the teachers. For this research, the drivers and barriers for eLearning are therefore listed in four domains: infrastructure, finance, policies, and culture, the model is called IFPC (see the details in figure 2). The IFPC model is to ensure that the essential factors in each domain are made clear when planning and managing online learning and that the domains are connected to each other, for example:

1) *Infrastructure*: in order to establish the online courses, infrastructure for running the programme, such as, computers, telephone, and the Internet connections are necessary;
2) *Finance*: having sufficient funding to cover the cost for planning, implementing, and managing the programme is essential;
3) *Policy*: the strategies to support and encourage the people to engage with the courses such as teachers, students, staff, and policy makers;
4) *Culture*: needs consideration with regard to awareness when employing the courses in a different part of the world, such as, in developed countries or developing countries, particularly in the case of gender, age, caste, class, ethnicity, belief and behaviour, and educational attainment. These need to be fully understood.

This finding tends to confirm the ideas of Sharma (2003) who notes that, the barriers to the growth of communication technologies in developing countries discussed one infrastructure, policy planning by the government, political factors, economic factors, and cultural factors. As we have seen, the discussion is on going and there is a particular emphasis on the impacts on barriers and drivers in eLearning environments (see for example:(Arami et al., 2006), (Barton, 2006), (Brown et al., 2007), (Conole et al., 2007), (Booth et al., 2005), (Childs et al., 2005), (Dyson, 2004), (De Freitas and Oliver, 2005), and (Clarke et al., 2005)). They contributed those factors influence whether eLearning initiative is successful.

6 CONCLUSION

The results showed that in order to achieve the goal to be successful with implementation of eLearning especially for healthcare professions. There is a need to concentrate on, and investigate the drivers and the barriers in eLearning. It is important to analyse the specific field of healthcare, especially the learners. The drivers and barriers not only occur in the eLearning process, but also in the development of more sophisticated programmes and tools especially designed for eLearning courses which will enhance the eLearning process. However, understanding the drivers and barriers in eLearning will help to encourage

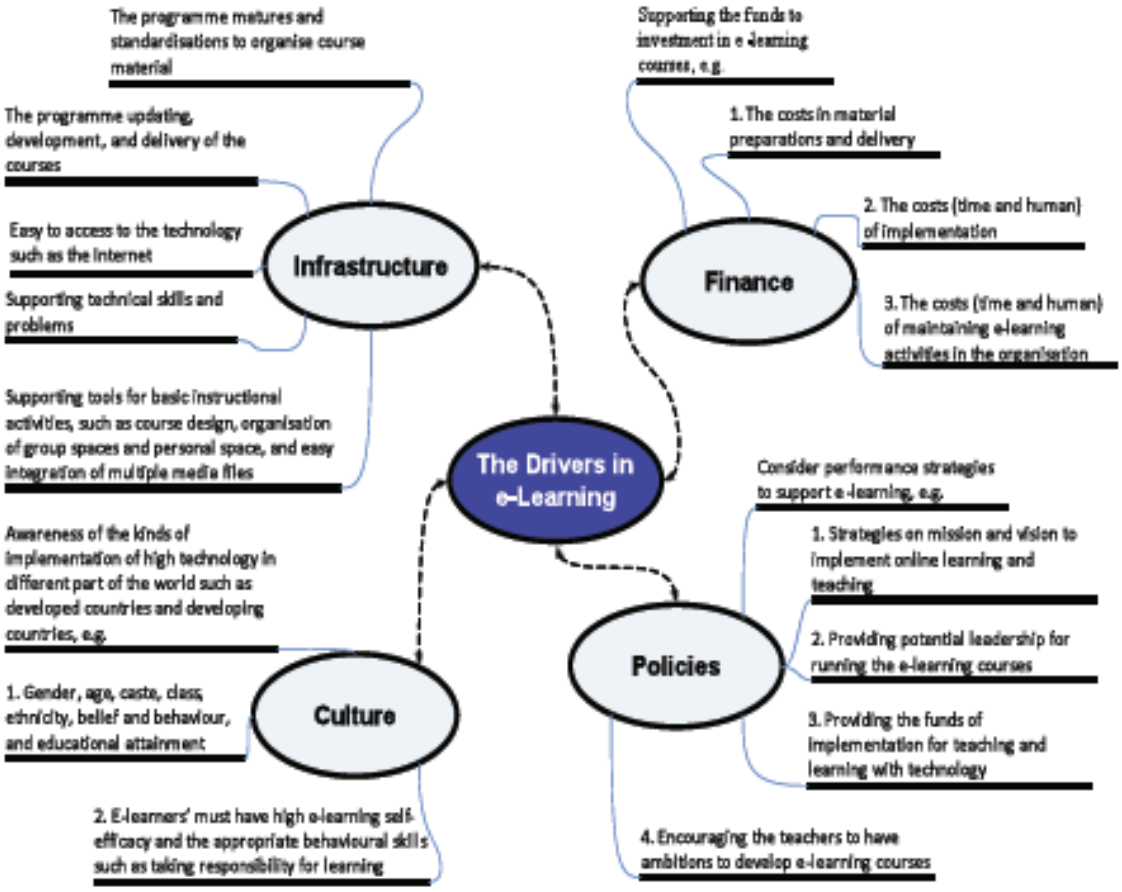

Figure 2 The four main drivers (IFPC) for implementation of e-learning

those people to engage with the implementation of eLearning courses, such as, students, teachers, and policy makers. Furthermore, a new model has been proposed to assist planners in this research, the IFPC model included essential concepts that are believed to be important when implementing eLearning in developing countries, especially Thailand.

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Appendix H Paper published in IEC 2011

The Challenge of Four-Status Model of eLearning: Principles Toward a New Understanding for Healthcare Professionals

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ABSTRACT

This paper presents the critical reviews of the advantages and disadvantages of eLearning for healthcare professionals. The impact of learning on healthcare professionals is explored; the focus is on healthcare professionals in rural Thailand. Literature suggests that there are four main topics related to the drivers and barriers in eLearning, they are: Infrastructure; Finance; Policies; and Culture (IF-PC). IF-PC model of barriers and drivers of eLearning is being adopted as a template for the design of all eLearning, to the exclusion of other ideas. Using a case study approach the research, completed in 2006, had two phases. A questionnaire was distributed to a group healthcare professional student to gain information with questions adapted from the Technology Acceptance Model (TAM). Phase 2 employed three strands of data collection: interviews, a group discussions, and observation were employed to help with the understanding of the problems in greater depth. Data was analysed using a form of pattern matching. An evaluation of the adoption of eLearning in Thailand is presented along with a discussion on the findings. It appears that alternative models of eLearning cannot be disregarded. This has interesting consequences for the implementation of eLearning especially in developing countries.

Keywords

eLearning, e-learning, eLearning model, Online Learning, Healthcare professionals, Technology Enhanced learning

1. INTRODUCTION

This paper reports on a pilot study of eLearning for healthcare professionals which delivering a part-time degree level course in Master of Public Health, introduced by Maha-Sarakham University, Thailand in 2006. The paper is structured in three parts. The first launches the motivation and the background for the eLearning courses for Master degree of Public Health, by showing the background of MSU eLearning (Maha-Sarakham University) and reviewing the professional imperatives to continue learning in healthcare. The second part illustrates the implementation of the research providing the results of two phase research; phase 1 was launched the questionnaires, following phase 2 were interviews, group discussion and observations which discusses along side with the problems. The final part discusses on the challenge of issues in experience implementation the eLearning for healthcare professionals for this case study. This also critiques the four main barriers and drivers of eLearning: Infrastructure, Finance, Policies and Culture (IF-PC).

2. BACKGROUND

A growing concern among healthcare professionals is the need to continually update knowledge and skills in order to enhance clinical practice. In some cases, to maintain the professional requirements, eLearning in particular can help with registered healthcare professionals who have to keep up-to-date with the knowledge base of their professions (Jadad and Delamothe, 2004). It is recognized that there are major concerns about recruitment and retention of

staff within healthcare, and an increasing need for greater emphasis on valuing the existing workforce (Gill, 2007). At the same time, there is growing use of eLearning technologies, which can be linked to competencies via emerging eLearning standards (Hersh et al., 2006). Indeed, eLearning is an interesting method for hospital staff who works on shift patterns that cover seven days a week, 24 hours a day, it also enables the healthcare professionals to maintain core skills including the ability to use electronic libraries, critically appraise evidence for healthcare, and provide health information for service users. Rural communities in Thailand are dispersed over large areas with limited transport and technology infrastructure. For healthcare professionals from such rural communities it is very difficult to attend training courses at a University and to keep up to date with current healthcare practice. When a rural healthcare professional does attend training courses it usually involves much time and expense in travelling as well as depriving the community of healthcare support by that professional, and for some communities that will be the only support. One solution being adopted is to make use of eLearning facilities as used in other parts of the world. There are challenges in running and attending eLearning courses in rural communities with limited technology infrastructure. However, Maha-Sarakham University (MSU) has provided these courses. The Faculty of Public Health at Maha-Sarakham University Thailand has obtained its full faculty status under the motto "*Learning at the Workplace and Lifelong Learning*". It has set its mission on the development of well-trained public health personnel and promotion of well being among the Northeast community in Thailand. By offering the courses for healthcare professionals in the Northeast part of Thailand, it will provide a means by which they can engage with advanced knowledge and information which should help them to improve their professional competency. These initial experimentations with online provisions of learning materials and learning activities can be considered as a tentative step in the direction of learning object paradigm. The main aims of the MSU eLearning project is that students could access available materials repeatedly and opportunities to work beyond the basic requirement of the module, where online material supports this. Therefore, the co-operative between the University and the Ministry of Public Health has had started in 2004. The course was first established on two university campuses which were at Nakhorachasrima province and at the main campus, Maha Sarakham province. This was first introduced into a few modules which were: Health and Management, Applied Epidemiology, Public Health Research Methodology, Applied Statistics to Public Health Research and Public Health Policy. These modules offer the MSU courses through a blended eLearning mode the courses for students and how to manage the courses for the lecturers.

3. IMPLEMENTATIONS

The study was a mixed method design employing both quantitative and qualitative approaches in two phases; phase 1 used a survey and phase 2 used in-depth interviews, group discussions, and observations.

3.1 PHASE 1: THE SURVEY

Phase 1 took place before the eLearning courses started. A questionnaire was distributed to a group of 30 healthcare professional students to gain information with questions adapted from the Technology Acceptance Model (TAM) (Davis, 1985) (see figure 1) to identify 'what healthcare professionals perceive as useful in information technology' and 'what do they perceive as ease of use information technology'.

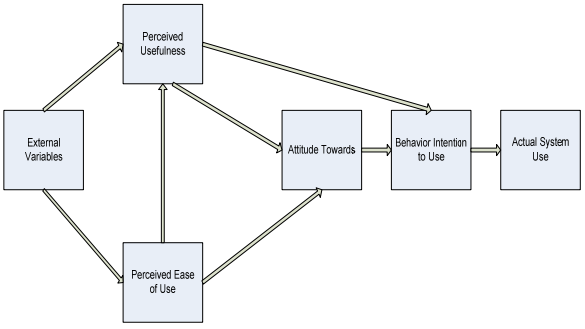

Figure 1: The Original Technology Acceptance Model (TAM)(Davis, 1985)

With the Perceived Usefulness (PU) and Perceived Ease of Use (POU) survey section, it was found that electronic information such as eLearning was useful for the healthcare professional and also that information was easy to use. Interestingly, most results of PU are significant, having regarded to the expected results, such as:

- '*Using electronic information improves the quality of the work they do*',
- '*Using electronic information increases their job performance*',
- '*Electronic information supports critical aspects of their job*',
- '*Using electronic information increases their productivity*',
- '*Using electronic information enhances their effectiveness on the job*',
- '*Using electronic information gives them greater control over their work*',
- '*Using electronic information allows them to accomplish more work than would otherwise be possible*',
- '*overall, they found electronic information useful in their job*'.

The addition of the statistics test (*t-test*) (p<0.05) found four results significant to PEU, they include; Interacting with electronic information requires a lot of mental effort, they find electronic information cumbersome to use, the interaction with electronic information is clear and stable, and Interacting with electronic information is often frustrating.

3.2 PHASE 2: THE QUALITATIVE METHOD

In phase two a number of methods were used to investigate the understanding of the structure and factors that affected the attitudes of healthcare professionals when using electronic information and MSU eLearning within this environment. The following methods were used: interviews; group discussions; and observations. These were conducted while the healthcare professionals were studying in term time.

3.2.1 Interviews

23 healthcare professional students were committed to interviews, the questions were designed using four topics: Information wanted, Factor of Information within search-using, The Opinion of MSU eLearning courses, and the eLearning environment. The design of the questions examined each of the key components with regard to the environment for the healthcare professional within the MSU eLearning courses. The details of the results are as follows:

1) Information wanted:

The results show 20 of 23 healthcare professionals use leaflets and documents from the Ministry of Public Health, and journals for non electronic information, and further electronic information they used search engines from the Internet such as Google, the website of Ministry of Public Health, and the Maha-Sarakham University's website to finding the information. In addition, six healthcare professionals used e-mail to communicate with the others as daily. These also found healthcare professionals had difficult to find in searching or using information such as:

1) do not have time to search for information,
2) hard to find out some information which included; live too far from source; didn't know how to search their topics; lack of data especially for public health or some special topics e.g. Bird Flu; the books or journals are too expensive for them,
3) cannot access to the internet e.g. no computer, no landline, not many computers in their office, they have to wait their turn in a queue.

2) Factor of Information within search-using:

The results show 14 of 23 healthcare professionals need more time to use and understanding both non-electronic and electronic information.

3) The Opinion of MSU eLearning courses:

Following this question healthcare professional gave their opinions which felt into two categories, i.e., 5 students had never been through the MSU eLearning course and, 18 students had gained some more information or knowledge from this courses. The opinion was shown by a sample respondent.

Respondent C said: '*I can't access the program, sometimes as it's a bit slow to access, and my internet is very slow also*'.

4) The eLearning environment:

The results were found:

a) Healthcare professional cannot access the internet; this includes having no computer to access, limited access, and no internet in their areas.

b) The quality of the contents in the eLearning module added no new data, it was hard to download and the content could not be read (Blur).

c) The chat room and web-board were not updated.

3.2.2 Group Discussion

The one group discussion was under taken with three open topic questions: 1) the facilities for access to the internet; 2) the design and content in eLearning module; and 3) the communication of the courses e.g. chat room, web-board. The interesting comment from a healthcare professional student:

Respondent D: '*we are interested in this program which enables us to find out more information, but the problem is that some courses have no content at all, also some contents are not updated, and when we access some courses, we cannot find anything, also when we have a problem we cannot find anyone who can help us to resolve it there is no communication from the web-board or chat room'.*

3.2.3 Observation

This section presents some early observations concerning the Master Degree of Public Health. Specially focus on such as healthcare professional students, administration, tutors and lecturers, and the library. At the beginning of the eLearning courses, some healthcare professional students worry about new mode of learning, as learning from the internet was a new concept for them. There was also concern from students about being forced to use this mode of learning. However, some students were excited to learn the new technology, see it as an opportunity to broaden their skills. All the students received two days of training on how to use the MSU eLearning Module. Unfortunately, during the term time, healthcare professional students were prevented from using the MSU eLearning course because no lecturers participated with them online. They only accessed the online courses when they needed to print out the notes e.g. power point. In the initial implementation of eLearning courses, the administrator decided policies that gave the opportunity for healthcare professional to study by eLearning. Then met the designers and implemented changes in the eLearning courses on the Masters Public Health degree. The policies included funding for the lecturers to commit the courses into the MSU eLearning module, and to support on-line learning. This seems to create more opportunities for healthcare professional people, especially those living too far from the university campus, and who do not want to leave their work to attend the university. Unfortunately, this policy did not go well because of a change in the administration of the courses. Thus when a person (who supported this policy) left, it seemed that nobody wanted to continue this policy, therefore, the program stopped. At the first start of the eLearning programme, five lecturers had been chosen to teach online because their subjects were compulsory for the courses. We then gave a training course for those lecturers, showing them how to manage their online courses. During the term time we spoke with some lecturers who were responsible for the course. Some of them did not seem to like to use the internet for teaching. They do not have time to discuss with students in the chat room or web-board room. They have many other classes to teach, too many other things to do. It was not only teaching, but also research, and so on. Thus, some topics in the eLearning course were taught in the traditional classroom. Furthermore, a librarian was asked to connect the library's website for students when they were off the campus which means they can access online facilities such as journals, online books, and some documents in the digital library. Unfortunately, it seemed to be hard to manage. Therefore online healthcare professional students have to access to same as traditional students, they could not access information by the internet form out side university. The reason for this being there is not enough staffs to manage the library network, and most of them have insufficient knowledge to manipulate online supporting.

4. DISCUSSION OF THE ISSUES

From the questionnaires we found electronic information was useful for the healthcare professional and also that information was easy to use. However, they had problems with accessing the resources. This was also supported by the researcher's observations revealed similar results as those from the questionnaires, interviews, and group discussions. Particularly, administrative' policy changes affected the funding in the eLearning courses, for tutors and lecturers, and so on. It appeared that when the administrator changed, so did the funding policy towards the MSU eLearning courses. Additionally the cooperation with the university's staff, such as tutors, lecturers, librarians were essential and fundamental to the discussion. The results illustrated that some lecturers did not seem to want to be online teachers; their opinions showed they were too busy to sit at the computer and too much time was needed to manage the courses. Teaching face-to-face seemed easier than being than online, and they needed IT training before starting online courses. A librarian suggested they needed specialist staff for managing the MSU eLearning courses, especially for the help-desk or web-master. However, these factors are different from what makes eLearning work anywhere else in the world, especially for developing countries such as Thailand. While there are still major difficulties to overcome and much work to be done, it is maintained that the results of this project provide strong evidence that eLearning can be a powerful approach for reaching particular healthcare professionals. The summary of main factors discusses of the results shows as follows:

1) Infrastructure variables:

Problems with accessing to information technologies' facilities: not many computers to support, not a lot subject material on-line (e.g. health sciences), not many internet accessing points, and Accessing the internet from telephone landline is an extremely slow connection.

These will be impacted to perceive of the usefulness information that healthcare professionals need to update their knowledge.

2) Finance variables:

Students live far from information sources such as accessing the Internet points which had cost to receive information (e.g. travels and cost for internet café), particularly the cost of time and human of implementation.

3) Policies variables:

The observation results indicate that policies main concerns for the strategies on missions and visions to investment for information technologies, for instant 1) having strategies for encouraging the teachers to have ambitions to develop eLearning courses, 2) having the policies with cooperation among teachers, staff and the others (e.g. library), and 3) Government have increasingly demanded and forcing the universities to engage in kind of planning and organisation in eLearning programme which is commonplace in business, but largely foreign to the collegial culture.

4) Culture variables:

Although, the motivation shown the percentage of opinions on the MSU eLearning courses are mostly neither agree nor disagree all parts of the questions which will be carefulness within eLearning environment, especially, the people within eLearning system must have high self-efficacy and the appropriate behavioural skills such as taking responsibility for learning (e.g. policy makers, lecturers, students and staffs). However, life in conventional universities is related organisational cultures which often operating simultaneously. In academic cultures are mostly relevant with the collegial and managerial culture, this also dominates with the development and the negotiated.

5. CONCLUSION

E-learning is a rapidly developing area and is gaining increasingly importance in all sectors of education. Indeed, healthcare sector also included in this situation. Consequently, the result of a successful implementation of eLearning is one that engages all the stakeholders, especially the students and the lecturers. For this research, the drivers and barriers for eLearning are therefore listed in four domains: infrastructure, finance, policies, and culture, the model is called IF-PC. The IF-PC model is to ensure that the

essential factors in each domain are made clear when planning and managing online learning and that the domains are connected to each other. Undoubtedly, eLearning will not be the only factor to change the focus of universities. Other forces are at work including changing governmental and professional requirements, economic development, and technological change, changing employment patterns and opportunities, and changing expectations of students. Although, the literature has presented many positive benefits and impacts on eLearning, none has addressed the impact in the four domains of the IF-PC model; Infrastructure, Finance, Policies, and Culture. Therefore, consideration of these is crucial, while these have been investigated separately; especially when implementing learning and teaching at a distance, they have not been assessed as a whole. This applies particularly to those who use technology, for instance healthcare professionals in developing countries such as Thailand who need to continue updating information for their patients.

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