Implementing E-learning in Vietnamese Universities: A Configurational Approach

By

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Abstract

This thesis reports the process and findings of a case study research which aimed at understanding how E-learning implementation was undertaken in higher education institutions in the context of Vietnamese universities. A case study research using semi-structured interviews was employed to generate qualitative data from three cases of E-learning implementation theoretically chosen from Vietnamese universities. A new configuration analysis approach was created to analyze and interpret the problematic issues embedded in the context of organization, technology and teaching and learning influencing the three sequenced stage process of implementation.

The research identified influential factors of contexts which are characterised by the organization, technology and teaching and learning shape of the E-learning implementation process in pre-implementation, implementation and post-implementation stages. The findings illustrate that E-learning implementation was driven and constrained by contextual factors interacting and interplaying with a process of implementation. Based on the findings, an implementation framework for continuous E-learning implementation as part of blended learning in Vietnamese universities was developed. This implementation framework proposes a way in which E-learning implementation will be reached at an equilibrium point, where a sustainability of implementation will be presented.

The study contributes to the body of E-learning implementation research that is shaping and incorporating contextual factors into the implementation process. Methodologically, it provides a configuration analysis tool which is tailored to the purpose of analysing data, interpreting individual cases and doing cross-case analysis through a qualitative case study research method. Theoretically, it provides a basis for practices in implementing E-learning, and offers useful suggestions for educators in implementing a formal blended learning system within the higher education sector. The framework of E-learning implementation and associated suggestions presented in this study are expected to assist universities and governments to play a more active role in the implementation of e-learning education to improve the quality of training and institutional performance. The findings are expected to contribute to sustaining E-learning implementation by better planning, organizing, implementing, operating and monitoring regarding institutional policies and practices, including investment in learning technologies, infrastructure, training and development and support services for e-learning.

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Abbreviation

ICT:	Information and communication technology
MOET:	Ministry of Education and Training
MOODLE:	Modular Object-Oriented Dynamic Learning Environment
VLIR:	Vlaamse Interuniversitaire Raad (Flemish Interuniversity Council)

Chapter 1 – Introduction

1.1 Introduction

This research project is a qualitative discovery study focusing on the issue of E-learning implementation with the aim of understanding how Vietnamese universities have implemented E-learning within their academic and institutional environments. The result is the identification of a set of factors that drive and constrain E-learning implementation within three top ranked universities in the Vietnamese higher education system. Due to a lack of prior empirical research on the interdisciplinary research of E-learning and in response to a need for theoretical and practical framework in this area, the objective of the research is to propose a conceptual framework of implementation, which has been largely neglected by discipline of E-learning research in information technology/information system in general, in E-learning particular. This chapter provides an overview by summarising the main components of the study. The chapter begins with a discussion of the rationale for the study and then introduces the problem of the research, which is followed by the background and scope of the study. The introductory chapter then raises the research aims, objectives and research questions, followed by the illustration of the methodological approach employed to conduct the study. Finally, this introduction outlines the structure of the thesis.

1.2 Rationale of the study

The needs for this study might be clarified through the views of current research and practices where the research had been conducted in a specific context. A further review of the literature indicated that there is a vast number of research papers on E-learning published in many academic disciplines. E-learning theories, models, development, strategy and policy at both national and organizational levels have been introduced and contributed to development of E-learning around the world. Scholars interested in E-learning research focus on inherent issues and enclosed by three domains, including E-learning technology, organization and pedagogy. It is also evident that most research papers related to E-learning usually draw from one (maybe two) perspective(s) and, more importantly, have developed exclusively from one perspective such as pedagogical or technological or organizational perspective.

Although E-learning is to be viewed as part of a university's teaching and learning environment, the mutual relationship between E-learning and other parts of the university system should be addressed. For instance, if it is taken for granted that E-learning is a

particular type of university information system, then the idea of the relationships which exist between E-learning and other university information systems will also be taken for granted. At the present time, few scholarly papers mentioning these relationships. Moreover, in developing countries, most academic activities are implemented manually on paper. A university system is to be likely operated independently from E-learning systems. Scholars in these fields have introduced and developed the theory of "information system design for E-learning" which is suitable for solving these practical problems (Jones and Gregor, 2006). The information system design theory for E-learning seems likely to be adapted for the context. The appropriate theory can give the right answers for two questions: (1) how institutions of higher education effectively integrate an E-learning system into university information system(s); and (2) how to avoid the risk of failure when developing an E-learning system to promote teaching and learning. The authors argue that, even if we have a stronger theoretical lens as a guide for implementing E-learning within an educational institution, it may not be enough to ensure successful implementation.

The present researcher is interested in researching E-learning under the special conditions in developing countries like Vietnam. However, there is very limited research relating to E-learning, particularly its implementation in developing countries, and no studies had been undertaken on E-learning implementation in Vietnamese higher education institutions. In a study by Phan (2007), he found that E-learning was introduced and transferred to Vietnam mainly on the technology side by installing and deploying software systems on the servers located on campus. This initial research demonstrated the researcher's view of the importance of E-learning implementation in Vietnamese HE and its implementation, as being of national significance, through the Vietnamese government resolution 49/CP that introduced ICT to the national agenda and the recent Directive No. 9772/BGDĐT-CNTT that decrees ICT to be a priority in educational reform (Do et al. 1996; Dang and Robertson, 2011). It is clear that there is a need for contributing to the practice of E-learning by making it more effective in the severely constrained context of Vietnam as a developing country, while E-learning research in such a context seems to be neglected.

1.3 Background of the study

Although Information and Communication Technology (ICT) has been widely adopted in Vietnamese education institutions for several years, it seems to be in the early stage of the adoption process. A large majority of information system/information technology (IS/IT) projects have failed because of implementation and organization. In the case of national

project No.112, for instance, the stated project objective was right, but the implementation failed (Quoc Thanh-Kiet Hung, 2007). Vietnamese scholars have explained that projects failed due to poor management rather than technical factors. Following the Vietnamese government policy of "Doi moi,"— renovation of the economic system — the higher education system sought to meet the demands for renovation and improvement through several IS/IT projects invested in, and implemented by, Vietnamese universities, and funded by the state. Specifically, Vietnamese universities have introduced an E-learning system to support teaching and learning for students.

However, the developing trend for the application of ICT in teaching and learning was halted in 2006 and 2007, and the Vietnamese government intervened in the development and application of ICT in the nation through several policies and strategies. As a result, in higher education, driven by the October 2008 official letter No. 9772/BGDĐT-CNTT of the Vietnamese government, Vietnamese higher education institutions have developed IS/IT projects to apply to ICT (Dang and Robertson, 2011). However, most IS/IT projects have not gained the expected results. The question of how to systematically solve and improve the performance of existing IT/IS projects needs to be addressed. More importantly, the key question taken into account by managers is what principles and frameworks should be applied to develop and invest effectively in IS/IT to support teaching and learning within institutions of higher education. These requirements have led naturally to efforts to seek the best practices and theoretical perspectives for developing the national education system to efficiently exchange and integrate with the global and regional education systems.

1.4 Scope of the study

The research was limited to Vietnamese educational institutions of higher education in Vietnam only. For reasons of accessibility, not all education institutions in geographical regions in Vietnam were included in this study. The study was conducted in educational institutions that had already implemented an E-learning system, which were acknowledged and recognized by the public. Educational institutions with no E-learning were not included; the reasons for non-E-learning implementation or factors affecting the uptake decision were not explored. The group of educational institutions examined in this study is top ranked universities within the Vietnam higher education system. In addition, the study did not include analysis of actual budgets; financial operations and funding; technical work; or other factors related to E-learning implementation.

The study examined E-learning implementation primarily at the organisational level, with the aim of gaining a deeper understanding of how an education institution implements an E-learning system as a blended system for its academic activities. The concept of E-learning implementation conducted in this study is taken from a management perspective to examine how E-learning may succeed or fail. More specifically, the study has focused on the managerial functions of E-learning implementation, such as planning, organizing, leading and monitoring E-learning implementation. Thus, it does not attempt to provide a detailed or comprehensive picture of E-learning implementation in Vietnamese institutions of higher education system. It was beyond the nature and intent of this research to describe detailed technical and technological aspects of E-learning system implemented, as well as how E-learning pedagogy is approached on an E-learning system. However, when pedagogical data is available, it will be analysed to support the research findings and discussions.

1.5 Aim, objectives and research question

The phenomenon outlined above reveals the need for understanding and addressing problematic issues associated with E-learning practices in Vietnam. Given these challenges, the overall aim of this study is to advance the understanding of E-learning implementation within the context of Vietnamese higher education institutions. The research in this field is appropriate for understanding the context of E-learning implementation in educational settings in Vietnamese HE institutions. The main research question is as follows:

- How has E-learning been implemented in Vietnamese universities?

To answer this research question, the following sub-questions have been developed to achieve the aim of study. They are:

- What are the factors that influence E-learning implementation in Vietnamese universities?
- What is the nature of the process of E-learning implementation in Vietnamese universities?
- What are the drivers and constraints that impact on E-learning implementation in Vietnamese universities?
- What framework of E-learning implementation has emerged?

To achieve this aim, this study targets five main objectives as follows:

- To identify the main factors as drivers and constraints impacting on E-learning implementation;
- To describe and analyze the processes of E-learning implementation and explore how users and organisations practice E-learning;
- To develop a configuration method for analysing and explaining E-learning implementation;
- To develop a conceptual framework of E-learning implementation; and
- To present recommendations for institutions, the Ministry of Education and Training (MOET), and scholars in Vietnam on relevant aspects of E-learning implementation and the adoption of effective E-learning implementation that may lead to successful E-learning implementation in Vietnamese HE institutions.

The achievement of these objectives will be confirmed when the research presents and explores the E-learning implementation associated with organisational issues; teaching and learning methods; and information technology within Vietnamese HE institutions and will be clarified by the literature and existing research.

1.6 Methodological approach

A qualitative research methodology has been adopted for this study. The case study approach with qualitative data has been identified as an appropriate research method for the purpose of this study, which is comprehensively addressed in the methodological section, chapter 3. Following the principles of the case study research method, the process of selecting cases and collecting data and their appropriateness is also described in this chapter. The qualitative data collection in the three cases selected in this study has been conducted in two phases. A thematic analysis has been applied for coding and analysing data in this study. Emerging themes from data analysis has been used for constructing individual cases in which a configuration has been developed for analysing the individual cases. A cross case analysis procedure was followed to identify the similarities and differences among those cases for research findings and discussion. For this study, the detailed illustration of the methodology is presented in chapter 3.

1.7 Structure of the thesis

This introductory chapter has explained the reasoning behind the exploratory manner of the research project in E-learning at Vietnamese Universities. Following the introductory chapter, chapter 2 describes the literature review from different perspectives as well as synthesising the conceptual framework for research design and approach. Chapter 2 provides the background to subject area support research practices and focuses on the research topic. The chapter reviews the body of implementation research from information system/information technology perspective which is significantly connected to the research of E-learning. The chapter then synthesized a conceptual framework of E-learning implementation from the literature for designing the research.

A methodological section, chapter 3 will provide an overview of the qualitative paradigm of this research, as well as a rationale for the qualitative research with case study design, by discussing and justifying its key methodological influences and key features. This chapter illustrates how the study was conducted through a particular procedure and how the principles of case study research were applied in this thesis. In addition, a differentiation between data analysis and case analysis is identified in this study to provide a foundation for how a case study has been interpreted in individual case development and cross case analysis. The developments of individual cases will follow in chapter 4, 5 and 6. The individual chapter employs data collected at the studied site to develop the case report which provides an overview of contextual settings for the sequenced stage process of E-learning implementation at each site. In each chapter, the historical background of educational institution along with E-learning initiatives has been provided and illustrated through a rich picture diagram (Sutrisna and Barrett, 2007), following major themes used to construct the case practices. The individual case report has been constructed following themes from the conceptual framework which has been developed in the literature review section, including organization, technology, teaching and learning; and the three stages of process. As mentioned in the methodology chapter, the configuration approach allows integrating the individual thematic networks as a whole, in which a pattern of E-learning implementation emerged from data and case analysis. Assertion and discussion on individual cases is drawn, in order to be used for the next step in the procedure of multiple case research, the cross case analysis.

The research findings, presented in chapter 7, have been indentified from cross case analysis. The influential factors and sequenced stages of implementation process have been identified

by comparing the similarities and differences among three cases developed in previous chapters. Cross-case analysis has been systematically undertaken theme by theme across three cases. Findings from the research have identified the factors which drive and inhibit E-learning implementation within the context of Vietnamese higher education. In addition, findings from this study also propose a conceptual framework which focuses on the sustainability of E-learning implementation which can apply to E-learning implementation and guide E-learning practices in Vietnamese context. These findings from the study were subject to in-depth examination in the next section.

The discussion section of research findings, chapter 8, explains the reasoning behind E-learning practices and the results of E-learning implementation. The key features of E-learning implementation and the nature of E-learning implementation process have been closely connected to change management, the integration of technology and the alignment of strategy between E-learning and business. These issues are underpinned to E-learning implementation at Vietnamese universities calling for the continuous implementation and adoption of E-learning within the Vietnamese higher education context. This chapter integrates literature from the literature review to clarify the relationships between the influential factors; the nature of the implementation process; the drivers and constraints of E-learning implementation that have been identified from the analysed data; and to confirm the findings and support the sustainable framework of E-learning implementation that has emerged from the research.

Lastly, the concluding section, chapter 9, joins all the components of the research together. It will first reconsider the research aims and objectives associated with the research findings, in order to examine the extent to which the research findings meet the research objectives. Secondly, it considers the contributions of this research to the wider body of knowledge and methodology, especially to the data and case analysis approaches. Thirdly, it discusses and identifies the implications of the findings for those involved in E-learning practices in the Vietnamese higher education sector. Finally, the chapter highlights the limitations of this research and makes recommendations for future studies.

1.8 Conclusion

The focal point in this study is E-learning implementation which was explored in order to achieve a deep understanding of this subject at an organizational level within the context of Vietnamese higher education. Within this exploration, the emphasis will be placed on the

process of reform of the higher education sector, in which an education institution implemented an E-learning system.

This introductory chapter has addressed the fact that there is a need for understanding E-learning implementation to provide effective and sufficient guidelines for E-learning practices which are very important for scholars, as well as professional practitioners, in Vietnam. The case study research of the three top-ranked universities in Vietnam has been approached to investigate the proposition. To achieve the research aims and objectives, the central research question and sub-questions have been identified and answered by the qualitative data collected at each site studied. A configuration method of case analysis has been developed to interpret the studied phenomenon. The principle case study research has been completed by making comparisons across cases to identify the research findings. In the next chapter, the literature review is undertaken to provide and demonstrate and summarise prior approaches to the conduct of research into the implementation of e-learning.

Chapter 2 – Literature review

2.1 Introduction

In this study, the main research question is to investigate how Vietnamese universities implement E-learning within their context. Two components have emerged from the research question, including E-learning and implementation. Stake (2010) pointed out that the emerging issues from research questions will help to define the data sources and data collection activities because the most important data will derive from research questions. In the light of these considerations, this review of the literature is directly focused on the components emerging from the research question related to E-learning implementation, by beginning with an initial scoping of what implementation means and then systematically reviewing the literature of E-learning implementation, both aimed at providing an essential summary of what is known about E-learning implementation. The objective of the review will help us better understand the challenges involved in implementing E-learning in educational settings. That should enable us to develop a research design regarding E-learning implementation and an outline for further research in order to answer the research question.

This study aims to advance understanding of how E-learning has been implemented within the context of Vietnamese higher education institutions. To conduct this research, a literature review enables us to better understand the E-learning. This chapter of the literature review is presented in six parts. After the introduction, the key definitions of E-learning implementation and types of implementation research will be presented. Thirdly, research on information technology and information systems from a process and factor perspective are presented. Fourthly, E-learning research from process and factor perspective will be illustrated. The following section provides the types and natures of E-learning research. Finally, a synthesis of relevant literature and a conclusion are provided.

2.2 Definitions and types of implementation research

How educational institutions can best implement an E-learning solution – new technologies and their associated methods of teaching and learning – is a core issue for academic managers and teachers. The bulk of the literature on the topic currently reflects the challenges of E-learning implementation associated with teaching and learning and the support process. The literature of implementation in general, and E-learning in particular, is often inaccessible, because appropriate papers are hard to find without specific subjects, such as teaching

methods, online assessment, etc. As a result, the review of literature associated with E-leaning implementation has found that it is difficult to locate the appropriate papers related to current practices and phenomena of E-learning within its context. In order to identify issues that are related to E-learning implementation and address our main research objectives, therefore, we will conduct a review of the literature, including reviews of implementation and E-learning. This allows us to synthesize and highlight the main points from these papers involving a combination of E-learning and implementation in an accessible way.

The free text search terms used are 'implementation' and 'E-learning' or Information Systems or Information Technology. We also restricted our search to English language articles by using the UK Google search engine, excluding Vietnam. The review developed a broad search strategy, designed to include all E-Learning domains. We undertook this review to provide, amongst other things, a frame of knowledge to discuss implementation and e-learning. Google scholar is used to explore general implementation research as much as it is aimed at academics, so papers identified in such a search would be most likely to reflect an implementation knowledge base, with which professionals are already acquainted. Also, this review is sufficient to permit a rapid overview of the main issues to inform reviews of E-learning implementation, because of its broad scope within an implementation focus, its ability to filter reviews from original research papers, and its frequent use in other systematic reviews by scholars. The filter uses two criteria, the key word is located in the title of the published paper and the paper must have a review of previous studies.

2.2.1 What is E-learning?

In literature, the term E-learning has been broadly used to express multiple aspects of the use of information and communication technology in a diversity of learning and educational contexts. In the context of higher education, the Higher Education Funding Council for England (2005) defines E-learning as "the use of ICT as a communications and delivery tool between individuals and groups, to support students and improve the management of learning" (HECPE, 2005: 6). Several terms, such as virtual learning, web-based learning, online learning, asynchronous learning networks, networked learning and blended learning used in the literature relating to E-learning research are employed interchangeably and offer a wide range of definitions of what E-learning means. For example, the term virtual learning refers to "a range of systems that comprise features like a designed information space, a social space being a "place", participants that are active and present actors" (Dillenbourg et.al, 2002). Another example is from De Laat et al. (2006), who use the term networked

learning to emphasize collaborative and co-operative connections among users, indicating that networked learning can be described as the use of internet-based information and communication technologies. In addition, the term web-based virtual learning environment was defined as "computer-based environments that are relatively open systems, allowing interactions and encounters with other participants and providing access to a wide range of resources" (Piccoli et. al, 2001). The term blended learning, which emphasises the central role of computer-based technologies, was defined as "the combination of instruction from two historically separate models of teaching and learning: traditional face-to-face learning systems and distributed learning systems" (Graham, 2006).

Generally, depending on context and focus, the term E-learning have been related to aspects of the what, how and why of E-learning (Mayer, 2003). Following Mayer's suggestion about a definition of E-learning, Table 2-1 illustrates the definitions of E-learning in the literature.

Table 2-1: E-learning definitions

Concept	Citation	What	Why	How
E-learning	HEFCE, 2005 OECD, 2005	From basic use of ICT to advanced applications and adoption	Supporting and managing learning Enhancing and/or supporting	Information communication and technology as a communications and delivery tool
Virtual learning environment	Piccoli et al. 2001	A wide range of resources		Computer-based environments allowing interactions and encounters with other participants
Blend learning	Garrison and Kanuka, 2004		An effective and low-risk strategy	Integration of text-based asynchronous Internet technology with face-to-face learning.
Networked learning	Goodyear et al. 2001	Adding computer-mediated environment to 'campus-based' course and running a new 'hybrid distance learning' course	Promoting connections between one learner and other learners; between learners and tutors; and between a learning community and its learning resources	Using Information communication and technology

Therefore, it is necessary for this research to adopt a definition of E-learning. In this study, we define E-learning as "the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services, as well as remote exchange and collaboration" (European commission, 2001). From the concept of blend learning, the scope of this study focuses on the form of E-learning which an educational

institution uses to support student learning on campus, not replacing the face-to-face learning method. In other words, the study only intends to understanding E-learning implementation combined with face-to-face and web-based learning.

2.2.2 What is implementation?

Implementation is a complicated concept. It has been given a variety of meanings by different scholars trying to address the problematic issues of implementation. Schultz et al. (1983) claimed that implementation occurred when a phenomenon had been changed from "what it was prior to the intervention" by processing information or making decision. Despite being based on different meanings, as well as different perspectives, most implementation research involves three critical dimensions of implementation, including installation, in terms of initial conditions for implementation; implementation by transferring intervention into the phenomenon; and integration by improving and further developing for better performance (Anderson & Hoffmann, 1978). The concept of implementation defined by Schultz emphasizes aspects of change created in an organization (Schultz et al. 1983). These authors define implementation in term of management change and improvement rather than model, framework and system. By separating the change and improvement in an organization when implementing, they conclude that sometimes, in some cases, implementation may change the actual phenomenon but not always achieve improvement in practices

2.2.3 Type of Implementation research

There is a huge body of research from organizational and technological perspectives of material resource planning, and technical and institutional aspects of innovation adoption. From a technological diffusion perspective, the work of Cooper and Zmud (1990) indicates that IT implementation might be viewed as an organizational endeavour directed toward diffusing appropriate information technology, along with strongly involving users and encouraging rational decision-making. Although they are largely separate in conceptual terms and vocabulary, implementation research can be divided into three areas: policy, management science and program implementation (Tonatzky et al. 1983). However, Berman (1978) suggests another way to distinguish bodies of implementation research, suggesting that it covers two levels of analysis and foci, called macro-implementation at the government level and micro-implementation at the organizational level.

In policy and decision-making research, implementation research is categorized into three distinct theoretical approaches: top-down, bottom-up and hybrid theory. For a long time, the

top-down school of thought dominated in policy implementation research, addressing the issue about the ability of governments to effectively implement their programs, and then followers developed further from analytical and comparative perspective by reference to specific variables and conceptual frameworks. According to Sabatier (1986), the top-down approach takes a policy decision as the point of departure and examines the extent to which its legally-mandated objectives were achieved over time. In the late 1970s and early 1980s, however, bottom-up theories emerged as a critical response to the perceived weaknesses of the top-down approach. Rather than starting with a policy decision with local bureaucrats as the main actors in policy delivery, and conceiving of implementation as negotiation processes within networks of implementers, bottom-up researchers started with an analysis of the multitude of actors who interact at the operational level on a particular problem or issue. In the process, the familiar policy stages of formulation, implementation, and reformulation tended to disappear. Instead, the focus has been on the strategies pursued by various actors in pursuit of their objectives. Such studies have shown that local actors often deflect centrally-mandated programs toward their own ends. By incorporating elements of top-down and bottom-up and other theoretical models, hybrid researchers try to synthesize approaches to gain advantages and avoid conceptual weakness between these approaches.

In the field of information system research, scholars study implementation in different ways depending on specific theoretical views. The factor approach tries to identify, examine and predict a number of factors which affect the outcome of implementation. By arguing that using factors' impacts on outcomes of implementation is insufficient to solve practical challenges facing academics and the industry, the process approach revolves philosophically from static to dynamic, by viewing implementation as a process of activities that are closely related within temporal dimensions (Lucas et al. 1990). From the factor view, some researchers consider implementation issues in context and emphasize technology and systems as a whole; they approach the implementation research by identifying a broad range of factors that affect implementation outcomes. In the process view of implementation, scholars conduct research using factorial frameworks and realize that understanding how the factors' impact on the outcomes of implementation is not enough to solve practical challenges facing academics and industry. They turn philosophically from static to dynamic by viewing implementation as a process of activities that are closely related within temporal dimensions (Saker, 2000).

Even though they are based on different meanings as well as different philosophies, most research on implementation involves three critical dimensions of implementation, namely installation, in terms of initial conditions for implementation (pre-implementation); implementation, by transferring intervention into phenomenon (implementation); and integration, by improving and further developing systems for better performance (post-implementation) (Anderson & Hoffmann, 1978). The concept of implementation defined by Schultz emphasizes aspects of change (Schultz, et al. 1983). These authors define implementation in term of management change and improvement rather than model, framework and system. Their research emphasizes implementation issues that will actually create changes in an organization. By separating the change and improvement in an organization when implementing it, they conclude that sometimes, in some cases, implementation may change the actual phenomenon but not always achieve improvement of practices.

2.3 Implementation on Information technology/Information system

2.3.1 IT/IS implementation: process perspective

From the theoretical lens of implementation as process, researchers agree that IT implementation, divided into several stages, is a process of technology transfer into an organization. For example, Walton (1989) stated that IS/IT implementation consists of three stages: generating IT context, designing an IT system and putting the IT system into practice (Figure 2-1). Thompson (1969) divided the IT implementation processes into three sequence stages, including initiation, adoption and implementation. Later on, the most cited paper in this field, published by Kwon and Zmud (1987), developed a further three stage model of implementation to emphasise the role of post-implementation in the process of transfer technology. They proposed the stages model in which IT implementation is covered by six phases, called initiation, adoption, adaptation, acceptance, routinization and infusion. Another model of IT implementation developed by Scheirer (1983) consists of seven stages in the process of implementation, such as basic research, technology development, diffusion of information, adoption, implementation outcome assessment and institutionalization. Also, Lai and Mahapatra (1997) when reviewing the IT implementation research by adopting Scheirer's model of IT implementation process, propose that research in IT implementation falls into four categories: individual, group, organization and inter-organization. They also state that there are strong needs of research to focus on IT implementation at the organizational and inter-organizational levels.

Both Thompson and Walton, although using different conceptual terms, proposed that the process of implementation included three stages. The first stage would create the conditions and context for IT implementation by tasks and management activities, these being contextual factors which collectively influence the alignment, mastery, and ownership of IT systems (Walton, 1989). They are also the factors which are used to measure and examine the successful impact and changes brought about by IT implementation in organizations. Walton (1989) also emphasises the important role of alignment between business strategy and IT strategy, which is called strategic integration by Henderson and Venkatraman (1999). The main task in the second stage is to design the IT system to align with the business system. Human resources, commitment from management, and organization competences would be placed in IT system designed to make the organization work and change. The final stage would continuously meet with the development of internal organization for integrating between organizational and technical aspects, namely functional integration, as stated by Henderson and Venkatraman (1999) again.

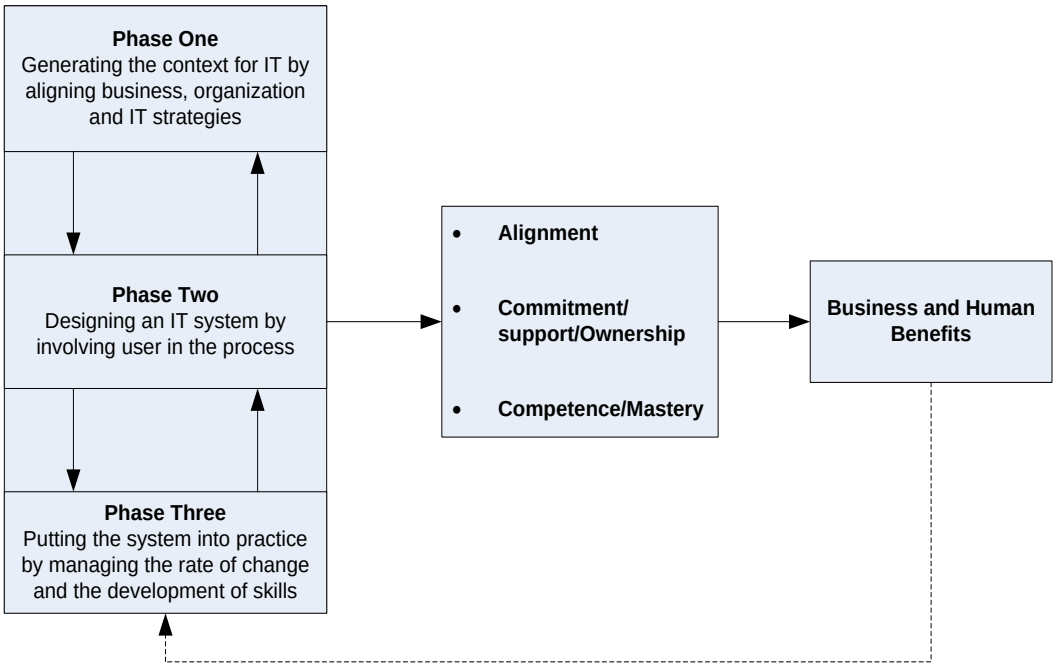

Figure 2-1: IT system and implementation process

Source: Walton, RE 1989, *Up and running: Integrating information technology and the organization*, Harvard Business School Press, Boston, MA, P. 3.

Walton (1989) insisted that integration between organization and IT, both at strategic and functional levels, is the key guidance for designing IT systems and the implementation process. From a managerial perspective, the Walton's model of IT implementation covers several different meanings of implementation, such as task, activities, process, design and planning.

According to Walton, top management has a critical role aligning business and IT throughout the process of IS/IT strategic planning and achieving the goal by committing organizational resources and maintaining consistency with policy on IT implementation.

Based on the Kwon and Zmud's (1987) model of implementation, Cooper and Zmud (1990) modified the model of IT implementation process from a technological perspective to incorporate some of the post-adoption behaviours. Their model is framed from the viewpoint of IT implementation, such as considering the efforts of the organization towards directly diffusing information technology. By emphasizing implementation, such as activities, each stage of the process of IT implementation has two important attributes, a process and a product, corresponding to the process of IT implementation and its outcomes (Figure 2-2).

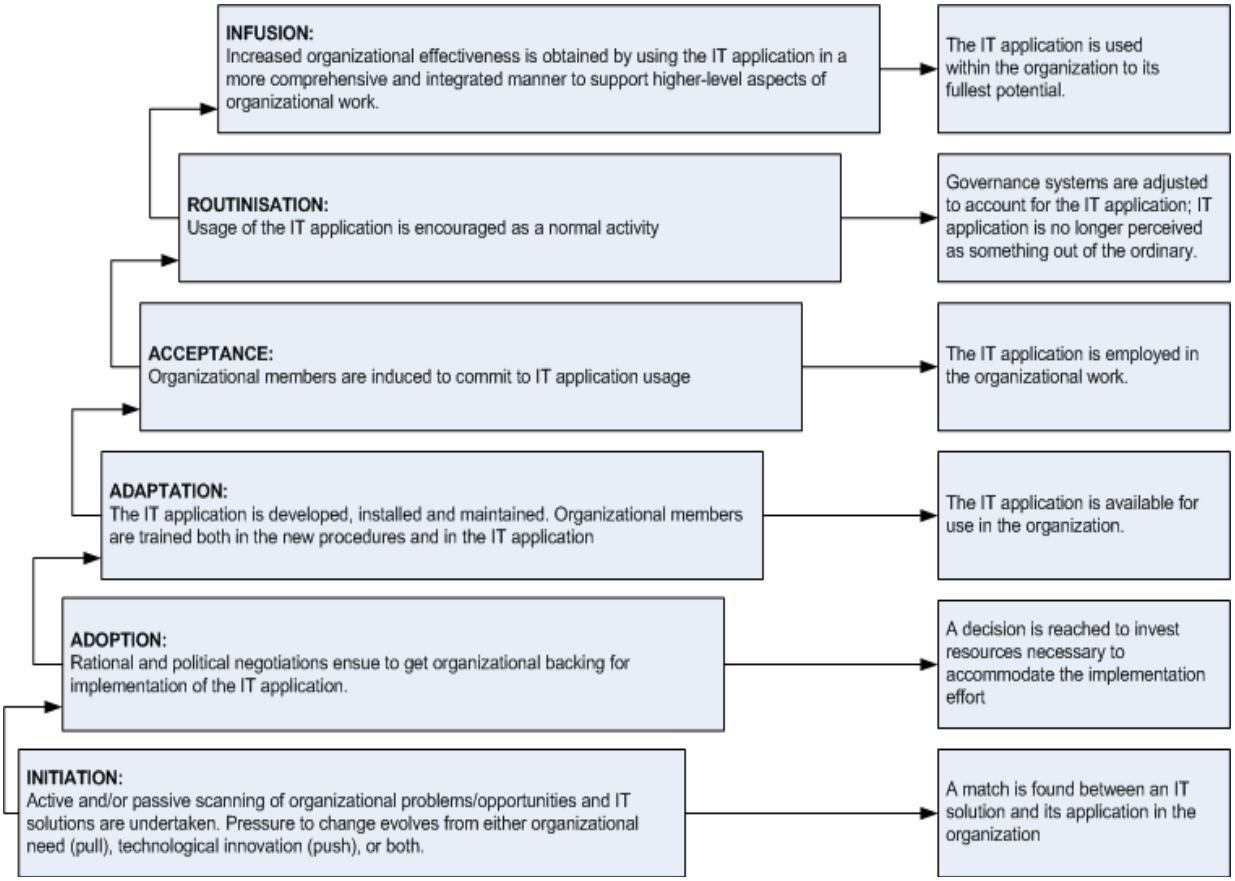

Figure 2-2: IT implementation process, adapted from Cooper and Zmud (1990)

Associated with Lewin's unfreezing stage, the first stage of Cooper and Zmud's model is initiation, in which the need for IT solutions is identified. By decomposing the change stage of Lewin's change model, Cooper and Zmud (1990) suggest that the process of adoption and adaptation for further development is appropriate to the diffusion of technology in organizations. Faced with organizational issues and scare resources, adopting an IT solution

requires political and rational negotiation, and it is necessary for organizations to change their internal procedures and train human resources to meet with the requirements of new technological development and IT applications. The refreezing stage in Lewin's model is divided into acceptance, routinization and infusion by Cooper and Zmud (1990). Cooper and Zmud (1990) remarked that the actual implementation process, viewed as implementation activities, may not comply with the model stage sequence in practice. Some stages or activities may occur in parallel.

While Walton (1989) focused on managerial aspects, Cooper and Zmud (1990) concentrated on technological aspects in the process of implementation associated with business and IT infrastructure tiers, respectively. However, both aligned the business and Information technology architecture of an organization. Logically, Cooper and Zmud (1990) look at the process of implementation at the tier of IT infrastructure and Walton (1989) sees the process of implementation from the point of view of the executive manager. When lining them in one organization, we can reach a logical model (Figure 2-3) for any implementation of IT/IS in an organization as follows:

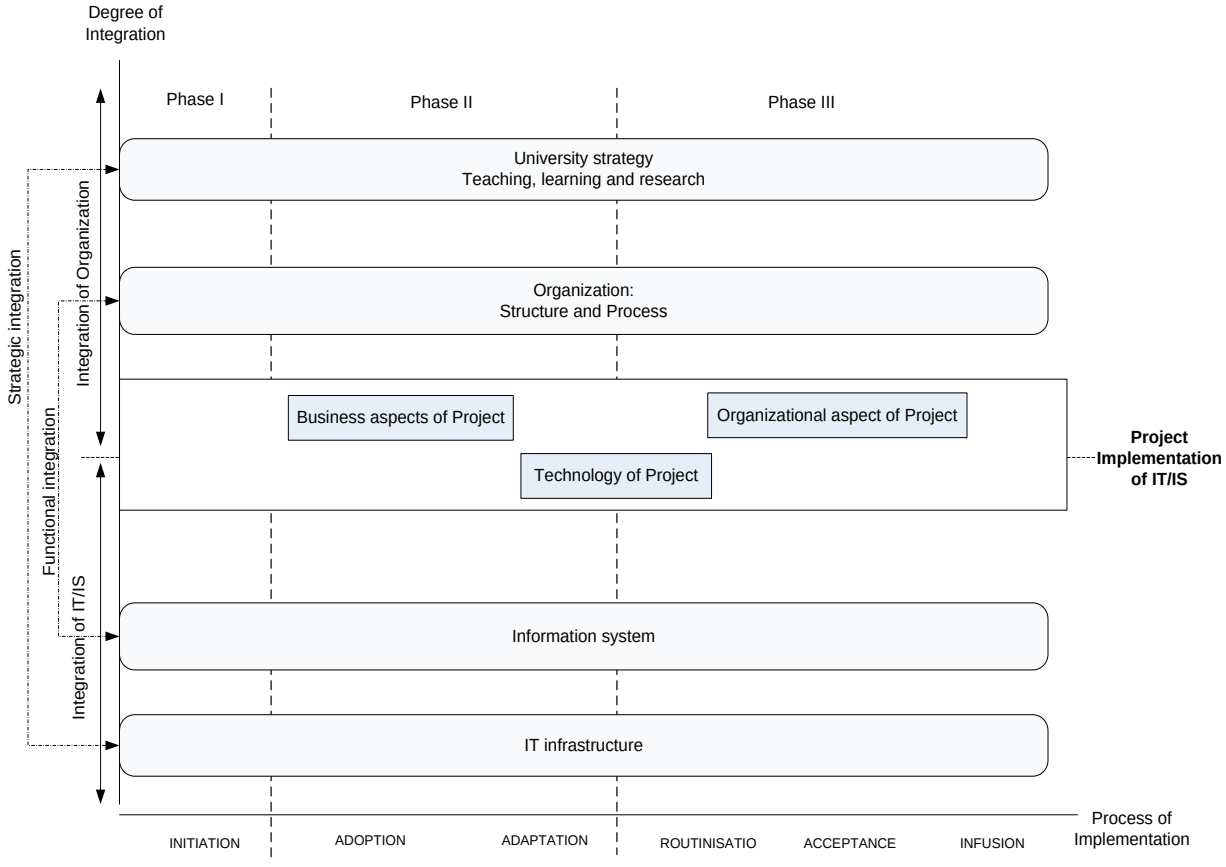

Figure 2-3: Logical model of IT/IS implementation aligned

Therefore, there are several common things shared between the Walton's model and the Cooper and Zmud's model. Both also recommend a sequential stage process of IT implementation which might occur simultaneously in practice. When implementing IT solutions, both frameworks insist strictly on a change of organization. The Kwon and Zmud's framework was developed originally from the stage model of change, while Walton stated that there was a crucial connection between IT implementation and organizational change (Walton, 1989). When encapsulating the two models together, the bridge connecting two models is derived from the implication, activities and meanings of two models (Figure 2-4). The relationship is framed in the dimension of a temporal chain of continuous activities taking place in the process of implementation. We might, then, shape the conceptual frame of implementation, including three phases; pre-implementation, implementation and post-implementation.

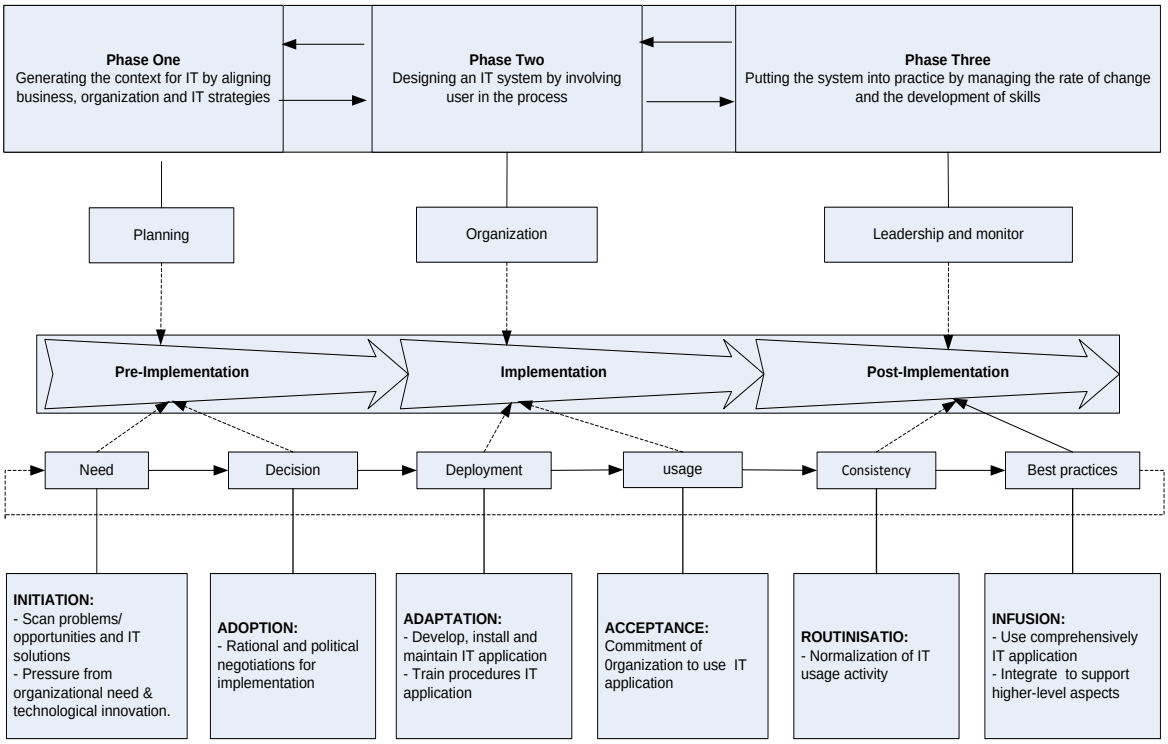

Figure 2-4: Conceptual Model: Relationship between Walton's and Kwon and Zmud's process.

2.3.2 IT implementation: factor perspective

While researchers adopting a process perspective addressed the implementation issues in a sequence of stages emphasizing technological innovation and changes, others have argued that solving problems at this stage might not gain good performance in IT implementation. Each stage of the implementation process consists of different activities and requirements; doing the best in each stage does not automatically guarantee successful implementation in

others (Ginzberg, 1981). Lai and Mahapatra (1997) concluded that most research adopted from a factor perspective focused on factors affecting the success and outcome of IT implementation at an organizational level. At the beginning, research scholars dealt with the success and failure factors of implementation then moved on to human factors, which have an important role in successful IT implementation. Later on, they paid much attention to the impact of organizational cultures and social issues on IT implementation. Researchers from a factors perspective thus proposed and focused on identifying a broad range of factors affecting implementation outcomes, including individual, organizational, situational and technological variables (Sarker, 2000). In particular, they also emphasized the importance of commitment to the IT project and change in implementing IT (Ginzberg, 1981). For example, Walton (1989) concluded that it was essential, as effective IT implementation depends heavily on the commitment and support of management by adequately allocating organizational resources; developing good relationships between developers and user departments; involving users during the implementation process; developing the right communication channels; fostering an organizational culture for change; and promoting an attitude of trust. Tornatzky et al. (1990) suggested that the process of innovation adoption is influenced by the external environment, technology and the organizational context. These factors and conditions continue to be addressed, validated and confirmed today by Thong (1999) and Zhu et al. (2003, 2006). They affirmed that top management support has a key role for implementing an IT/IS project effectively. In addition, they recognized that external IT/IS expertise, such as IT consultants and vendors, are the second most decisive factor for successful IT implementation.

In the field of IS/IT adoption and implementation, researchers have applied technological innovation and adoption theories to providing a useful reference discipline for empirical studies from the factor perspective (Lee & Kim, 2007). Most papers in the field have been based on Roger's theory of diffusion and Davis's Technology acceptance model (TAM) for predicting IT adoption. Roger's theory has usually been applied to predict whether or not innovation will be accepted or rejected; TAM has been used to explain how and why technology innovation was accepted or not. Due to using a factor implementation research approach, in which factors have been modified during the implementation process in predicting behaviours of innovation adoption, research on the theory of diffusion and TAM perspectives are also classified as diffusion theory (Hogarth & Dawson, 2008). However, the diffusion theory has faced challenges in validating the implementation of complex technology and innovation scenarios at organizational levels where multiple adopters have

been required to coordinate and incorporate across functional departments and different organizational layers. Therefore, researchers have developed another approach: IT implementation research is placed within organizations as a whole, where IT innovation and adoption have been examined from different organizational perspectives, including intra, inter and network. In this sense, researchers use several concepts and theories that are borrowed from organizational studies such as IT strategy and governance, business strategy, organizational structure and culture, management, and organisational politics as the factors relevant to determining the overall outcomes, process of innovation and change of IT implementation (Gallivan, 2001; Prescott and Conger, 1995; Hogarth & Dawson, 2008). Dwivedi et al. (2008) claimed that the current state of adoption, acceptance, and diffusion research on IS/IT was the most active area across 337 different peer-reviewed journals during the period 1970–2007. Their work suggested that the majority of articles on user adoption and acceptance of IS/IT focused on adoption and diffusion issues dominated by the positivist paradigm and quantitative approach within the IS/IT discipline at the organizational level and has been applied the most in studies of adoption, and diffusion, the theory of Diffusion of Innovation being ranked second. They also found that the theories employed were diversified in the study of adoption and diffusion concepts in the field of information systems (Dwivedi et al. 2008).

2.4 E-learning implementation

2.4.1 E-learning implementation as process approach

The search for E-learning implementation research has yielded many studies, but it has been very surprising that almost all studies consider other stages of E-learning development, such as the learning process in the classroom, end-user behaviour or perception, and so on. It is likely that E-learning implementation still remains significantly under-researched because of the lack of a unified theoretical framework to bring together the various stages of the process in which E-learning is developed, implemented, and used. Wilcox et al. (2004) has developed a higher-level model for describing the E-learning lifecycle, called Unified Process (Figure 2-5). At the present time, it is the only example of research focusing on E-learning implementation. This model is developed out of an inter-disciplinary effort to propose a staged approach for the full and integrated E-learning process. The unified process model has been developed by borrowing standards, concepts and work from software engineering and development. Wilcox et al.'s model reflects a theoretical approach in which E-learning

implementation and development moves towards rational choices and behaviours for dealing with changes and developments (Hogarth & Dawson, 2008).

It also has many common characteristics associated with the process models reviewed above in terms of a temporal approach and staged progression. Combining the various disciplines of Wilcox et al.'s model with process models connects the natures and activities in the disciplines with what process models propose and demonstrate. However, the E-learning Unified Process is more comprehensive, as it joins a set of discrete activities of E-learning implementation within the proposed process models.

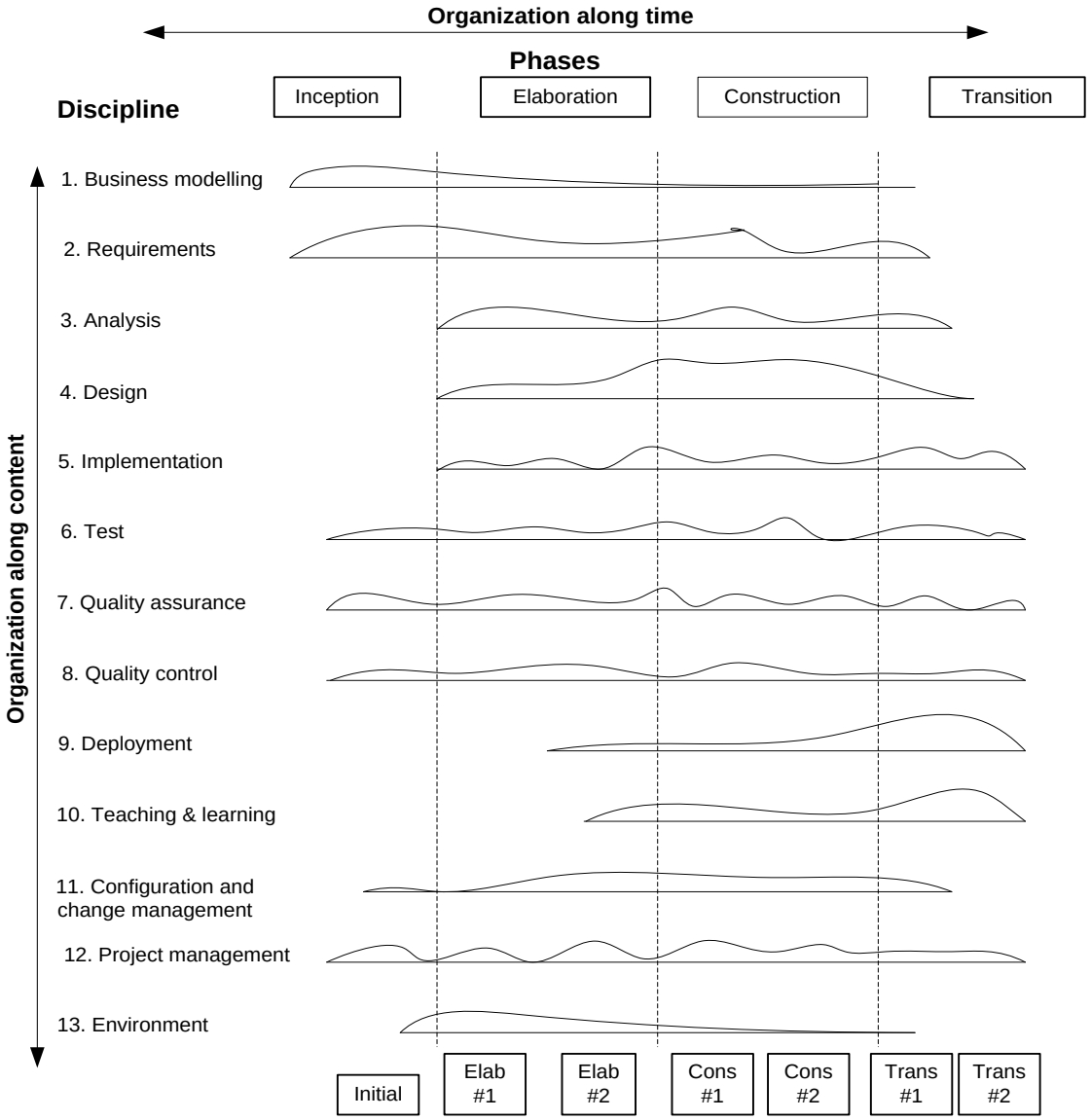

Figure 2-5: The E-learning Unified Process. (See Wilcox, Dexter, & Petch, 2004, p. 12)

When synchronizing nature and activity with process models, we might conclude that the E-learning Unified Process is actually one type of process model discussed previously. Its

development was originally based on the software engineering tool, the Rational Unified Process from IBM, to meet particular demands for E-learning development. It is likely that the E-learning Unified Process is not useful to apply to all aspects of organizations and pedagogy when implementing an E-learning environment within a given institutional context. The model is useful for technologically analyzing particular workflows or tasks rather than planning and preparing for changes and innovations within an organization in the process of E-learning implementation. Finally, the model provides a list of the natures and activities of disciplines as a potential reference source for E-learning practitioners rather than for academic scholars doing academic research (Table 2-2).

Table 2-2: Nature and activity of E-learning process; adapted from Wilcox et al. 2004.

No	Discipline	Nature and activity
1	Business Modelling	Planning for motivations for developing E-learning materials, consisting of activities such as planning, allocating resources, analyzing costs.
2	Requirements	Establishing the requirement to provide the core educational material, and mechanisms for deployment to meet with requirements of all stakeholders.
3	Analysis	Driven through activities such as market research and establishing institutional capacity to map against institutional drivers and controls.
4	Design	Design activities in response to analysis by allocating resources, associated design planning and curriculum design
5	Implementation	Building educational content and support/deployment systems associated with environment/technical infrastructure to support the content, course content, associated procedures, etc.
6	Test	Testing can occur very early in the lifecycle, assessing the nature of the activities in the earlier phases, and checking ongoing work in the implementation phase.
7	Quality Assurance	Reflecting policy checkpoints for the institution and measuring conformance to external guidelines by introducing and measuring throughout the E-learning lifecycle to avoid disappointment in the end product and its deployment or support.
8	Quality Control	Concerning the evaluation of materials and deployment issues and needs to be measured against a different set of metrics and criteria.
9	Deployment	Concerning the logistical issues required before teaching and learning can occur.
10	Teaching and Learning	Actual activities in the delivery of the material between teacher and learner, such as teaching, assessment, feedback, support, tracking, progression, mentoring.
11	Configuration and Change Management	Tracking and maintaining the integrity of the evolving project assets, including activities concerned with staff development and course procedures.
12	Project Management	Monitoring project progress and managing risks of iterations across the E-learning materials lifecycle about the necessary number and durations.
13	Environment	Tailoring and customization activities that support the selection and set up of tools to support lifecycle, configuration, improvement and refinement.

2.4.2 E-learning implementation as factor approach

From the factor perspective, the technological innovation and diffusion in IS/IT research has increased and provided a useful frame of knowledge and understanding about how to implement successfully an E-learning environment. Tracking the root of variables and conditions in the area of ICT applied and implemented in the educational setting, Ely's research is the most referential paper in the field of technological innovation in education (Ensminger et al. 2004). Ely (1999) has proposed eight conditions that facilitate the implementation of ICT in education, including (a) dissatisfaction with the status quo, (b) adequate time, (c) resources, (d) knowledge and skills, (e) rewards and incentives, (f) participation, (g) commitment, and (h) leadership. The factor view, which is based on Roger's theory of diffusion, can explain why and how levels of success or failure are different in each organizational context, but it lacks recognition of the role of ICT-based pedagogy in the process of E-learning implementation (Naveh et al. 2008). Therefore, it has been documented that factor view research on E-learning implementation is differentiated from general IS/IT research, although E-learning implementation might be categorized as a child of the research in the field of the application of IS/IT at the organizational level. While the focus of factor research has been on adoption and diffusion of technology, much recent research in E-learning implementation has concentrated on identifying and examining a set of conditions constructed in the model of E-learning implementation. Researchers have paid attention to the variables and conditions that influence the success and failure of implementation of ICT within the educational context (Table 2-3). Along with IT/IS research from the factor perspective that reflects theory and models such as Technology Acceptance Model (TAM) and factors of organization, technology, and environment, research of E-learning implementation from the factor view has recently extended the scope of research to the unique dimensions of the educational context: ICT-based pedagogy (Johnson et al. 2008).

A review of the literature reveals that that many authors in the area, such as Johnson et al. (2008), Sun et al. (2008), Selim (2007), Holsapple & Lee-post (2006), and Ifinedo (2009), have paid great attention to the success and failure of E-learning implementation. Most of their research used quantitative methods to test or confirm the models that they developed or revised from the relevant literature. They usually constructed survey questionnaires to collect data for analysis by statistical methods. The results of their studies have converged to the set of critical factors impacting on the outcome of technological innovation and implementation within an organizational context, after validating, testing, and confirming the factors that

have a strong influence on the outcome of technology implementation which have been found to be aligned in previous studies, including the quality of technology and system; the commitment of management and leadership; the skills and knowledge of the user and user involvement; and user support.

Table 2-3: Research on E-learning implementation from the factor perspective

Factor	Purpose of Study	Model	Methodology	Author
- Perceived usefulness - Interaction - Social presence - Computer knowledge and skill of user	Understanding how technology can support and enhance learning with social presence.	Application-specific computer self-efficacy model with social presence factors.	Quantitative study to test a model by deductive enquiry, online survey.	Johnson et al. (2008)
- Instructor characteristics - Student characteristics - Technology - University support	Identifying and categorizing the E-learning critical success factors.	Using CFSs to identify the variables and verify by confirmatory factor model.	Quantitative research, data collected through anonymous survey instrument.	Selim, (2007)
- System Quality - Information Quality - Service Quality - Usage - User Satisfaction	Explaining how to define, evaluate, and promote E-learning success from an IS perspective.	Developing an E-learning success model elaborated by literature and the DeLone & McLean's model.	Action research with a survey instrument developed for collecting data.	Holsapple & Lee-Post, (2006)
- Ease of finding - Computer anxiety - Perceived usefulness - Perceived ease of use - Usage	Developing extra factors in relation to students' continuance intention in the use of technology.	Using the technology acceptance model throughout; adding the exogenous factors.	Hypotheses are tested using a structural equation modelling technique.	Ifinedo, (2009).
- Attitude, anxiety, Internet self-efficacy of Learner - Response timeliness and attitude toward E-learning of instructor - Flexibility, quality, and assessment of course - Technology and internet - Usefulness and ease of use, interaction	Investigating thirteen critical factors to identify which one has the strongest impact on learners' perceived satisfaction.	Six dimensions identified which cover thirteen factors integrated into one framework.	Quantitative study with questionnaire survey.	Sun et al. (2008)

Introduced in 1980s and expanded in 1990s the internet has had a tremendous impact on education. During this period, both practitioners and researchers have been more interested in addressing issues that institutions have faced during the initial stage of implementation of E-learning. Therefore, it is understandable that most research published during this time focused on addressing issues associated with activities and initial stages of the E-learning process. After two decades of research and development, E-learning implementation seems to be mature in academic research and practice. Most educational institutions in developed countries have already built an E-learning environment on their campuses and offered online courses in academic degree programs. The process of implementation of E-learning in educational institutions nowadays has passed through the initial planning, installing, and adopting stages. It is likely that the current status of E-learning implementation is at the post-implementation stage. Nowadays, institutions and researchers are more interested in learning how to adapt and use what is built and have invested in ICT efficiently and effectively. The current research in this field is interested in addressing issues relating to the post-implementation period of the E-learning process. From the implementation process perspective, it is clear that most research papers in the period 2005-2009 fall in the post-implementation stage of the implementation process.

It is likely that the research associated with influential factors impacting on E-learning implementation have been matured in the literature. Research in the topic has successfully identified what the critical factors are which influence E-learning implementation within organizations. However, the need to improve E-learning practices and policy requires more specific implications and suggestions to be successful and avoid failure in E-learning implementation, therefore recent work (Reid, 2012; MacKeogh and Fox, 2008; Anderson and Gronlund, 2009; Birch and Burnett, 2009) illustrates systematically a broader view of drivers and constraints to E-learning implementation. For instance, reviewing E-learning in the context of higher education, Reid (2012) grouped constraints to E-learning implementation and adoption into five categories, consisting of technology, process, faculty, environment and administration. Anderson and Gronlund (2009) divided challenges to E-learning implementation and adoption in the developing countries into course, individuals, technology and context. They stated that, although "these challenges are equally valid for both developed and developing countries; however in developing countries more papers focus on access to technology and context whereas in developed countries more papers concern individuals". The study by Birch and Burnett (2009) reported three groups of constraints to E-learning

implementation and adoption, including institutional barriers, individual inhibitors and pedagogical concerns.

It is also important for those conducting research on E-learning implementation in developing countries to be aware that the current status of E-learning implementation in educational contexts is quite different from that in developed countries. Developing and applying ICT in education are still far behind the developed countries. The challenges and difficulties that developing countries face include deficiencies in basic educational infrastructure and ICT infrastructure; limited availability of quality teachers to apply ICT in the existing education systems; and obstacles to bringing long-term, sustainable ICTE reform through local, national, and regional government bodies, depending on the specific country (Gutterman et al. 2009). Therefore, research on E-learning implementation must be placed in the real context of the organizations and conditions of specific countries.

2.4.3 Conclusion

In conclusion, the literature review revealed that the implementation research in various disciplines at organizational levels is the absence a unified framework to shape what the implementation concept means. The implementation concept in research is a complex process in sophisticated scenarios. However, there are certain similarities between major implementation research of information technology, technological innovation and diffusion, which are applicable to exploring E-learning implementation. It is noticed that the nature of E-learning is different from other technical systems in term of outcomes and types of activities, such as pedagogy or learning processes. Therefore E-learning research must take into account the inner characteristics of E-learning which differ from a generic implementation research. Online pedagogy, for example, cannot be separated from the e-learning implementation process. The outcomes of pedagogical variables in implementing an E-learning system process have to be considered and addressed while generic implementation seems to be focused more on other aspects of organization and technology. Benefits gained from reviews of implementation research allowed exploring deeply E-learning implementation both from a process and factor perspective. E-learning implementation could be viewed as the process by which E-learning technology will be transferred into institutions at a different stage of technological innovation and changes which cover activities accomplished through three stages of the technology project, including Pre-implementation, implementation and post-implementation within organizational settings. E-learning implementation from a factor perspective could also take into account organizational,

pedagogical and technological factors which significantly impact on the success and failure of implementation. The next section will explore different aspects of research on E-learning.

2.5 Type of E-learning research

There is a tremendous volume of literature on the topic of E-learning. E-learning research is still building a body of foundational research that can give validated knowledge to update our understanding. E-learning research offers valued guidance that is necessary for the successful implementation of e-learning. When online teaching and learning environments have been officially accepted, widely used and popularly developed within educational settings, research in e-learning has also been extended to offer guidance that institutions will know how to select, design, develop, and implement a useful e-learning program or project. Studies in e-learning nowadays focus on addressing the research issues which are related to pedagogy; human-computer interaction; a sustainable business model; strategic implementation; mobile learning and technology; change management and innovation; and other implications of e-learning at the individual, organizational, and national levels. Previous and diversified E-learning research can be helpful in guiding many organizational practices and future research. In this section, we will present just a few of the major research findings that can provide initial guidance in the development of a successful implementation of e-learning. In addition, at the end of this section we briefly frame a holistic picture of implementation of E-learning by synthesizing the process and factor perspectives in one frame to better guide research in this field.

From the frame of perceptive implementation summarized in the previous review, we started to seek papers related to the implementation of E-learning from several potential sources and databases. The key words used to extract papers from sources reflect all aspects of implementation of the framework. Method is used by text implementation and E-learning and adoption or routinization, normalization, institutionalization, change, process, pedagogy, technology or systems. Sometimes another term which is interchangeable has been used to seek for papers instead of E-learning. Based on papers collected, the systematic review identified five categories that are mentioned in the research of implementation of E-Learning, although there is some overlap between these categories, as follows:

- E-learning acceptance and adoption
- Pre-implementation - Condition and E-learning readiness

- Staff training and development
- E-learning technology and IT infrastructure
- E-learning pedagogy- Online teaching, learning and learning community

2.5.1 E-learning acceptance and adoption

A review of the literature revealed that there has been much research on E-learning with regards to technology acceptance and technological adoption. In the context of information system implementation research, E-learning implementation was viewed as technological diffusion and adoption and technology acceptance (Keller, 2005; Masrom, 2007, Lee, 2006; Ifinedo, 2009). From a technology acceptance perspective, the technology acceptance model (David, 1989) is applied in most of the studies in the acceptance or rejection of E-learning by users. From a technological innovation perspective, E-learning was viewed as the process of making decisions related to adoption and diffusion of new instructional technology to individual and organization. The theory of diffusion (Roger, 1983) used to answer a research questions related to the decision process of either adoption or rejection of E-learning.

According to Davis (1989), user acceptance is determined by two perceived characteristics, namely perceived usefulness and perceived ease of use. The first characteristic, perceived usefulness refers to an individual's belief in enhancing job performance and resolving a certain task by using information system. The second one, perceived ease of use, refers to individual beliefs in using a particular system could gain free of effort (Keller, 2005). In the TAM model, the behavioural intention which depends on the perceived usefulness and perceived ease of use, impacts on the behaviour to use technology. For a protracted period of testing and confirming the technology acceptance model in technology acceptance, most recent studies in E-learning modified the TAM model to apply widely in a specific context to predict a various aspects of E-learning (Lee et al, 2013; Martínez-Torres et al. 2008; Yuen and Ma, 2008). Research in this stream extended the original TAM model by incorporating with other theoretical frameworks and factors which were driven from a specific contextual settings and studied phenomenon. This research method is used to verify, test and confirm the original-extended model to successfully predict the intention to continue using e-learning (Liu et al, 2005; Lin, 2011); intention to use e-learning at national level (Lee et al, 2009), success factors contributing to the acceptance of E-learning by learner (Lee, 2006); teacher acceptance of E-learning technology (Yuen and Ma, 2008); intrinsic motivational factor to the acceptance of E-learning (Zhang et al, 2008); motivational factors that influence the

acceptance of E-learning (Sánchez and Hueros, 2010); outcomes of e-learning systems adoption (Islam, 2013); and student's attitude towards E-learning (Bertea, 2009).

The theory of diffusion provides a comprehensive foundation for understanding the factors influencing individual adoption and collectively diffusion (Straub, 2009). From a theory of diffusion perspective, diffusion is made by a five stage process of individual adoptions across a population over time, including awareness of an innovation, persuasion, decision-making, implementation and confirmation (Straud, 2009; Roger, 1995). E-learning implementation as a technological innovation based on the theory of diffusion was broadly well developed in literature. There has been significant interest in applied diffusion of innovation in E-learning research in various aspects of institutional and individual implementation and adoption, such as sustainability of E-learning implementation (Nichols, 2008); teacher's adoption of E-learning (Jebeile, 2003); and Students' Perceptions of E-learning (Keller & Cernerud, 2002). For example, Nichols (2008) pointed out that, without an institutional suitability of E-learning implementation achieved, enthusiasts for E-learning will be limited in the long term. In their study, Keller & Cernerud (2002) emphasised that higher education institutions should develop an implementation strategy to motivate students who have experience with computers and positive attitudes towards E-learning adoption.

It is clear that E-learning implementation as technology acceptance has been well matured when the original TAM-based studies has already been tested, confirmed and verified the original model to extend a new one which can be applicable for research interests regarding stakeholders involved in E-learning, including learners and instructors at different levels in various aspects of E-learning. However, E-learning implementation research based on the TAM model has been criticized because of a lack of "theoretical support regarding the relationships between e-learning adoption behaviours and outcomes" (Islam, 2013). Keller (2005) pointed out that in TAM-based research individual variables were measured at specific points. In addition, in review of the literature study, Straub (2009) revealed that the TAM model lacks support for equality between the perceived ease of use and self-efficacy and individual differences that later research confirmed were important in influencing intention to use technology. From the theory of diffusion perspective, E-learning implementation could overcome drawbacks of specific points of time in TAM model. However, a research which is based on the theory of diffusion should concern about how to frame a study within the structure of theory. In addition, the theory of diffusion is primarily

descriptive rather than prescriptive. Therefore it will be applicable for research with the why question of occurring rather than the how question of facilitating adoption (Straub, 2009).

2.5.2 Initial conditions prior to implementation

From organizational aspects, necessary conditions, including those within organizations and the external environment, should exist prior to E-learning implementation for successful implementation. An organization's readiness and willingness to implement E-learning has important driving factors. E-learning readiness of organizations might be categorized into three components: resources, education and organizational environment (Psycharis, 2005). Resource readiness includes technology, human resource and economics for investing in an information technology infrastructure in which skilled staff (teacher and support staff) might access the available ICT online. Education readiness refers to the ability of the organization's staff and other facilities analyse, design, and digitalize the content and learning resource for academic programs. Environment includes entrepreneurial, cultural and leadership aspects which will create sustainable conditions for E-learning development and impact on the behaviour and attitudes of staff and organizations in relation to commitment, acceptance or rejection of new teaching and learning environments. In his study, Psycharis (2005) concluded that institutional resources, education process and context are the most important factors closely related to successful E-learning implementation. In a later study Keramati et al. (2011) categorise the readiness factor of E-learning into three groups, consisting of technical, organizational and social factors. Actually, this classification of E-learning readiness is the same with the Psycharis's approach, when they arrange the same elements of E-learning readiness factors into different categories. In their study, Keramati et al. (2011) concluded that organizational readiness factors such as organizational culture, rule and policy have the most important effect on E-Learning outcomes. It was clear that there was a important movement of the readiness factor from a technological to an organizational group during the development process of integrating ICT into education.

From a personal aspect, Sadik (2007) points out that, although equipped with adequate pedagogical knowledge and skill, teaching staff's lack of technical skill and knowledge related to web-based interaction and authoring-packaged tools, as well as experiences in using computers and networks, creates barriers to adopting E-learning. Therefore, to overcome institutional and personal barriers, researchers in this field advocate that an adequate preparation for an implementation within an educational institution should be planned. Bates (2007) emphasised strategic planning for E-learning as a solution to envision

what is to be achieved, and preparatory needs strategic analysis of the current status and future development recommend that "attention to objectives, core values and principles, and faculty development and training, are critical for the successful transition from mainly face-to-face teaching to e-learning". In other words, the well-planned and prior knowledge before E-learning implementation from top management are identified as important facilitators to E-Learning implementation. Therefore, it is necessary that an institution should assess their E-learning readiness to guide them in how to strategically plan and prepare for implementation. Chan & Ngai (2007) developed five indicators which could be used to assess an organization's readiness for E-learning, namely levels of IT knowledge among top management; levels of IT knowledge among individual learners; levels of IT use in the organization; organizational size and financial resources. In the context of developing countries, Omoda-Onyait and Lubega (2011) suggested a five-layered model of E-learning readiness, which covers awareness, culture, technology, pedagogy and content, could be used to evaluate the institutional readiness for E-Learning implementation.

The initial planning of E-learning implementation may depend on a positive relationship across functional departments within organizations (Penrod and Harbor, 2000). Established inter-cooperation from departments within institutions is a precondition of successful system implementation. This will create support and a process for implementing E-learning, taking into account faculty 'sand students' needs for support during the process of teaching and learning based on technology. In addition, E-learning could not be implemented in isolation and requires input from service providers, financers, and all academic departments (Penrod and Harbor, 2000; Sadik, 2007).

The successful implementation of any E-Learning system seems reliant on a broader acceptance of principles. There is the importance of a positive link among domains of E-learning implementation. The implementation of a system from one organizational domain of E-Learning implementation may be more likely to succeed if those from other domains are already established, or will be implemented simultaneously. E-Learning implementation is more likely to be successful, in terms of cost and continuity, if E-learning implementation is considered to be part of the larger field of E-Learning. The E-learning implemented and evaluated as independent program is at greater risk of failure. While prior conditions in an organization clearly seem to affect the likelihood of E-Learning success, such conditions could not be separated from the broader socio-technical context. There may be significant differences in professional and organizational cultures between societies and the

infrastructure of IT. If there are shortcomings in the funding and infrastructure of an E-learning system, an intervention is more likely to fail; whereas if the E-learning implementation is well funded and supported, new interventions are easier to implement.

2.5.3 Staff training and development

Review of literature revealed that adopting E-learning seems to face major problem of faculty readiness in many institutions, according to case study research papers (Panda and Mishra, 2007; Borotis and Poulymenakou, 2004; Kosak et al., 2004; Saekow and Samson, 2011 and Keramati et al., 2011). Therefore, it is not surprising that faculty development and training features frequently in the literature. The success or failure of an E-learning implementation depends on the capabilities of those using it. Not only has the lack of skills and knowledge frequently been cited as a barrier in implementing and accepting technology (Psycharis, 2005), negative attitudes towards the use of technology is the main reason faculty resist using e-learning materials in university teaching (Uzunboylu, 2007). The acceptance and use of technology in teaching depends on several factors, such as years of experience; levels of computer literacy; degrees held; academic profession and training received (Sadik, 2007). Sadik (2007) also points out that the readiness of the faculty to use technology in university teaching might be categorized in three component pedagogical and technological competencies, experience and attitude. His study claims that three components are vital to the eventual acceptance and implementation of E-learning. Faculty might resist E-learning because of organizational change, time management, administrative support, outside intervention, personal and psychological issue, and perceptions (Mumtaz, 2000). As a result, appropriate and effective faculty training and development programs for E-learning adoption must assess the factors that influence the faculty's E-learning adoption process (Keengwe et al., 2009; Mumtaz, 2000). From faculty training and development aspect, the influential factors inhibiting E-learning adoption and use can include a lack of teaching experience with ICT; on-site support for teachers using technology; help supervising children when using computers; ICT specialist teachers to teach students computer skills; computer availability; time required to successfully integrate technology into the curriculum; and financial support (Mumtaz, 2000). In other words, to be successful, E-learning implementation, institution should devise a training and development program to support faculty in overcoming these hindering factors. In this sense, Ward and Parr (2009) emphasise that the faculty's professional training and development "must be to increase teacher confidence in their ability to facilitate student learning with computers, along with the provision of stronger pedagogical

motivation for teachers to integrate ICT". To do so, Georgina and Olson (2008) point out that a most effective faculty professional training and development should be conducted by a trainer in a small group.

Meeting with the use of E-learning in teaching from many case studies, researchers emphasise needs for training faculty in using e-learning development software, managing e-course, integrating with E-resources and interacting with students by way of the web. The faculty training program to approach e-Learning should focus on E-learning pedagogy, online material design, and multimedia authoring tools, especially web technology development. Although positive attitudes towards the use of technology; high appreciation of educational technology and confidence in computer skills; faculty seems not to actively engage in immediately beginning to invest their time and efforts in developing and delivering the e-course in E-learning system. While teaching on an e-learning system would significantly increase an already heavy workload, motivation and encouragement from the institution is too distant from the needs of faculty for sharing and supporting these challenges. Therefore, to successfully implement an e-learning system, an educational institution should acquire an adequate technological infrastructure and suitable human resource policy which encourages, motivates and sustains active engagement and dedication in using technology (Sadik, 2007). The consistency of support comes from departmental and institutional levels which motivate faculty members to seek new ways of adopting and looking for solutions to improve practice in adopting E-learning.

2.5.4 E-learning technology and IT infrastructure

An E-learning environment is constructed through digital infrastructure. Rapid change and the development of ICT are enabling the evolution of education in the new millennium. One of the core components of E-learning, along with pedagogy and organization, is how and what technology have been developed and used in the learning system. With a large number of papers published in the field, E-learning technology might be categorized into two areas: one belongs to the school of thought on social perspectives and another is developed from a technological and technical perspective.

From the technical perspective, the basic technologies enclosed in an E-learning system consist of Dynamic hypertext mark-up language (DHTML), virtual modelling language (VRML), Portal, Knowledge tree, Live Net, Ajax, E-dap, central system and computerized adaptive testing (CAT) (Liu and Wang, 2008). Introducing the Silverlight technology by

Microsoft, Flash by Adobe and HTML5 drafted and proposed by the World Wide Web Consortium (W3C) in 2010, multimedia technology (audio and video) will be significantly improved and transformed smoothly via the internet and level up integration in the E-learning system. This makes more interactive and real-time communication possible for teaching and learning via networks. This is significant for the improvement of the E-learning system in the future, especially for developing countries, where a bandwidth bottleneck is a major barrier to applying educational technology. E-learning system cannot be deployed alone independently with other systems and applications within an organization. E-learning system needs to technologically communicate with the others to provide its functions. At (inter)organizational levels, researchers have focused on computer technology in network supported learning and teaching. They have separated them into hardware and software when addressing their role in design and application which supports learning and teaching. In general, most papers try to address and solve research issues which are related to the capacity of E-learning interoperability by providing and proposing standardized data structures and communications protocols for e-learning objects and cross-system workflows (Liu et al, 2003). Liu et al (2003) summarised and categorized E-learning standards and specifications into five types, as follows:

- Metadata refers to learning content and catalogues to support the indexing, storage, search, and retrieval of learning objects. There are several standards of metadata proposed, but most organizations and software developers have adopted and adapted the Learning Object Metadata (LOM) of IEEE.

- Content package refers to the ability of courses which are exchanged among E-learning systems. There are two major content packages on learning environments; IMS Content packaging of IMS and Sharable Content Object Reference Model (SCORM) of IDA.

- Learner profile refers to the personal data of learners in many aspects, such as learning plans, status participation, degrees, learning history, etc.

- Learner registration helps to provide information on learners to identify, manage and deliver suitable system services to registered learners.

- Content Communication refers to the ability to communicate learner data and previous activity information to the content performed by using the specification of the ADL's Sharable Content Object Reference Model (SCORM).

When implementing E-learning therefore, system performance depends on how institutional capacity and technological infrastructure are met with E-learning standards and specifications of E-learning technology, embedded in E-learning system packages which are available on the market. Based on various activities invoked, an e-learning system covers the following components: (1) the Learning Management System (LMS) includes functions of course preparation, content presentation, course management, user management, communication among e-learning communities, and maintaining learners tracking data; (2) Content Authoring Systems provides design and publishing functions for instructors to develop digital content and courses on the system; (3) the Adaptation System provides functions to customize teaching and learning systems for the specific context of learners; (4) the Assessment System provides functions to manage, design, assess and evaluate user's learning performance on the system; (5) the Content Delivery System provides functions to distribute the contents for connected users regardless of space dimensions (Zafar and Ahmad, 2006).

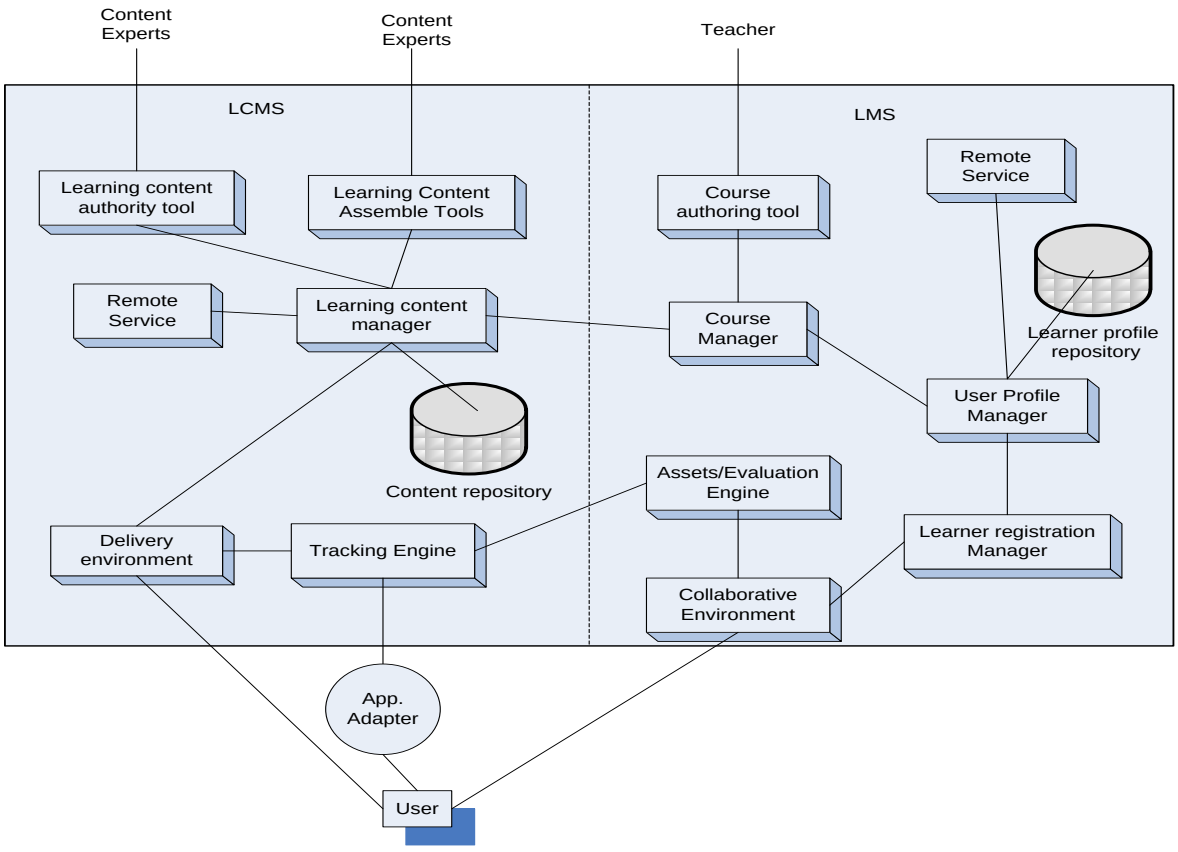

Figure 2-6: Model of functional E-learning system, adapted from Lui.et Al, 2003

In the E-learning system, LMS provides the "services that manage the delivery and tracking of learning content to a learner" (Lui et al, 2003). The services are invoked based on the mechanism of SCORM. A learning content management system (LCMS) is a multi-user

environment which manages the process of creating and delivering learning content and permits users to create and reuse digital material and content (Lui et al., 2003). The learning objects will be shared among multiple tools and learning repositories based on applying the standardized learning metadata structures plus standardized learning object import and export formats. Therefore, LCMS have to be designed to conform to industry standard specifications, including the content metadata, content packaging, and content communication. LMS has been responsible for interchanging user profile and user registration information with other systems, locating the course from LCMS and getting learner action from LCMS. The Web service technology will help to integrate successfully between LMS and LCMS to implement interoperability between the LMS and LCMS and also between different learning systems. The Web Services architecture can facilitate interoperability and extensibility among these various applications, different technology platforms that currently exist within institutions (Lui et al., 2003). Therefore, the selection of E-learning technology can be made more easily by the developer and consumer in planning the E-learning technology. Nowadays both the J2EE and .Net platform support the implementation of Web Services. Recently, Window Service Foundation released by Microsoft in 2010 offers many benefits for .Net technology developers and users when developing enterprise e-learning system.

The component in the functional model is divided into several components distributed into different layers. The components with similar functions in the same layers are grouped into one to create service to the upper layer. It is the layered integration that is responsible for the programme of the E-learning architecture model. It is understandable that an E-learning system is built in several layers of digital technology which can interfere with end-user assessment. Whatever technology is developed, the most important characteristics of the E-learning system are to provide usability, utility and accessibility for end-users which can be evaluated through an assessment of the functions that are presented in that system. From the user viewpoint, the following functions are typically available in an E-learning system: Course and Module outlines; assessment and assignments; Email and contact tools; student homepages; content contribution tools; synchronous collaborative tools; and metadata repositories (Power et al., 2010). These functions and tools, which currently exist on an E-learning system, are most closely related to internet technology and the web 2.0 application. According to Power et al, accessibility of the current E-learning platform such as Moodle and WebCT, the market leaders in this segment, is not well understood and standardized, due to the static web technology which has dominated from the inception of E-learning. Although the development of internet technology and communications, such as Web 2.0, has increased

the ability to interact and has improved accessibility, the E-learning system has been left behind. Unfortunately, the lack of research and papers make it difficult to offer “cases for improved awareness, training and procedures in accessibility” at educational institutions (Power et al., 2010).

From the social perspective, researchers tend to express research e-learning technological issues in different ways. While technological and technical researchers try to address issues associated with interoperability and accessibility of E-learning technology, social researchers in the field are interested more in how E-learning might support the pedagogical and organizational implementation and process rather than pure computing and digital technology. Khan (2005) summaries that planning for implementation of E-learning should be concentrated on the following issues: technological and technical capacities; digital literacy; E-learning standards and specifications; and institutional policies of technological infrastructure. Like the physical infrastructure of organizations, the digital infrastructure and assets which support implementation of E-learning has been strategically designed, planned, built and maintained and staffed. Rosenberg (2001) points out that an E-learning system is built on the base of the technological infrastructure of an institution. Therefore, successful implementation of E-learning must be matched and aligned with current status and the planned technological capacity of an institution. Due to the new skills and knowledge required for a digital learning environment, all stakeholders should be digitally literate to support active participation. In addition, a technology policy and guidelines about hardware, software and network should be developed to support the accessibility of the digital resources of the institution. Finally, the institution should pay attention to E-learning standards and specifications during the process of evaluation and choice of E-learning technology, as they will impact significantly on learning objectives, which are the most important feature of E-learning technology. Different technological learning objectives will influence the cost of a learning program, reusable information objects, course content and sharable resources of learning and teaching (Khan, 2005).

It is clear that language used and interests among researchers, managers, and educators are expressed technically in different ways in E-learning technology. How many managers, educators, social researchers and supported staff understand the E-learning technical and technological terminologies? Why should we learn these terms? Is it necessary to learn those terms? Obviously, it is best if we have been trained in practices in this field but this is not always the case. Implementation of an E-learning project requires the endeavour and

coordination of many experts in different disciplines. The implementation of E-learning requires teamwork. No one has enough convergence of abilities and capacities, power of management and pedagogical vision in technology to go straightforwardly on to an E-learning project. It seems teamwork makes e-learning work in practice. However, coordination and project management seem to lack literature to guide practitioners. E-learning technology is acknowledged in the field of technology and in the way that technology is semantic between learning and teaching with the development of ICT. Researchers from both perspectives, social and technical, have paid more attention to technological development to support the design and operation of e-learning system. The needs for building and maintaining current educational technology solutions from institutions using appropriate technology and integrating advanced technology with the current technological capacity of organization seem to be the semantic direction of technological research in the field.

2.5.5 Learning theory and E-learning pedagogy

Learning theory is a conceptual framework describing "what it means to learn, and how learning can be seen by others to have taken place." (Haythornthwaite and Andrews, 2011:28). Learning is internally a psychological process of change and transformation which covers several aspects of the world in which we are living, including social, technical, political, and environmental aspects. The result of learning can bring us to a new state of knowledge and understanding which can make sense of the world around us (Haythornthwaite and Andrews, 2011). Reviews of literature revealed that conventional learning theories can generally be categorized into four paradigms, including behaviourism, cognitivism, constructivism, and humanism.[1] However, this classification does not cover significantly theoretical perspectives and diversified development of learning theories and models which are applied in educational practices. From an educational psychology perspective, the philosophies of behaviourism, cognitivism and constructivism have been generally accepted by scholars in educational research; however other researchers have developed an interest in other significant theories having a critical role in education practices and research, such as activity-based theory, socially situated learning and systems theory.

2.5.5.1 Behaviourists

The behaviourists assume that learners are passive and respond to external environmental stimuli. Therefore learning is a change in behaviour caused conditionally by external stimuli

[1] http://www.learning-theories.com/paradigms, accessed on July, 05, 2014

without the need to consider what is happening internally in the learner's mental state or consciousness. In light of this point, changes in leaners can be observed and measured as learning indicators (Ally, 2008: 19). In other words, behaviourists emphasise the important role of input and output components to the black box - the internal mentality of the learner in instructional design and teaching scenarios. Responses to behaviours of learners caused by stimuli from the external environment are evaluated and used to generate some form of feedback in education (Cooper, 1993). In addition, researchers (Coopers, 1993; McLeod, 2006) have summarised that the behaviour theory of learning was developed on three assumptions, namely objectivism, environmentalism and reinforcement. Objectivism means that human behaviour might be analysed by observing external events which are significant factors belonging to environmentalism in determining human behaviour. As a result, human actions will be reinforced by subsequent behaviour. However, learning researchers argued that focusing on internal changes of learners which might not be observed and reinforced could not illustrate all aspects of learning, therefore cognitive theories of learning have broadly replaced behavioural theories in educational practices and research.

2.5.5.2 Cognitivism

Instead of emphasising behaviour which was stimulated by environmental factors, learning research is considered to "the mental processes and knowledge structures that can be inferred from behavioural indices and that are responsible for various types' human behavior" (Shuell, 1986). To them, learners will use memory, motivation, and thinking in the learning process. Because a person's way of thinking, perceiving, remembering and problem-solving (Liu & Ginther, 1999) will be different to anothers, learning results will depend on processing capacity and level, effort and existing knowledge structures (Ally, 2008). In other words, cognitivism has argued that different learning by different people requires a perseonalised teaching method which is appropriate to realise potential learning performance, otherwise it will be limited to the leaner's capacity, or even destroyed. Shuell (1986) summarised that scholar postulating this theoretical approach have contributed significantly to educational practices by confirming that learning is an active and goal-targeted, high-level process, which acknowledges the important role of prior knowledge, what is to be learned, and the cognitive process of analysis.

2.5.5.3 Constructivism

In the last decades, educational practices and research today has been significantly led by the theory of constructivism. According to Cooper (1993), constructivism views that knowledge and learning are based on the learner's reality and are built up from the foundation of other

knowledge throughout observing, processing, interpreting and personalizing their application and meaning (Cooper, 1993; Lucas, 2002; Ally, 2008). Lucas (2002) has pointed out that constructivism is mainly divided into social and cognitive constructivism. According to Lucas (2002), social constructivism emphasises the role of the teacher in supporting a learner discovering reality in order to develop their mental abilities, while cognitive constructivism considers that learning has several stages in which a stage will be built based on the previous one, including assimilation, accommodation and equilibrium. However, Boghossian (2006) has suggested that constructivism can be categorized into four types, namely cognitive, critical, radical, and social. He stated that all types of constructivism have the same core – learners constructing their own knowledge. From a constructivist perspective, Ally (2008) implied that teaching and learning require a sophisticated manipulation of principles to achieve education goals, as follows:

- Active Learning requires the learner to actively engage in a learning process to build knowledge and meanings for themselves:
- Metacognition refers to a methodological strategy and level of thinking to acquire knowledge and meanings during the learning process. Learners should plan the way to approach learning tasks, monitor their learning and evaluate the progress towards the leaning objectives.
- Contextual learning means that construction of knowledge and meanings is placed in its context, the learner's world. Knowledge and meanings will interrelate with other things what learners believe and know.
- Collaborative learning states that the knowledge and meaning constructed learning process will be closely connected with social aspects, viewing learning as conversation and interaction between human beings.
- Learner-centered education focuses on the learner’s interests and needs rather than stakeholders involved in the learning process. Learning motivation is the key component while the role of the teacher provides support to connect existing knowledge with learning goals.
- Authentic Assessment means that achievement of learner's knowledge and experiences should be evaluated during the process of learning and in its context based on learning theory.

2.5.5.4 Instructivism

It is noticable that, alongside the three conventional theories of learning, intructivism is also interested in researching and practices. According to Lucas (2002), the two principles of

instructivism are the role of teachers as learning agents and changes in learner's behaviors to what all stakeholders involved in learning agree to be better. As a learning theory, instuctivism proposes that learning should be led directly by the teacher who is responsible for curriculum design and implementation (Lucas, 2002). With regards to this theory, the instructor has a primary role in delivering knowledge and skills, while students are expected to achieve a pre-agreed result. In contract to constructivism, the instuctivism school of thought does not respect individual learning styles and learner's learning needs and interests. Learners will achieve all the best knowledge, skills and behavior changes as agreed by other participants in the learning process, rather than themselves.

2.5.5.5 Development of learning theory in the digital era

The development of ICT has opened new doors for our world, since there are many ICT applications that can be applied to achieve the potential power of technology in all sectors. However, it is likely that the advanced technology which is applied in education practices moves faster than theoretical aspects. As in learning theory, applied ICT in education is borrowed from conventional theories of learning rather than generating its own paradigm. Education research and practices have used the principles of behaviourism, cognitivism and constructivism to apply to online learning. Reviews of the literature reveal that constructivism seems to have been dominant in informing and guiding use technology since the 90s. However, Haythornthwaite and Andrews (2011) argued that learning online is different from conventional learning because learning is connected with technology, thus E-learning requires a new theory of learning. Siemens (2004) pointed out that conventional learning theories are limited to learning which occurs inside a learner. They have failed in the connected world to address “how learning happens within organizations." Because the worth of information and knowledge are instant in a connected world, skills to synthesise and recognize a "learning" connection are necessarily important. Therefore, new learning theories and models of E-learning have been proposed in literature, such as the theory of connectivism (Siemens, 2004), the reciprocal co-evolutionary mode (Haythornthwaite and Andrews, 2011), and the semantic web model (Anderson (2008).

Responding to challenges in practice and researching debates in online learning environments, the theory of connectivism has emerged from research which focuses on networks and collaboration in learning. The connectivism suggests that learning is a process in which information and knowledge come from nodes of diverse sources. In the information technology era, recognizing, nurturing, and maintaining connections are score skills for acquiring knowledge (Siemens, 2004). The reciprocal co-evolutionary model of literacy

development and learning (Haythornthwaite and Andrews, 2011) was proposed on the relationship between learning and information and communication technology. This model views learning as dynamic and visible presentations at any time which are "affected by the social and technological nexus" (Haythornthwaite and Andrews, 2011). Despite these new theories and models emerging, the conventional theories of learning have retained their value in providing insight into learning skills and tasks needed for learners to flourish in the digital era, while emerging theories could significantly support and level up what we know about how to achieve the best performance in education in the era of information technology. With regards to the "learning" component in the "E-learning" situation, online learning can reuse principles and procedures from the three conventional learning theories, Behaviourism, the Cognitivism, and Constructivism. The theoretical aspects of well-known learning theories could be applied to E-learning implementation, as summarised in Table 2-4.

Table 2-4: Learning theory Implication for E-learning.

Behaviourism	Cognitivism	Constructivism
• **Instructional steps:** Broking down material into small being presented in a deductive way, giving positive examples to reinforce understanding, and negative examples to establish conceptual boundaries; • **Sequences of instructions** using conditional or unconditional branching to other instructional units and pre-determining choices within the course with sequenced activities carried out; routing or repeating certain sections based on the performance on diagnostic tests. • **Behaviouristic learning** for copying the desired behaviour, a demonstration of required operation, procedure or skill, with appropriate explanation for leaner. Review and revision with test's feedback are needed; motivation through reinforcement messages.	• **Enhance the learning process:** facilitating all sensors, focussing the learner's attention, highlighting important and critical information, reasoning each instruction, and matching the cognitive level of the learner. • **Tie up to new information with existing information:** using advanced organisers to activate exiting cognitive structures or to incorporate the details of the lesson, providing conceptual models to enable the learner to retrieve existing mental models, using pre-instructional questions to set expectations and to activate the learner's existing knowledge structure, and using prerequisite test questions to activate the prerequisite knowledge structure required for new materials; • **Prevent cognitive overload** by chunking learning content. Applying, analysing and evaluating should be used to promote **deep processing of information** • **Different learning and cognitive styles** by combing learning content and activities with adequate and the right type of support. • **Dual-coding theory:** presentation of information should be personalised for	• **Active learning process** by doing high-level activities, such applying information in practical situations, facilitating personal interpretation of learning content, discussing topics within a group; • **Good interactive online instructions** provided by instructor to enforce learners constructing their own knowledge and taking the initiative to learn and interact with other students and the instructor with their own control • **Collaborative and cooperative learning** Facilitating constructivist learning by working with other learners to earn real-life experience, to use and improve their meta-cognitive skills, to benefit from other's strengths; • **Control of the learning process** by learner such as setting their own learning goal, time plan and opportunities to reflect learning contents. • **Example and case study** used to make meaningful and illustrative to apply and personalise the learning content;

	different type of processing and memorizing. Students need to be motivated to learn by intrinsic and extrinsic drivers. • **meta-cognitive skills:** reflecting on what they learn, collaborating with other learners or checking their progress; • **Tie up to own experiences:** connect learning content with different real-life situations to memorise things better and develop personal meaning and contextualisation of the information.	• **Interactive learning activities** used to promote higher-level learning and social presence and to help develop personal meaning to overcome problems of psychomotor, affective and higher-level objectives on virtual learning environment.

Adapted from Mödritscher, 2006

2.5.5.6 Pedagogical practices on E-learning implementation

When implementing E-learning, Khan (2005:207) pointed out that educational institution should take into account pedagogical dimensions of E-learning to address issues relating to delivered content, learner needs, learning objectives, design and strategy. Not only is a delivered method chosen but also learning performance on the system should be a focus. The American Institute for Higher Education Policy proposed seven dimensions of quality of internet-based learning which can be used to evaluate, assess and improve online learning performance for higher education, as follows: Institutional support; Course development; Teaching/learning process; Course structure; Student support; Faculty support; and Evaluation and assessment (Phipps and Merisotis, 2000). From these attributes, Govindasamy (2002) proposed the frame to implement a successful E-learning system which is rooted in strong pedagogical foundations of the following five parameters: developing content; storing and managing content; packaging content; student support; and assessment. His work also proposed that a prerequisite for successful e-Learning implementation was that vendors of E-learning solutions, educational managers and administrative supports change from "merely managing the logistics of electronically delivering e-Learning content to managing e-Learning content" (Govindasamy, 2002).

When implementing E-learning, institutions of higher education not only have to change their organization, processes and systems to support technology-based learning and teaching, but also face challenges of approaching a more appropriate online pedagogy which matches the demands for knowledge of its learners in new ICT environments. Therefore, while educational institutions have to prepare the process of change and readiness for the implementation of E-learning, it is important to examine pedagogic approaches in which learners and teachers cooperate and interact about their beliefs, values, perspectives and

results in relation to the process of learning and teaching, in order to create knowledge and acquire literacy. However, the current pedagogical approaches to E-learning do not fit with the technology-based learning and teaching environment (Morrison, 2007). Many pedagogies and approaches have been developed and proposed in the E-learning literature. In their work of review of learning theories and models, Conole et al (2004) summarized that there are at least seven pedagogical theories which are the most relevant and applicable to E-learning, including behaviorism, cognitive approaches, constructivism, Activity-base theory, socially situated learning, experiential learning and system theory (Table 2-5).

These theories might be categorized into constructivism, communities of practice, and collaboration. Meanwhile, Felix (2005) pointed out that learning theories proposed in the literature are very diversified and interrelated. In the era of revolution of ICT in education, it is likely that the contemporary features of education such as flexibility, inclusivity, collaboration, authenticity, relevance, and globalisation have effective led to the domination of a constructivist approach which can be divided into social and cognitive constructivist (Felix, 2005). He also suggested that educational institutions should combine social and cognitive constructivist approaches to maximum potential advantages of each pedagogical school of thought via technology.

When adopting E-learning, educational institutions will install and deploy a package of software, called a Learning Management System, in their technological platform and network, during the phase of implementation. The choice of LMS to implement seems to impact largely on pedagogy on the virtual learning environment. Therefore, it is taken for granted that the effective and qualitative method of teaching and learning heavily depends on how the LMS is designed and integrated into the system associated with principles of pedagogy. The most open source LMS systems used currently are Moodle, Sakai, Atutor and Ilias (Aberdour, 2007). Meanwhile, the LMS systems, such as WebCT and Blackboard, account for the whole commercial market in E-learning (Lane, 2007). Vrasidas (2004) criticizes that teaching methods on E-learning systems is often very ineffective because teachers use LMS to upload content without applying appropriately any reasonable pedagogical principles. In addition, the commercial LMS does not support the use of constructivist learning strategies as most LMS replicate sterile traditional face-to-teaching and learning (Vrasidas, 2004).

Table 2-5: Theories and models for supporting online learning

Theories	Pedagogical Features	Potential E-learning Application
Behaviourism	• Control and adaptive response, observable outcomes • Learning through association and reinforcement, trial and error	• E-learning development represents little more than transfer of didactic approaches online, the 'web page turning mentality' linked to assessment and feedback
Cognitive	• Processing and transmission of information through communication, explanation, recombination, contrast, inference and problem solving • Useful for designing conceptual material	• Shared knowledge structure between individual and surrounding information rich environment of resources and contacts • Development of intelligent and learning systems, and the notion of personalized agents
Constructivist	• Pedagogical focus is task-orientated • Favour hands-on, self-directed activities orientated towards design and discovery • Useful for structured learning environments	• Toolkits and other support systems which guide and inform users through a process of activities • Access to resources and expertise to develop more engaging and student-centred, active and authentic learning environments
Activity-based	• Bridging the gap between the historical state of an activity and the stage of a person. • The Zone of Proximal Development gives limited insight into an individual's potential for development.	• Emphasizes communication, collaboration, understanding the factors, and realizing needs for structuring and fostering learning environments. • Networking capabilities enable more diverse access to different forms of expertise.
Socially situated learning	• Emphasis on social interactions & learning as social participation • Emphasis on interpersonal relationships involving imitation and modelling • Language as a tool for learning	• (A)Synchronous communication offers the potential for more diverse and richer forms of dialogue and interaction and archiving materials and resources. • Different online communication tools and learning environments create new forms of communities to support and enhance.
Experiential	• Experience as foundation for learning • Learning as the transformation of experience into knowledge, skill, attitudes, values emotions • Reflection as a means of transforming experience	• Asynchronous communication offers new forms of discourse which are not time-bound and opportunities for reflection • Archive and multiple forms of representation of different communications and experiences.
System theory	• Focus on organizational learning, or on modelling the development of learners in response to feedback	• New forms of distribution and storage, archiving and retrieval for shared knowledge. • Models of learning account for adaptation in response to both discursive and active feedback

Adapted and Adjusted from Conole et al. 2004

On the one hand, the default structure, by pre-configuring the organization of LMSs from software vendors, makes it easy for instructors to go online to teach instead of working out their own pedagogical style. In the default E-learning environment, the structure of course content, with functional buttons such as discussion, syllabus, and quiz, are provided, in order to easily build courses and teach. On the other hand, a built-in pedagogical LMS is different

from constructivism pedagogy. It is likely to limit creativity and flexibility, which are the most important factors for freedom and creativity at the academic foundation (Lane, 2007). Presently, the LMSs have dominated the commercial market and open source, Blackboard and Moodle claim that they are more open and flexible. The Moodle platform states that the system has been built by guidance from constructivist theory which "delivers a powerful set of learner-centric tools and collaborative learning environment". It has been claimed that Blackboard system pedagogical models applied specifically for E-Learning, such as the Mayes' Conceptualisation Cycle, Laurillard's Conversational Mode and Salmon's E-tivities, are the most significant foundations for eLearning and online learning and teaching activities (University of Manchester, 2013). If so, we might conclude that the educational institutions which have implemented and used Moodle and Blackboard software for their E-learning systems are applying constructivism theory or pedagogic models mentioned. However, these institutions cannot simply be inferred in this way. Actually, there is a need for research papers to address how well the built-in pedagogy and practical pedagogy applied are correlated. Govindasamy (2001) points out that most LMS vendors who offer the "complete" or "total" E-learning solution fail to address how e-learning pedagogy can convert onto their pure technological system. His study also concludes that LMS lacks pedagogical integration because of a lack of "incorporation and consideration of domain specific knowledge" (Govindasamy, 2001).

For the countries which are dominated by Confucianism, such as Vietnam, China and Japan, teaching and learning are built around the role of the centralized teacher. There are no questions or comments, and no feedback during and after lectures in any way. Students passively listen and write what is taught by the teacher. Traditional Confucianism positions the teacher at the top of the hierarchy and requires the acceptance of what is taught without question. Problem solving, critical thinking, innovation and creation are not encouraged in learning. It is considered to be impolite if students raise any questions in classroom. Active participation, communication and collaboration of the students are not supported by this method. Clearly, teaching and learning methods in these countries are more closely connected with the theory of instructivism. According to Moodle sources, the stated philosophy of Moodle includes a constructivist and social constructionist approach to education, emphasizing that learners can contribute to the educational experience. Implementing E-learning based on a Moodle platform is the same as introducing the new pedagogic environment with the new teaching and learning approaches. A pedagogic method of constructivism is different from the instructivist method so how traditional teaching and

learning is implemented in e-leaning environments should be addressed. However, teachers and academic managers have not realized the need for changes and recognized the need to support them in order to adapt to a new academic environment. In addition, online teaching is very different from putting power-point slides or text files on this system. Therefore, without adjustment or modification to adapting a new educational pedagogy which is built on the new modern learning theory of constructivism, such as Moodle or Blackboard, Confucianism-dominated counties will not apply ICT successfully to improve the quality of education. Govindasamy (2001) pointed out that "one of the most crucial prerequisites for successful implementation of E-learning is the need for careful consideration of the underlying pedagogy, or how learning takes place online". Therefore, with new teaching approaches introduced by Moodle platform– constructivism, the teaching and learning approach has to adapt. Simply speaking, if implementation of E-learning is to install E-learning software which is available on the market, such Blackboard and Moodle, it is clear that we will apply the constructivism pedagogy in teaching and learning at those sites. However, how many educational institutions in the developing countries recognize that they are using a pedagogical foundation contradicting current methods and cultural attributes? This issue seems to be neglected in the literature.

E-learning pedagogy has been identified as the major issues arising in the process of education technology adoption and adaptation in higher education. Due to limited resources, using open source software to deploy E-learning system is the best choice for developing countries. It also implies that pedagogy has to change from instructivism to constructivism to adopt E-learning platform because of the adoption of software developed in western counties. It should be seen as an opportunity rather than an obstacle to improve the quality of higher education.

2.5.6 Co-value creation of E-learning implementation

Reviews of literature revealed that the learning theories are progressing from behaviourism to cognitivism to constructivism to connectivism (Siemens, 2004). This progression of learning theory responds to a understanding that knowledge is chaotic, complex and residing in contextualised network which is co-created by individual learners through interaction with each other (Mentis, 2008). This perspective is relevant to the concept of "value co-creations"; originally discussed in marketing and service and then strongly adopted in service science and service-dominant (S-D) logic (Vargo and Lusch, 2004, 2006). From the service science perspective, education definitely is a service and an educational institution is a service system.

The following section illustrates how service science and value co-creation are implication in E-learning implementation.

The concept of service varies depending on the perspective and contextual setting. Service traditionally refers to "an act of beneficial activity" (Qiu, 2014). A service consists of five core components, including resource, provider, consumer, benefit, and time. A resource to create a service might be physical and soft or hybrid which is performed by service provider for consumer who will gain benefit as consuming at a specific time. Therefore a service as created and used, provider and consumer will need to interact together regardless of space, time and place. However, instead of focusing on "form of what goods are service ", Vargo and Lusch (2004) who have developed a foundation of S-D logic in marketing suggested an alternative perspective of service- service-for-service exchange as "the application of competences (knowledge and skills) by one entity for the benefit of another". This concept of service led to a fresh mindset to how a service is created and consumed. The S-D logic implies that value is created collaboratively in interactive configurations of mutual exchange in service systems in which resources; including people, information, and technology are configured to connect to other systems by value propositions (Vargo et al., 2008). Therefore, from a S-D logic perspective, value is co-created with the consumer, rather than being embedded in output offered by provider (Qiu, 2014). The fresh perspective on the concept of service offers an emerging research stream, the service science which is defined as the study of service systems and of the co-creation of value within complex configurations of resources. From the S-D logic point of view, value is formed through interaction in a two way communication between the customer and provider; in which they are interweaved in the process of acquisition, usage and disposal (Qiu, 2014, Ismail et al., 2010). As the adaptation of concept of value co-creation and service science, an educational institution is a service system in which the institution is education service provider and the learner is an education service consumer. In this system, an education service is a knowledge transformation process, delivering the values that are beneficial for both service providers and learners and centered on people rather than on the service products themselves (Qiu, 2014). According to Qui (2014) an education system is a socio-technical service system which includes "a number of interrelated and interacting domain systems empowered by a variety of resources, which are coordinated in a collaborative manner to help realize their common goal". For instance, given E-learning system teachers will provide "the application of competences" and student will use that service system. In addition, administrators and support staff across functional departments manage and assist teacher and student to impart and acquire knowledge. By

applying the principles of service science, Uden (2011) pointed out that successful E-learning implementation to enhance learning, teaching and assessment and remain in effective can apply the principles of service science because it can address "to what extent organizations that provide services can be restructured, how to manage service innovation and optimise a high value creation". A comprehensive approach of the principles of service science and system proposed by Qiu (2014) is incorporated with the sequenced stage process of E-learning implementation illustrated in Table 2-6.

Table 2-6: Service science-led E-learning implementation.

Pre-implementation	Implementation	Post-implementation
• *Defining Service Value Propositions*. The values of services to the provider and customers must be simultaneously defined; service utilities and warranties shall be clearly identified in a deliverable manner. • *Planning Supportive Service Resources*. Resources and capabilities in support of service shall be identified and planned. • *Determining Value-Added Service Structures and Corresponding Operational Trajectories*. T he service systems shall be analyzed and determined through designing service structures or delivery networks with requirement of desirable, viable, and competitive service value chains. • *Creating a Contingency Plan*. A plan of resource and operation should prepare to deal with issues across the service value chains.	• *Defining and Validating Service Specification:* service specifications, service-level agreements and service contracts with partners should be defined, validated. And finalised. • *Developing and Preparing the Resources:* All needed social and human capitals should be developed and prepared with the specified technical and functional attributes in the service specifications to meet the needs of customers in their socio-psychological dimensions in consuming services. • *Defining Measurements and Metrics and Developing Corresponding Means for Collecting the Necessary Performance Data*. Appropriate measurements and metrics should be clearly defined to evaluate performance of service provision.	• *Educating the Customers*. The provider should educate the customers by leveraging all the means available in today's information era to reach at a potential benefits offered. • *Delivering the Service*. Insuring the interaction between the provider and the customers co-create the service values. • *Managing and Facilitating the Service Consumption Process*. The service provider should make sure that all involved service encounters are well managed and facilitated in term of technique, society, and psychology. • *Monitoring the Service and Detecting Ongoing and Potential Service Problems*. The process of co-creating the service should be fully monitored to eliminate and recover any issue with the delivery and operations.

Source: Adapted from Qiu, (2014).

From the service science perspective, in pre-implementation stage planning for courses offered on the system should be signalized from student needs and are discussed with administrators, instructors, and student along with authority agency. Therefore, curricula will be revised and enriched continuously by stakeholders. As a result, content and learning materials will be enriched with carefully adopted teaching pedagogies. At the implementation

stage, as orientation of the principles of service science, application of competences – the knowledge and skills acquired by students on the system should be co-created by the instructor and student by interacting effectively between student and instructors. Assuring and making these things happening impact substantially to a learning outcome involves in transformation the process of learning. The post-implementation stage will focus on optimization and improvement of E-learning system which is based on the feedback and learning performance to make necessary changes in organizational structures, resource allocation, service collaboration and operations for improved learning outcomes and stakeholders' satisfaction (Schumann et al., 2013; Qiu, 2014).

2.6 Conclusion

Because of the inconsistency of implementation in terminology used in the research we reviewed, we have tried to summarize and synthesize the literature in two phases. We found no comprehensive theory or model that informed studies of implementation of E-learning. We also found few conclusive guidelines about how to build an E-learning system and what factors influence it in different stages of implementing the process from the previous studies reviewed. Though several of the reviewed studies pointed to the need for a more sophisticated approach than merely installing software on the E-learning system and moving traditional courses to that platform, they simply recommend use of new technologies, new environments and sound pedagogy as models or frameworks of IT/IS implementation. Very few areas of inquiry about the implementation of E-learning were supported by previous studies. There are, however, some conclusions we could draw from the literature.

From the process perspective, implementation of E-learning is viewed as the process of IT/IS implementation which will spend several stages in its lifecycle and can be placed in the context of technological innovation and diffusion. From the factor perspective, implementation of E-learning is influenced by several factors which stem from organization, technology and pedagogy. Many researchers who have attempted to investigate the research of E-learning from the process perspective also emphasise how factors such as context, technology and pedagogy relate to their results. Meanwhile, researchers from a factor perspective identify and measure the factors which impact on the results still weight their results during the process of change and innovation. The main issue is that almost no research in IS/IT implementation mixes factor and process perspectives to different degrees. Moreover, the strategic inquiry of research among influenced factors of implementation during the

process actually reflexes the interaction of factors with the temporal dimension. Therefore, it is clear that there is an overlap among these three perspectives of IT/IS implementation.

When synthesizing a review of IT/IS implementation, we have integrated views of implementation of E-learning (Figure 2-7). From this integrated view, implementation of E-learning envisioned as a special IT/IS section will be process, which covers six stages under the impact of factors when planning, organizing, leading and monitoring the changes from traditional to online learning and the learning environment.

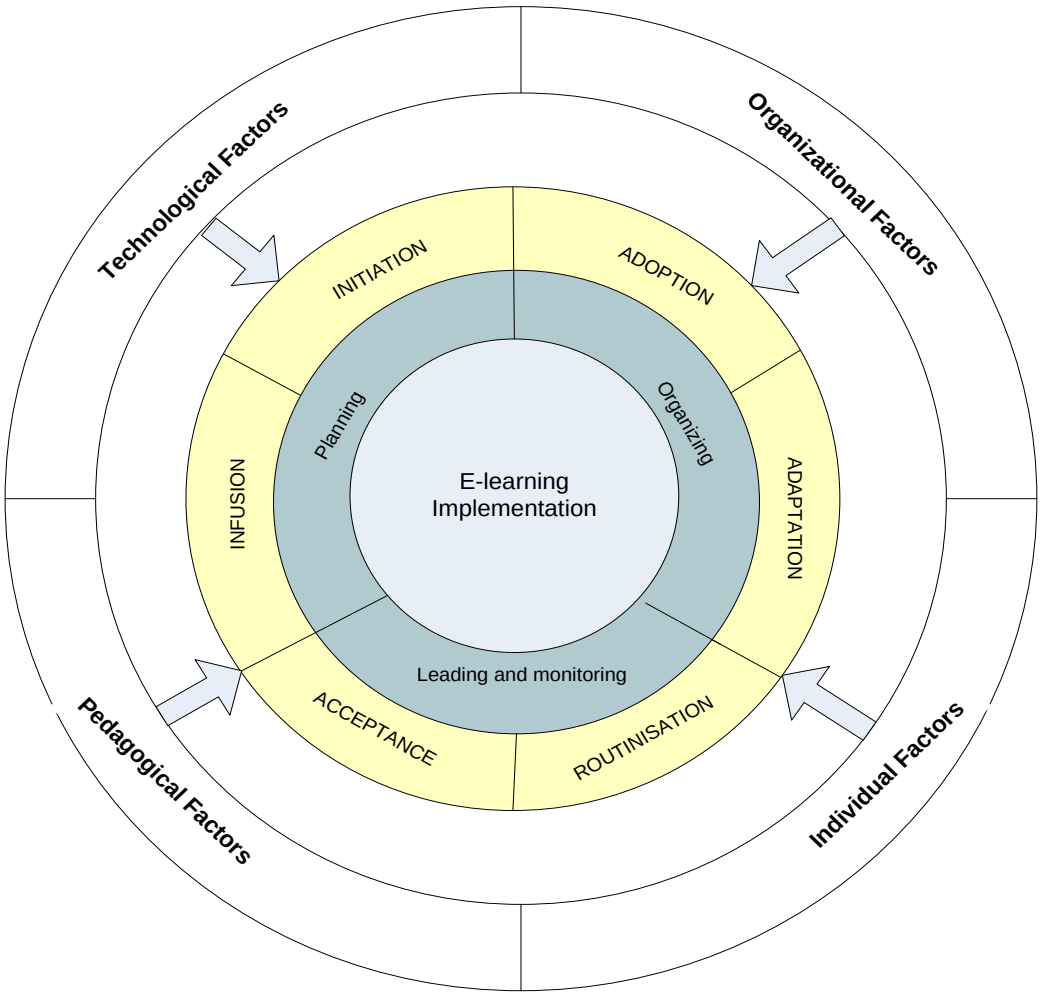

Figure 2-7: Integrated view of IT/IS implementation

Clearly, more well-designed research is needed on the implementation of E-learning. Specifically, we need a more systematic research approach focused on the aspects defined in our integrated view. On one hand, we decompose the research purpose of E-learning into the process of IT/IS implementation; on the other, we allocate various research of E-learning into each factor categories, then the holistic picture of E-learning literature will emerge (Figure 2-8).

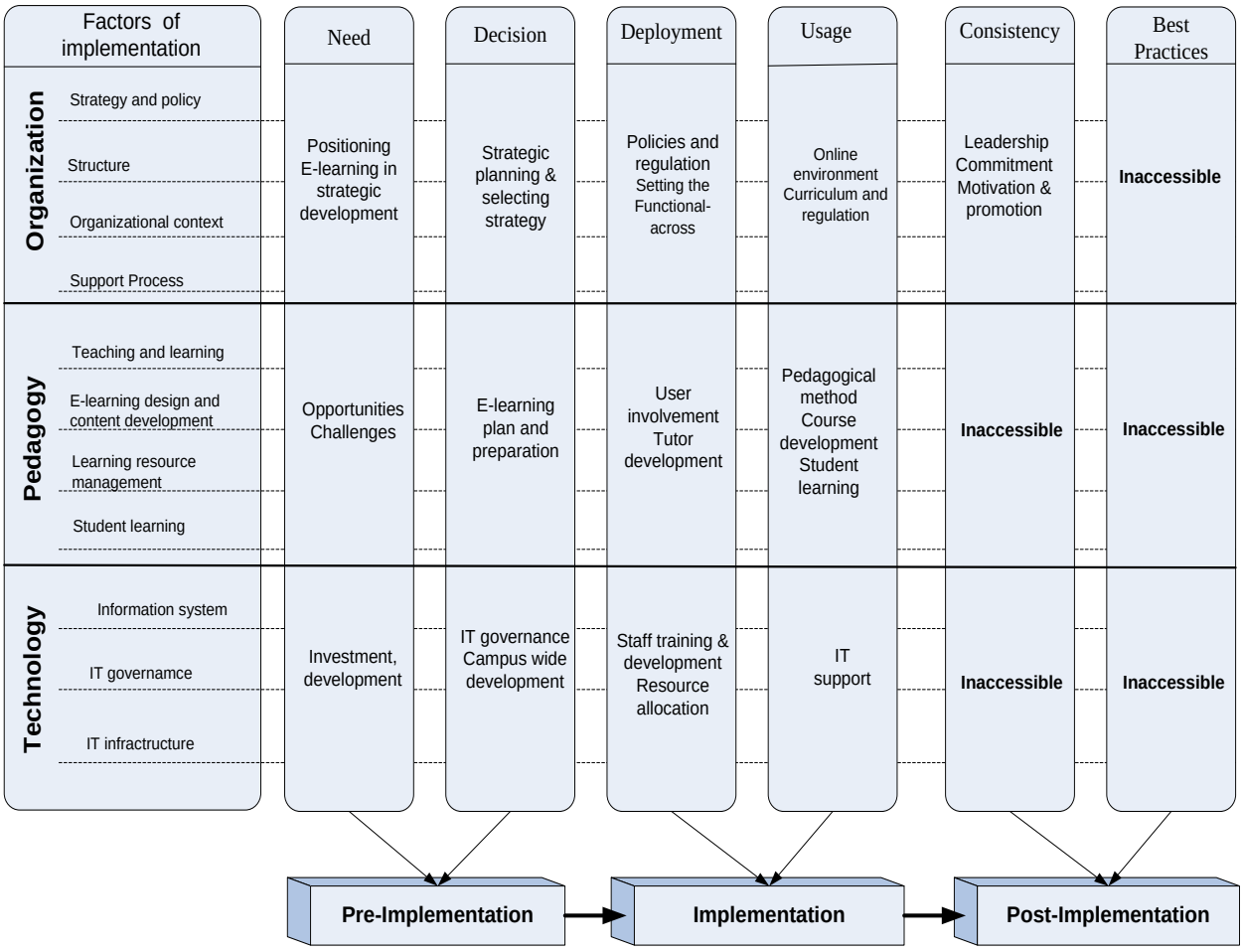

Figure 2-8: Literature map of E-learning implementation

This literature review provides the direction for future research as well as some suggested approaches for further study. We also recognize that research should develop appropriate approaches to data collection in order to reflex the holistic view of implementation. This review assists researchers in studying E-learning implementation in terms of how E-learning has been framed and how E-learning in practice compares to what is found in the literature. The model for data collection and site approach extracted from the literature reviewed as guidelines is indicated in figure 2-9 below:

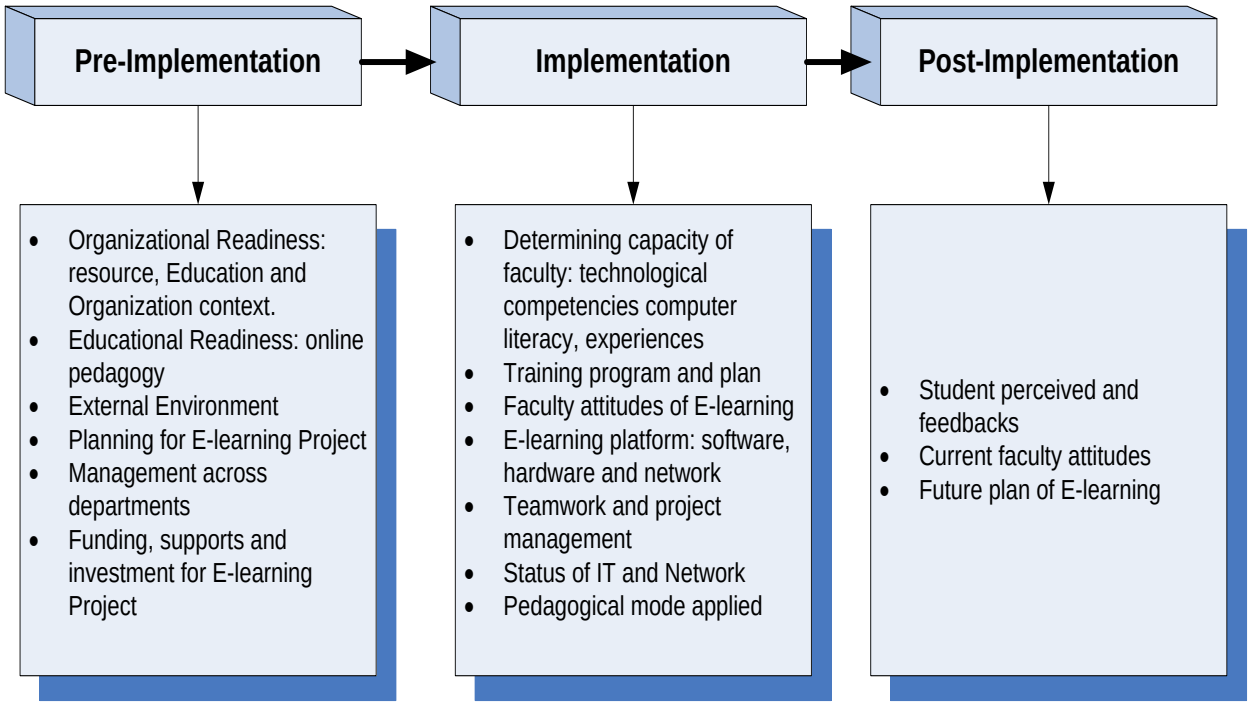

Figure 2-9: Process of E-learning implementation Approach

Chapter 3 – Methodologies

3.1 . Introduction

This chapter describes research methodology and design. The chapter commences with a brief introduction to qualitative and quantitative research. It follows with a discussion of the underlying philosophical assumptions of this study by considering the ontological, epistemological, and methodological foundation. The next part focuses on the research strategy, followed by research methods, which presents an overview of various definitions and different types of of case study research. It also presents inherent research characteristics which provide a rationale for adopting case study research as the most appropriate approach to reach the research aim and objectives of this study. The next part describes research design for this study, with a full description of practice procedure for selecting cases and collecting data. The next part is concerned with data analysis and the case analysis method. The final part of this chapter provides a summary of chapter.

3.2 Qualitative research

3.2.1 What is qualitative research?

While doing research two common methods which a researcher will identify for his/her approach includes traditionally qualitative and quantitative methods. The qualitative research refers to approach that involves using situational inquiry to make sense of, or interpret the meanings of studied phenomena which people bring to them in the natural settings (Denzin and Lincoln, 2005). Denzin and Lincoln (2005) point out that qualitative research emphasises the quality of entities and process and meanings, to seek "a wide range of interconnected interpretative practices to get better understanding of the subject matter". In contrast, quantitative research refers to collecting empirical data in which the variables are experimentally measured and analysed, with the causal relationship of variables displayed in numeric rather than narrative form (Denzin and Lincoln, 2005). The concept of research methods indicates that each research approach has its own characteristics, techniques and operations which are appropriate to a certain type of inquiry. Therefore, employing either qualitative or quantitative methods, even combining qualitative and quantitative, called the mix method, depends on features of the research. They include the aim and purpose of the research; the research questions; the research context; data type and evidence; the data collection method; research results; and researcher role and position. In qualitative research,

for instance qualitative data is collected by interviews; "meanings" are sought from evidence and observation; studied phenomena are examined in their contextual settings; and the researcher is close to the research context, interacting with the data, people and context to build and interpret the entities and constructs. In quantitative research, the researcher conducts the research in a "laboratory environment" in which the researcher does not belong. According to Creswell (2003), the type of research question and the nature of inquiry are some of key aspects to help determine the appropriate research method for a research project.

3.2.2 Philosophical assumptions of qualitative research

When the appropriate research method employed is qualitative, researchers begin their journey of inquiry with several philosophical assumptions (Creswell, 2006). Guba and Lincoln (1994:107) pointed out that a paradigm, or worldview, is "a set of basic beliefs guided for action" of qualitative research which are inquired of by ontology, epistemology and methodology. In other words, qualitative researcher, when adopting the paradigm, is really implying what the nature of reality is; how they know about what they know; and what the process of inquiry is. According to Creswell (2006), there are five philosophical assumptions made when researchers commit to qualitative study, including ontology, epistemology, axiology, rhetoric and methodology. In this sense, a qualitative researcher will conduct the study in a process which will determine "a stance toward the nature of reality (ontology); how the researcher knows what she or he knows (epistemology); the role of values in the research (axiology); the language of research (rhetoric); and the methods used in the process (methodology)" (Creswell, 2006).

Ontology was the "philosophical science of being" with general aim to "provide reasoned, deductive accounts of the fundamental sorts of things that existed" (Noonan, 2008). According to Creswell (2006), ontology refers to the nature of reality and its characteristics. When qualitative research approach adopted, qualitative researcher will look for multiple realities in its natural settings and report them in different individual perspectives of its natural settings.

Stone (2008) defined that epistemology refers to "the theory or science of the method and ground of knowledge". The concept of epistemology relates to meanings of three questions, including "What is knowing? What is the known? What is knowledge?" Creswell (2006) pointed out that in conducting a qualitative research, researcher try to get as close as to the

"live world" where his/her participants are living with. In other word, Creswell (2006) emphasises on the important role associate with his/her studies.

According to Creswell (2006), methodology refers to "the procedures of qualitative research which are characterised as inductive, emerging and shaped by the researcher's experiences in collecting and analysing the data". In reviewing strategies of inquiry in qualitative research, Creswell (2006) indicated five strategies of inquiry that are the most commonly used in qualitative research, including narrative, phenomenology, grounded theory, ethnography and case study research. These five strategies have several common characteristics in the process of qualitative research from stating the research problem; defining research questions; data collection and methods; and the research report. Again, following Creswell (2006), when choosing a qualitative research strategy, the qualitative researcher should consider (a) a narrative type, if he or she wants to tell a story arranged in chronological order; (b) an ethnography, if she or he wants to show an individual story within the context of culture and a culture-sharing group; or (c) a case study, if she or he wants to illustrate an issue by compiling detailed descriptions of the setting for the case. However, depending on the natural settings and features of a research problem, a qualitative researcher will decide which research strategy should be chosen (Creswell, 2006).

3.2.3 Qualitative research paradigm

Hence, it is useful to review the major paradigms identified in the literature. Creswell (2003) outlined four major paradigms that structure qualitative research and how they operate in research practice, namely Post-positivism, social constructivism, advocacy/participatory and pragmatism, showed in Table 3-1 below. In the field of information system research, Orlikowski and Baroudi (1991) proposed a classification of paradigm which is adopted for qualitative research, including positivist, interpretive and critical. The review of Myers (1997) for the three-fold classification is summarized in Table 3-2 below.

Table 3-1: Four worldviews of qualitative research

Post-positivism	Social Constructivism	Advocacy/Participatory	Pragmatism
Determination	Understanding	Political	Consequences of actions
Reductionism	Multiple participant meanings	Empowerment and issue oriented	Problem centred
Empirical observation and measurement	Social and historical construction	Collaborative	Pluralistic
Theory verification	Theory generation	Change oriented	Real-world practice oriented

Source: Adapted from Creswell, (2003)

Table 3-2: Nature of qualitative research paradigm in information system

Assumption	Positivist Research	Interpretive Research	Critical Research
Reality (Ontology)	Objectively given	Social constructions	Historically constituted and produced and reproduced
Recognition (Epistemology)	Properties measured with independence of the researcher/ instruments	Language, consciousness and shared meanings	Various forms of social, cultural and political domination.
Inquiry (Methodology)	Testing theory to predict an understanding of phenomena	Understanding phenomena through the meanings assigned by people within context	A type of social critique used to shed light by focusing on the oppositions, conflicts and contradictions in society.

3.3 Research method

3.3.1 Principles of Case study method

As a research strategy, the case study has been the most frequently used research method in the fields of psychology, sociology, political science, business, economics, and education. According to Lincoln and Guba (1985), answering the question of what a case study is seems to have little agreement. Different research methodologies have different meanings. The review of the literature about case study research has revealed that the definition of a case study consists of a list of characteristics. At least eight features have been mentioned for a case study definition, including method; examination of comprehensive phenomena; type of evidence; method of collecting evidence; overlap between context and phenomenon; multiple sources of evidence for triangulation; and properties of a single phenomenon (Gerring, 2007). Therefore, understanding the characteristics of a case study could shed light on the nature of case study research. Yin (1994: 13) proposed that case study research is "an empirical inquiry that investigates a contemporary phenomenon within its real life context, especially when the boundaries between phenomenon and context are not clearly evident". Case study is an examination of a comprehensive phenomena in which research deals with a limited number of complex cases in a configured way, so that an individual case is considered to be a complex combination of properties, a specific "whole" (Ragin, 2008:6). Far more broadly, Woodside (2010: 1) proposed that a case study is "an inquiry that focuses on describing, understanding, predicting, and/or controlling the individual (i.e., process, animal, person, household, organization, group, industry, culture, or nationality."

Unlike other methodologists in this field who have emphasised the similarity or commonality within the boundary of case(s), Stake (1995) suggested that qualitative research should consider both unique and commonalities of case(s) within its bounded system, based on the

nature of the case(s). He also indicates that case study research is the process of learning a case by studying that case. Instead of placing emphasis on the representativeness of a case as a criterion for its selection, Stake underlines potentially learning by studying a case as a superior criterion to representativeness (Stake, 1998). By using the epistemological feature of "potential learning" from a case study, Stake argues that "...case study is not a methodological choice, but a choice of object to be studied … as a form of research, case study is defined by interest in individual cases, not by the methods of inquiry used" (Stake, 1998). In contrast, several other methodologists preferred the feature of commonality and similarity to select a case study to generalize, build or test theories. For example, Gerring (2007: 341) argued a case study "is best defined as an in-depth study of a single unit where the scholar's aim is to elucidate features of a larger class of similar phenomenon". Yin (2003) pointed out that a case study can be used for replication when designing a multiple-case study. Similarly, a case study can be used to build a theory through a process of grounded theory in case study research and can identify the case study as a qualified methodology by which a "valid" theory can be generated. From this point, she implied that a case study is a "research strategy which focuses on understanding the dynamics present within single settings" (Eisenhardt, 1989).

3.3.2 Types of case study

Case study research can be classified into various types, depending on purposes, design, approach and strategy of a study. For the purposes of this study, case study has been divided into intrinsic, instrumental and multiple-case study (Stake, 1995). For a research project, an intrinsic case study will be applied when studying a case to learn from it. Meanwhile an instrumental case study is used to learn about the others or something else other than the particular situation. A multiple case design refers to case study research in which several instrumental cases are chosen to investigate a phenomenon with respect to a more in-depth understanding than a single case can provide (Stake, 2006).

Case study research could be classified into how it is designed. Yin (2003:39-46) proposed "four types of case study designs", namely a single holistic case; a single embedded case; a multiple holistic case; and a multiple embedded case. The main difference among these types of case designs are based on two aspects of design, the contextual boundary of research entities and the number of units of analysis.

When research has only a single unit of analysis, it is called holistic case study research. A holistic case study has only one case; it will be viewed as a single holistic case study, otherwise, with more than one case study, this case study will be called multiple holistic case studies. An embedded case study is designed for studying a phenomenon in which more than one unit of analysis is nested in one or more cases. It can be a single or multiple embedded case study research, depending on one or several individual cases needed to investigate the phenomenon of study, respectively.

From aspects of research strategy, case study research is applicable to different research purposes and questions in a variety of disciplines. In this manner, case study research might be categorised into descriptive, explanatory and exploratory types; and be seen to be suitable for answering the "how" and "why" research questions (Yin, 2003). Explanatory case study research is employed for explaining "presumed casual links in real-life interventions that are too complex for survey or experimental strategies". Descriptive case study research is used to illustrate "an intervention or phenomenon and the real-life context in which it occurred". Exploratory case study research is utilized to discover "those situations in which the intervention being evaluated has no clear, single set of outcome" (Yin, 2003: 15).

3.3.3 Case study design

3.3.3.1 General case study design

Yin (2003) proposed that five important components should be developed for a research applied case study method. Application of the case study method in research includes the following:

(a) Developing research questions which are applicable to the case study method which are "how" or the "why" questions;

(b) Identifying propositions which are inherently connected to the scope of the study which emerge from the research questions;

(c) Defining the unit of analysis where data will be collected and what conclusions can be inferred;

(d) Linking data to propositions throughout developing a strategic plan of data analysis in which data analysed is oriented and connected to propositions to answer the research questions; and

(e) Setting criteria for interpreting research findings (Yin, 2003).

3.3.3.2 Theory building-oriented design

In the case of theory building research using case study research, Eisenhardt (1989) developed a framework for building theory from case study research which included eight steps (Table 3-3).

Table 3-3: Procedures of building theory from case study research, adopted from Eisenhardt (1989)

Step	Activity	Reason
Getting started	Definition of research question Possibly a priori constructs	Focuses efforts Provides better grounding of construct measures
Selecting cases	Neither theory nor hypotheses specified population Theoretical, not random, sampling	Retains theoretical flexibility Constrains extraneous variation and sharpens external validity Focuses efforts on theoretically useful cases-i.e., those that replicate or extend theory by filling conceptual categories
Crafting Instruments and Protocols	Multiple data collection methods Qualitative and quantitative data combined Multiple investigators	Strengthens grounding of theory by triangulation of evidence Synergistic view of evidence Fosters divergent perspectives and strengthens grounding
Entering the Field	Overlap data collection and analysis including field notes Flexible and opportunistic data collection methods	Speeds analyses and reveals helpful adjustments to data collection Allows investigators to take advantage of emergent themes and unique case features
Analyzing Data	Within-case analysis Cross-case pattern search using divergent techniques	Gains familiarity with data and preliminary theory generation Forces investigators to look beyond initial impressions and see evidence thru multiple lenses
Shaping Hypotheses	Iterative tabulation of evidence for each construct Replication, not sampling, logic across cases Search evidence for "why" behind relationships	Sharpens construct definition, validity, and measurability Confirms, extends, and sharpens theory Builds Internal validity
Enfolding Literature	Comparison with conflicting literature Comparison with similar literature Theoretical saturation when possible	Builds internal validity, raises theoretical level, and sharpens construct definitions Sharpens generalizability, improves construct definition, and raises theoretical level
Reaching Closure	Theoretical saturation when possible	Ends process when marginal Improvement becomes small

In this framework, Eisenhardt (1989) suggested that research questions could be defined by using several approaches, such as hypothesis-testing, a priori specification of constructs and a clean theoretical slate. Although these approaches are legitimate for theory building research, she especially emphasized the formulation of a research question "which is begun as close as

possible to the ideal of no theory under consideration and no hypotheses to test" to avoid a bias and limitation of findings (Eisenhardt, 1989). The next step is selecting cases based on a theoretical rather than a statistical sampling method. Theoretical sampling in choosing cases will help identify which cases can potentially offer the ability for replicating or extending the emergent theory. The following step is developing case instruments and protocols. They should be designed for multiple data collection and investigation methods which provide stronger substantiation of constructs, creative potential and confidence in findings.

Analyzing data is developed into two steps: within-case and cross-case analysis. In the first step, within-case analysis as a standalone entity might be developed by a narrative description or by organizing data and events in a sequence analysis for each site studied. As a result, a pattern of each case might emerge from this step. The following step is to develop a cross-case analysis which searches for patterns represented in the cases studied by comparing data among cases. Next, hypotheses will be shaped by refining the definition and building evidence for construct in each case. The constant comparative method is applied in this iterative process where data and construct has been compared to accumulate evidence for a well-defined construct. The emergence of a relationship between constructs then must be verified by evidence in each case, not to aggregate cases to meet logical replication and prove internal validity.

3.3.4 Multi-case study design

The multi-case study, also called a collective case study, is an approach in which several individual cases are bounded to explore a specific phenomenon (Stake, 2006). From a geographical perspective, multi-case studies can be expressed in another term, as multi-site studies, where individual cases in the bounded system of study will be investigated in different locations (Bishop, 2010). By illuminating how phenomena perform in more than one naturalistic setting, multi-case studies provide in-depth understanding, rich description and enhanced logic replication more powerful than a single case study (Yin, 2003; Stake, 2006).

3.3.4.1 Multiple case study design

For multiple case studies design, Stake (2006) offers a detail depiction of how to design a multi-case study which is significantly different from designing for a single one. In the single case study, we want to study the real situation. Entities of the case, when interacting, will help to recognize the coherent and sequential patterns of the case as an integrated system. By

seeing the holistic picture of an individual case, the researcher will render the others too. In multiple case studies, studying the individual cases is to identify problematic issues of each case which belong to a particular collection of cases, instead of the central research question of the study.

Multiple case studies refer to "an object or phenomenon or condition to be studied" (Stake, 2006:6). According to Stake (2006), there are two typical research designs in multi-case studies, called qualitative and organization-centred design. The difference between two designs is how the individual cases in the study provide potential opportunities to learn about the phenomenon of study. In a qualitative multi-case design, individual cases will offer potential learning about complexity and situational uniqueness. In the case of organization-centred design, each case in the study will be targeted at particular aspects of a phenomenon which aggregately contributes to learning about the phenomenon as a whole. In this sense, when working with an individual case in qualitative multi-case design, the researcher could learn more about the phenomenon of the study. In the organization-centred design, each dimension of the phenomenon could be understood in-depth when working with each case but the opportunity to learn about the phenomenon will come after aggregating the individual cases in the boundary of the study.

There are two main procedures for conducting multi-case design. The multi-case study can be conducted in sequential order, in which individual cases follow each other. In the parallel procedure, all cases are conducted at the same time. The parallel design requires a number of staff to participate in the field at different sites and seems not to be applicable in doctoral research. In other words, sequential processing is a relatively simplistic method.

3.3.4.2 Case selection

Individual case selection significantly impacts on how deep understanding of the research phenomenon is. In a multi-case study, there are two decisions made in the selection process; including how many cases should be optional and which cases should be chosen for the study. The number of individual cases is sensitively adjusted to balance the research resources, the nature of research and research context. More importantly, the selection of cases focuses on which particular cases should chose to be enclosed in the bounded system of a multi-case study. Stake (2006) proposed that an individual case selected for multi-case study should be relevant to the phenomenon of the study and offers the opportunity to explore the complexity and context of a phenomenon in diversity across contexts. In this sense, an individual case is

chosen for the purpose of learning how a phenomenon performs within a local context and its environment rather than how a phenomenon relates to other ones. In other words, sampling in multi-case studies is a purposive procedure rather than a statistical one.

3.3.4.3 Multi-case analysis

A multi-case study is more powerful than a single case in understanding the phenomenon. A study requires a multi-case research approach to enhance the credibility of the phenomenon compared with a single case research. Individual cases in the bounded system will contribute to learning and understanding about the phenomenon studied. However, the biggest challenge for a multi-case study is how each case will help the researcher to understand a phenomenon better. In the other words, a multi-case study is employed for a study because the research wants to benefit from an understanding of the aggregate. According to Stake (2006), the multi-case study has "an obligation to provide interpretation across the cases" through cross-case analysis. A cross-case analysis is to use the individual case findings within its context to answer the research question (Stake, 2006). Therefore, it is expected that the research result is achieved and created by modifying the understanding of the case's findings from the situation. He also offers systematically practical approaches to cross-case analysis procedure and method for making the assertions of findings from individual cases within the bounded system of a multi-case study. The first method, called individual case findings, is selected when the emphasis on "situationality" is the highest priority for findings from individual cases to make cross-case assertions. The second method, called merging case findings, is employed with the aim of moving towards generalization. Finally, the influential factors method is applied for cross case analysis when the study needs to focus on factors driven by individual case findings (Stake, 2006).

3.4 Research Design of study

In this section, a case study research is designed along with the rationale for choosing this methodology rather than other research methodologies as the most relevant strategic form of inquiry to answer the research question and achieve the aim and objectives of this study. This section also presents some of the main features of this methodology within the context of its research settings, including education, information technology, and organization. First of all, the features of the study are briefly presented. Secondly, there is an overview of case study research and its characteristics. The third section describes the full practical procedure adopted by the researcher to conduct this study.

3.4.1 Case study design

This study focuses on "E-learning implementation", which has fundamentally three inherent characteristics, including an assessment of the dearth of literature on the phenomenon and an abstract of the research problem and the nature of the multidisciplinary scope. Firstly, the rapid diffusion of ICT and innovation within the educational context has impacted significantly on the structure and activities of higher education systems and institutions. Research practices in this field are increasingly multidisciplinary, with different perspectives. From the educational informatics perspective, E-learning is shaped by three broad disciplines: information science, education and computer science (Levy et al. 2003). In practice ICT projects designed alongside consultant experts from different areas will be evaluated carefully on various standards and areas rather than a single mode of technology, pedagogy or organization (Jochems et al. 2006). In a study by Jochems et al. (2004:6) they argued that, when requirements for E-learning systems are "becoming more and more complex", it will need a "genuinely integrated approach". Therefore, this research project is bounded by three domains: online pedagogy, from educational science views; information systems, from the computer science view, and organization, from an information science perspective within educational settings. Accordingly, this research needs to be considered to be a multiple approach to highlight and recognize the interactions and relationships among domains to seek for knowledge and applications. In this sense, the intersection among the domains can be the research knowledge area (see Figure 3-2). However, the research is not limited to this boundary, but can investigate more broadly in each domain-specific area to gain more practical knowledge.

Secondly, the concept of "E-learning implementation" is to seek for knowledge in the area which is shaped by the three different domain areas. Therefore, it is likely that the "facts" we are seeking, the "factors" we are recognizing, the "attributes" we are identifying, and the "nature" this research is implementing, called artefacts, that present in abstract meaning, will be hard to measure and calculate at a specific point in time. In other words, they will be gradually conceptualized in the progress of the research process. Consequently, this research will be qualitative, which is the most suitable for its settings.

Finally, a review of the literature in chapter 2 revealed that E-learning implementation is likely to have dearth of literature. A literature map developed indicates that most research seems to have little interest in the stage of post-implementation in general implementation research, completely lacking this in E-learning implementation. In addition, there was no

such research into the implementation of E-learning in the Vietnamese context and educational settings that is designed and investigated by combining the three domains, including online pedagogy, organization and technology. In other words, there are no roadmaps available for research in E-learning implementation that will confidently lead to success. This research, then, could not be guided and based on previous research. The limitation of literature suggests that our research will be likely connected to inductive research rather than deductive one.

The lack of literature of the phenomena and the abstract nature of the research problem, along with the nature of the multidisciplinary scope show that a qualitative approach is legitimate in our research. Qualitative research has been defined as multi-methods involving an interpretive, naturalistic approach to its subject matter (Denzin & Lincoln, 2005). This means that our research should be conducted in its natural settings, and we should act from our belief that different perspectives can explore multiple phenomena by using an inductive form of inquiry, and that "knowledge is derived from the social settings" by "giving voice to the feelings and perceptions of the participants under study" (Stake, 2005, Denzin & Lincoln, 2005 & Lodico et al., 2010: 142). Case study research is a common approach used by implementation researchers in the information system and education. It has proved to be an effective method for studying complex phenomena and is particularly relevant to this study that relies on an advanced understanding of the context of the Vietnamese higher education institutions being studied. Higher education institutions have been characterized as complex organizations with vague environments. Therefore, the complexity inherent in Vietnamese higher education institutions makes them a good test of the proposed qualitative research using the case study method with grounded-data analysis. The case study design used in this study includes the collection of qualitative data in the form of semi-open interviews at multi-sites; and a data-driven analysis for interpreting. This approach enables the researcher to collect qualitative data from which to determine a profile of respondents and patterns to understand the E-learning implementation, and documentary data to clarify the activities, processes and factors and intended outcomes. Drawing on data from a variety of sources provides the basis for confirming the validity and reliability of the findings (Figure 3-1).

As mentioned in the introduction and literature review chapters, this study aims for an-depth understanding of E-learning implementation as a phenomenon that previously has not been completely researched in the interdisciplinary context, from an integrated perspectives. Thus, a qualitative approach will be taken to enable the researcher to gain an in-depth insight into

this phenomenon in the real higher educational context of E-learning implementation at sites which were selected. A further explanation will be given in the following sections in this chapter.

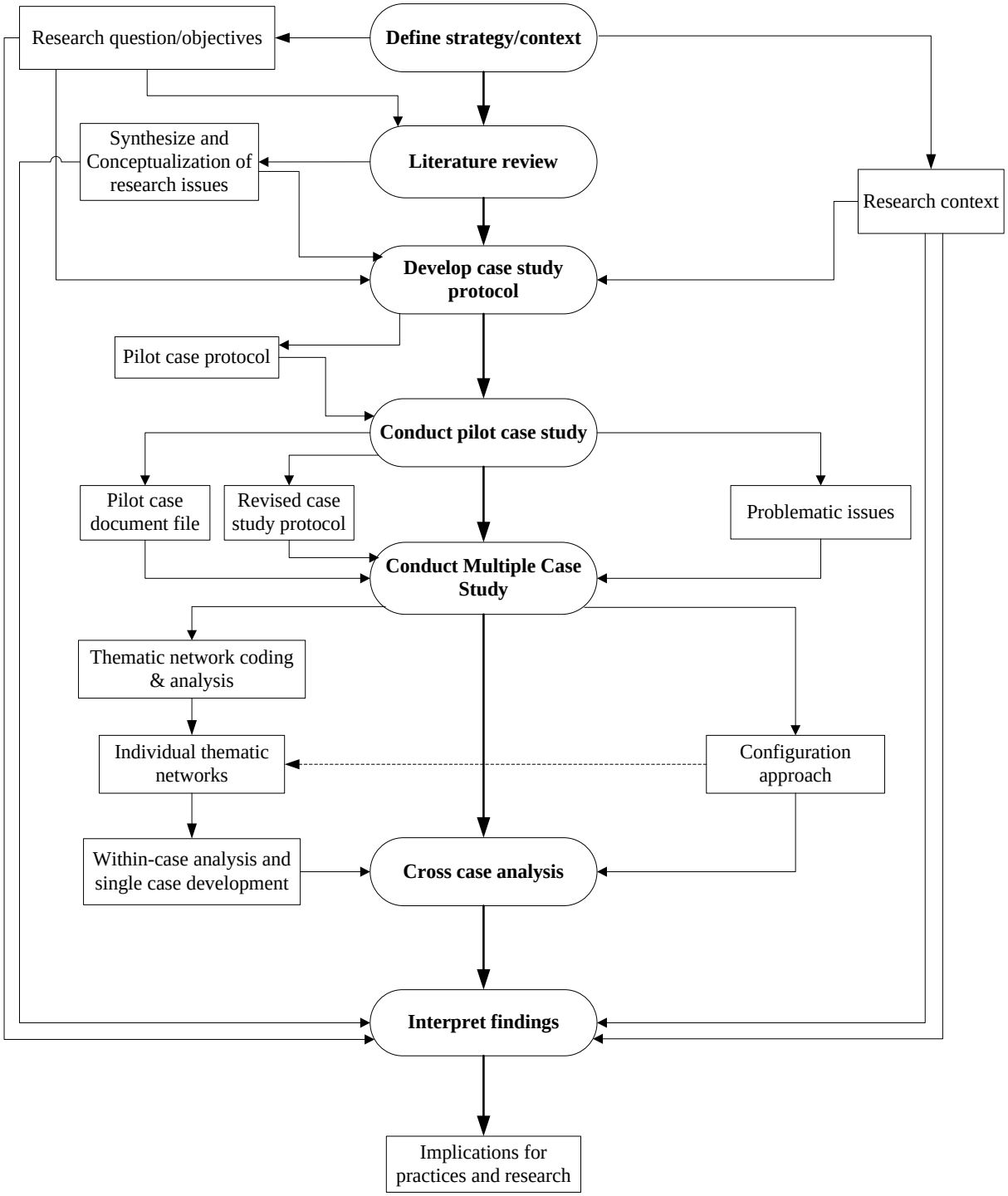

Figure 3-1: Research design, revised and developed from Gable (1994)

In this study, we view educational institutions in which educational technology and technical objects presented and operated correctly function with social processes within organizational settings. Both technological and social processes are inter-related and integrated in

functioning within the contextual institution as a whole. From this point of view, they are acknowledged and recognized as socio-technical phenomena, where social constructs have been enabled by technological application. The harmonized integration between social and technological perspectives has supported educational institution to manage the primary processes of teaching and learning more efficiently. We can therefore recognize and understand the institution through the collection of salient information and data from staff, lecturers and students, or from technological objects existing within this context. What people in the institution think, communicate, and what their opinions are can help identify what "reality" for them is. In this study, research entities, both social and technological, presented in their contextual settings, have been acknowledged, as interacting dynamically with the researcher. This is a process in which research entities have been investigated and recorded in terms of historical and current states. If a historical state of research objects is not available, seeking changes of research objects when comparing current states with previous ones will be the optimal solution.

Although E-learning and implementation research seem to be well developed in the research community, the dearth of literature in the field of E-learning implementation as a whole suggests that the research will not depend on any structure, framework or theoretical oriented guidance. Instead, this study will inductively explore the research phenomenon within its context. The manner of exploring the research phenomenon is to identify what the research entities are and to recognize how they interact and interrelate with each other. By acknowledging in this way, the appearances, characteristics and presentation of technology, social and organizational aspects, and pedagogy within its environment and context could enable the researcher to describe, explore and interpret its nature. According to Creswell (2003), case study research allows the researcher to "explore in depth a programme, an event, an activity, a process, or one or more individuals". This study is oriented towards the qualitative research approach; therefore the qualitative case study research methodology has been adopted for this study. Although case study research methodology can be employed in both qualitative and quantitative research, the remainder of this chapter will only present the case study as a qualitative research methodology.

3.4.2 Selection of cases

The institutions involved in this study are public universities located across Vietnam. These institutions have operated an online learning environment that has a long history of using E-learning and has existing internal processes to support online learning and teaching.

Furthermore, each institution was chosen based on it being similar type of institution in terms of structure, degree levels, and approximate size. These institutions will be examined to gain an understanding of their situations as well as the similarities and differences in the interactions between contextual settings and the implementation process. The common things shared among these institutions are a good test for a study on E-learning implementation. After completing a study at each of the institutions, a cross-analysis will be performed to identify patterns across the institutions that could highlight the nature of E-learning implementation at Vietnamese HE institutions. The use of multiple institutions facilitates the explanation of what is happening in one setting and also enables testing of those explanations across similar institutions within the Vietnamese educational context.

The research tries to understand E-learning implementation in Vietnamese HE institutions, and seeks to investigate the phenomenon with a multi-case study. A major challenge for a researcher using the multi-case study method in designing research is to carefully select cases to incorporate a diversity of contexts (Stake, 2005). Not all higher education institutions in Vietnam have implemented E-learning in the same way, and the development and application of learning technology have been different among them. However, we recognize a possibly large population of cases of implementation of E-learning, but a rather small group of accessible cases. In our research, we chose a small number of three universities that have implemented E-learning and have been recognized by the Vietnamese Ministry of Education and Training (MOET). These selected cases have several commonalities, including demography, regulation, structure, program and so forth. The common profile of cases is briefly summarized in Table 3-4 below.

Table 3-4: Settings of boundary of cases

Boundary	**University of Danang**	**Hue University**	**Cantho University**
Status	Public	Public	Public
Regulation and policy	Regional University	Regional University	Regional University
Enrollment	55,000	45,000	40,000
Staff	2,5000	2,6000	1,9000
Academic program	Multi disciplines	Multi disciplines	Multi disciplines
Structure	University-College-Department	University-College-Department	University-College-Department
Established year	1975	1975	1975
Home city	Type I	Type I	Type I
Population	926,000	1,090,000	1,187,000

At this point, these cases selected for research are bounded by common constraints. They are directed by the same and similar MOET policies of regional university, size, organizational

structure, academic program and demographic characteristics. The research is intentionally designed for the instrumental and multiple cases method, in order to address the research question.

3.4.3 Case instrument and protocol

This study intends to investigate E-learning implementation in universities in Vietnamese higher education. Three of the five Vietnamese regional universities were selected for this study because their similarities provide a common base for setting a bounded system of multiple-cases (Stake, 2005). All are multi-disciplinary universities, offering academic programs that are mandated by MOET. They are located in the central-governed cities with similar demographic conditions, following the same MOET policies. The number of institutions involved in the study and their structural, operational and environmental similarities adds to the validity and reliability of the findings and their broader applicability to other types of HE institutions. The study focuses on E-learning implementation within these institutions and examines this process using four target populations: student, instructor, staff and manager. The selection of these groups as the target populations is based on the pilot study and the higher education implementation research literature that identified the tension among pedagogy, technology and organization as a key determinant of the institutional implementation and adoption of new instructional technology. They are identified as the actors having the most influence on institutional implementation of E-learning. Manager and staff are responsible for enacting the policy process and making related operational and structural changes in the institutions and technology. Instructor and student must decide on changing their teaching and learning methods to effectively implement online pedagogy. It has been recognized that two components have emerged from the research questions as the research focus, including implementation and E-learning. From the research approach developed above, data collection should not be biased and dominated by any prior specific domains or theoretical or conceptual framework. Therefore, the research should approach the selected sites with semi–open interviews to gain as much potential data as possible (Figure 3-2).

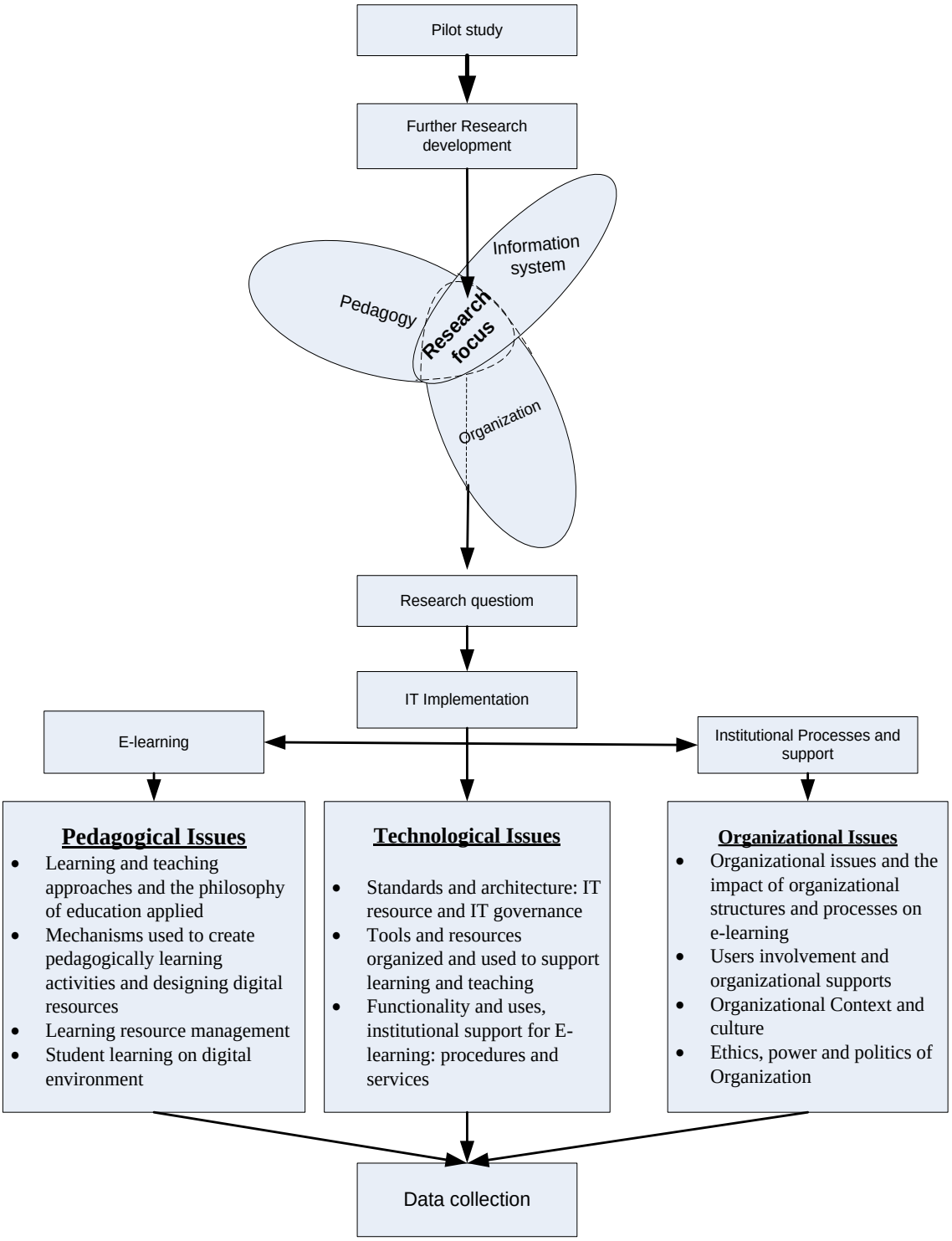

Figure 3-2: Research issue and data collection

3.4.4 Data collection

The data collection plan was discussed with the supervisor and a carefully prepared procedure developed for how to get through the selected sites and was conducted with four key groups at two different time periods, including managers, staff, instructors and students.

The data collection was undertaken in three steps at every site, including contacting and preparing, collecting data and primarily analysing and reporting. Firstly, the researcher contacted several people who have been involved with ICT and E-learning at each studied site to arrange for visits. At this stage, several visits, discussions and interview arrangements were made with informants. Secondly, interviews were conducted with both lecturers who used E-learning and those who did not. The data were also gathered from academic managers who were chairs of academic departments, some of which offered E-learning support and activities on the system, and some which did not. From their responses, data helped the researcher to revise and prepare for the next interviews with college and university administrative managers. Finally, after finishing data collection at each site various actions were undertaken, such as, in the case of the University of Danang, the researcher primarily analysed data, and reported results to the supervisor for further direction. Results and experiences from the first cases led the researcher to improve on the data collection at the second and the last case. Based on the first case data, questions were clarified for each interview in the last two cases. Table 3-5 below shows the distribution of the study informants and the instruments through which the data was gathered from different study sites.

Table 3-5: Interviewees' profiles

Informant	Study site	Method	Number of participant
Lecturer	University of Danang	Interview	5
	Hue University	Interview	3
	Cantho University	Interview	4
Student	University of Danang	Focus Group	16
	Hue University	Interview	5
	Cantho University	Focus Group	7
Academic manager	University of Danang	Interview	5
	Hue University	Interview	3
	Cantho University	Interview	3
Administrative manager	University of Danang	Interview	4
	Hue University	Interview	2
	Cantho University	Interview	3

The mode of data collection consisted of 39 detailed semi-structured interviews and 7 focus groups. The initial phase of the interview took place during November and December 2010, when ten administrative managers, eight heads of academic departments, twelve lecturers and seven focus groups of student were involved. Towards the end of 2011, a further nine

interviews took place at the studied sites. In all, excepting the students in the focus group, a total of 32 participants were invited into the data collection process, including nine administrative managers, ten academic heads, and twelve lecturers who either adopted or resisted E-learning; and twenty eight students. The students enrolled in courses taught by chosen lecturers were selected to participate in the focus group interviews.

All interviews were conducted in private except students in focus group. The duration of each interview was between one and one and half hours. All interviews in both phases were tape recorded and transcribed for analysis. The college documents related to E-learning implementation and adoption were also collected and examined as well. These interviews and supporting documents formed the basis for the case description and analysis. Strong and consistent responses emerged from these interviews during both time periods, independently helping to reinforce and validate the responses of others. During the interviews, respondents were allowed to express their own perspectives by bringing up issues they felt were related to the discussion topics, with extensive notes taken. Interviews with senior managers were conducted to investigate the college and university's objectives and policies towards E-learning application as well as how E-learning was prepared, managed and operated and what were the factors that affected the implementation. Staff were interviewed concerning the services and forms they provided to support E-learning implementation. The lecturers were interviewed to examine how E-learning was combined with their instructions, associated with method of delivery; design of content; format of web courses; and the components of E-learning courses on the system. Students were encouraged to express their evaluation and interests related to the differences among courses enrolled on with and without E-learning support; benefits gained from E-learning; as well as suggestions about their learning performances (Appendices C). Due to the limitation of historical data associated with the pre-implementation stage, whenever possible, interviews tried to focus on what the differences were between the current status of teaching and learning, with a period before E-learning was introduced, in order to track data back to the pre-implementation stage.

3.4.5 Data Analysis

Thematic analysis is a process of making sense, analyzing, observing and seeing themes within qualitative information by encoding, in order to convert qualitative information into qualitative data (Boyatzis, 1998). Themes will be identified and developed by reading and re-reading the data carefully so that the pattern of data will be recognized and themes will emerge to turn into the categories for analysis. A review of the literature revealed other

studies that had used the thematic analysis approach, which guided the researcher during the process of data analysis. The thematic approach, using qualitative data driven codes, has mostly been cited in the book and articles by Boyatzis (1998), Attride-Stirling (2001), and MacQeen et al. (1998). In this study, the guidance for thematic analysis from Boyatis (1998) has been chosen to incorporate within the thematic network tool introduced by Attride-Stirling (2001) for data analysis. To use this data-driven method, we synthesized Boyzatzis's approach with Attride-Stirling's tool to develop a comprehensive code framework for this research. Although the hybrid approach suggested for data driven code might apply, we cannot locate a priori theory to develop the criteria. Therefore, the mixed approach can help the researcher overcome challenges to develop the code framework for coding across multiple case studies.

The initial task is to reduce the raw data from the transcripts of all cases. The researcher then identified from the texts' ideas implications and meaningful issues that are salient. When examining all the interview transcripts, we recognized that meaning, ideas and implications discussed by interviewees have been located broadly in sentences, line by line and in paragraphs. It is impossible to label a code for one sentence or line. In addition, several paragraphs within one interview transcript might cover several meaningful ideas and implications that required more than one relevant code. Therefore, we decided to make our unit of code follow the level of meaning rather than sentences, line or paragraph. In this research, level of meaning is flexible to capture whatever salient theme emerges across the texts. It is important to bear this in mind during the process of examining transcripts; anytime, anywhere and any combination in a text segment could potentially lead to meaningful ideas, issues or implications. Segmented text was assigned a label (or code) which was turned into the initial code framework for this case. When a new meaning was salient from the texts, a new code was allocated in the code framework; otherwise, the existing codes were used to assign similar meanings in the text segment. This same rule was applied for every transcript within a case.

From the thematic network analysis (TNA) perspective, the following discussion illustrates how it was applied in this study. The procedure includes six steps undertaken to analysis data collected for all cases as follows:

- Firstly, based on the salient issues discussed that arise in the transcript itself, the researcher built an initial codebook, which was applied to the transcripts to dissect them into text segments which indicate meanings, ideas and implications. As a result, all

transcripts of interviews, for example, in the case of the Uni**v**ersity of Danang, were developed into 208 codes associated with issues discussed (see Appendix E).

- Secondly, association with conceptual frameworks: all the issues discussed in the transcripts were allocated into a two dimensional matrix, the first factor dimension illustrating organization, technology, teaching and learning, while the second one presented the pre-implementation, implementation and post-implementation with regards to the temporal process.

- Thirdly, the basic themes were merged, arranged and modified following their meanings and relationship with others, in order to represent a higher level of meaning and close relationship, called organized themes. For instance, in the case of UD the study identified 72 organized themes relevant to the contextual settings and process of implementation (Appendix F, G and H).

- Fourth, the organized themes were then arranged and rounded up to global themes, which broadly cover and represent the main points for the organized themes, which resulted in the construction of networks. Whenever possible, the global themes were enhanced at the highest abstract level, called super global themes.

- Fifth, we constructed the thematic networks for individual cases, looking for further patterns in the data to determine that themes were comprehensive (see section 4.3; 5.3; and 6.3).

- Finally, we summarized the networks' global themes and patterns for each case; these patterns were interpreted in the light of our original research questions.

3.4.6 Case analysis

When shaped by the research approach and paradigm, the study aimed to operate them in further steps in the research process, to find ways to get sufficient information, which was the most appropriate to achieve significant responses to the research questions. This section has reflected a study epistemology about how we know what we know. In the case of E-learning implementation, it is likely that there are two epistemological components which should be built to answer the research questions. Firstly, it is the "artifacts" of E-learning implementation in the multidiscipline perspectives which have been used and applied within higher education settings. Secondly, it is "mechanism building", in which the artifacts are designed, managed, and have come into operation within higher education institutions, have

been shaped by organizational interactions and incorporation. In addition, we should consider carefully how the components are interrelated, in order to to answer the research question and achieve the research objectives.

3.4.6.1 Artifacts of E-learning implementation

Determination of artifacts in a study has been varied, depending on what and how the worldview is governing the research. It might be started theoretically, by a priori-theory, to come to an end by verifying or predicting the findings. It can stem from real problems which need to be solved to arrive at the end of research for suggestions and implications to improve practices. In the case of E-learning implementation, however, because of the dearth of literature, it has to build from the inherent characteristics of research entities rather than from a theoretical framework or priori-theory.

The nature of multidisciplinary research has shaped research entities in various aspects. Therefore, seeking information related to artifacts of E-learning implementation should be synthesising understandings from a number of different perspectives:

- From the technological perspective, E-learning implementation might be viewed entirely as a technological appearance within an institution. The artifacts might refer to hardware, software, network in the field of information and communication technology. However, technological implementation will give no meanings at all when ignoring pedagogy and organizational processes in educational institutions. For this reason, artifacts will be viewed as human-centred applications created by technology.

- From an organizational perspective, E-learning activity is viewed as a primary process within an institution in its educational settings. Without supportive processes, teaching and learning activity in that environment has never existed. Lecturers and students cannot work in "E-learning classroom" without ready-made facilities and preparation by staff. Technology will enable learning and teaching in new environments however; organizational settings will offer its functions ready for use. In other words, the artifacts should reflect the socio-technical aspects of the research objects.

- From a pedagogical perspective, E-learning may gain very good ideals in teaching and learning but with poor technology and organization considerations it cannot be implemented with current techniques and supported by the existing administration. Recommendations for a very good pedagogy model without association with current IT

infrastructure or increasing the overall cost of the educational system may lead to delays or to these changes being unaffordable. In the light of this aspect, artifacts are viewed as technology-enable pedagogy.

From the diversity of artifacts, designing research should be able to cover a number of varieties of dimensions which are inherent in the research object. The nature of artifacts from organizational, technological, and pedagogical perspectives should be integrated during the research process within a particular context and organizational settings to see how it works. It is clear that in the case of E-learning implementation, case study research is likely to be the most appropriate for the nature of this study.

3.4.6.2 Mechanism building

Mechanism building is defined as incorporating artifacts within their contextual settings. This section looks at how the studied phenomenon works. Building an artifact needs resources. When time is also viewed as a resource, then an entity constructed takes time to come into operation as well. Accordingly, the E-learning entity operating within an educational institution had spent a period of time to build. It has become very clear that the nature of "mechanism building" relates to the temporal dimension. Mosakowski and Christopher (2000) summarise that there are five dimensions of time in research from several different fields. It includes (a) nature of time, (b) experience of time, (c) flow of time, (d) structure of time, (e) and reference anchor. As a result, mechanism building in this study will be acknowledged in a number of different dimensions.

From the referent anchor dimension, building mechanism might present what artifacts are and how they work in the past, present and future or in the short or long term. From the structure of time dimension, mechanism building might be retrieved in discrete events, recorded as continuous sequences, and even remarked as an epoch-making change within an institution. From the nature of time dimension, mechanism building can be adjusted when considering an artifact as a variable of time or closed with time. From the flow of time dimension, an artifact might act and impact on others in a novel or repetitive scale. As a result, mechanism building becomes stable or instigates new challenges to organizational settings. Beside time resources, mechanism building will also need other resources, such as human and capital. In this sense, mobilization and the use of organizational resources are the socio-technical process in which artifacts will interact together in determining and shaping mechanism building. In addition,

the allocation of organizational resources might create organizational conflicts and agreements which can be solved by the core competencies of artifacts or political intervention.

The dearth of literature in implementation research, and in E-learning implementation in particular, does not permit speculation on the characteristics and attributes of artifacts of E-learning implementation and how they interplay and interact in their context and organizational settings, from pre-determined theoretical frameworks. In other words, testing or verifying a null hypothesis derived from a priori theory is not applicable in this case. Instead, it involves deducting from a theoretical framework to see how artifacts are built in their context; mechanism building will set out the progress of looking for what and how artifacts interact to shape the research object. In this sense, the mechanism building will be constructed in collecting and examining artifacts in the real life contexts. In other words, findings from this process of inquiry are to be grounded in the data. For this reason, working out mechanism building will be inferred from grounded data to seek "patterns of unanticipated as well as expected relationships" (Stake, 1995:41).

The diversity of artifacts in E-learning implementation needed to cover a variety of different dimensions of mechanism building might be done when investigating and examining them in more than one context and institutional setting. This could offer more in-depth understandings about how the workings of artifacts and mechanism building might be affected by different environmental and local contexts and settings under which the results might occur. This kind of research strategy may also help to form more general categories of how the specific conditions might be related by illustrating the workings of artifacts to shape mechanism building across a more varied range of circumstances. Depending on the type of research question, Yin (2003) proposes a case study approach which could be classified as single case study and multiple cases. Therefore, multiple case research design is applicable for this study. Stake (1995) proposed a different classification of case study research. Case study research might be designed as an intrinsic or instrumental case study. An instrumental case study approach potentially offers "potential learning" from case studies which is very useful for this study. In this study, artifacts which have been explored within their contexts and settings are suitable for instrumental and exploratory multiple case study design. Mechanism building could explain how these artifacts have been built and shaped in particular manifestations under a strategy of inquiry from grounded data, which is appropriate and relevant to the research context.

3.4.6.3 Configuration approach

In the final step of TNA, the thematic network constructed will be interpreted by bringing all individual thematic networks in an extensive exploration of significant themes, concepts, patterns and structures (Attride-Stirling, 2001). Attride-Stirling pointed out that the thematic network is only one tool for analysing data, not analysis itself, so that the researcher has to develop an own method to incorporate the individual thematic networks by relating them back to the original question and the theoretical grounding of research. In the other words, any method of case analysis should guarantee that the individual networks could be connected to interpret the patterns in meaning fashioned, which is conceptually guided by theoretical underpinnings.

TNA originally proposed up to three levels of theme, where the basic themes are finally levelled up to global themes which are the centre of thematic networks. Theme has been developed by categorising data in the process in which the higher abstract level will be gained when reaching a new level. However, data analysis in this study already has been developed at both the global and super global level. It is likely that the different levels of abstraction will challenge the incorporation of all individual thematic networks. To facilitate this integrated analysis, the study adapts the organization configuration to incorporate all individual thematic networks to represent a holistic stance (Mayer et al. 1993). This approach is operationalized by seeking for "any multidimensional constellations of conceptually distinct characteristics that commonly occur together" from research "imperatives" and the implementation process (Miller 1987; Mayer et al., 1993). Three imperatives associated with thematic networks of technology, organization and teaching and learning will have the central role in organizing the process of E-learning implementation (Miller, 1987). In this sense, configuration might be identified as a degree to which the process of E-learning implementation is orchestrated and connected by a single theme which could be found within or across the imperatives (Miller, 1996). Within technology imperatives, for instance, one may be the favourable condition of technological integration towards the successful adoption of E-learning. The other themes might be identified from organizational and technology imperatives. For example, the resistance to E-learning adoption may stem from a poor incentive policy and the limitations of network bandwidth. Focusing on this kind of configuration for analysis of the case, the study will examine the configurations between the imperatives and the process of implementation. In the other words, the configuration between the case context and process of implementation might be emerged from (i) within imperatives,

(ii) across imperatives and (iii) between sequences of interactions from the process of implementation. The degree of configuration will be identified by closely aligning the imperatives and the implementation process to reinforce their relationships and interactions (Miller, 1996). Whenever the alignment between elements of imperatives and the nature of the implementation process has been recognized, their interaction and relationship have been configured for interpreting pattern of implementation.

This approach will extend the method of thematic network analysis by using theoretical configuration to analyse the case. It offers an extra layer where the relationships and interactions of elements of individual thematic networks are capable of integration and exploration from the view of theoretical configuration. To enable patterns in the text to emerge, the individual networks of imperatives and the implementation process will be connected via a layer where the configuration will be identified, depending on the alignment of elements of thematic networks. To illustrate, Figure 3-3 below shows how individual thematic networks integrate on a virtual layer.

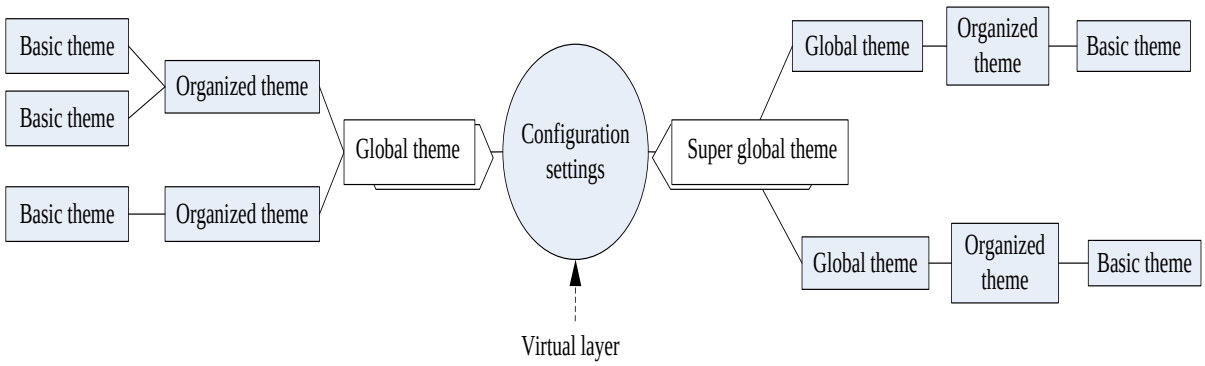

Figure 3-3: Configuration settings

The virtual layer is a place where the individual thematic network might be configurationally assembled and configuration can be defined as how they are aligned. In other words, the process of analysis will make assertions from orders emerge over the interaction and interrelation on the thematic network as a whole. It is very likely that configuration will allow thematic network to be organized into a patter in which the individual elements of pattern might work together to represent conceptual knowledge and allow for unbiased exploration of knowledge. From a TNA perspective, configuration settings allow the individual web-like-networks to connect, depending on a close alignment of their relationship and interaction. Therefore, both thematic networks of context and the case process might well be integrated on one virtual layer under their contextual settings to answer the research questions.

3.5 Chapter summary

In this chapter, the paradigm of qualitative research has been justified and has led to the adoption of an interpretivist approach as the philosophical foundation for this study. The interpretivist epistemology emphasises understanding a phenomenon through the participants' thoughts and perceptions. Multi-case study research has been selected as the most appropriate method for this study as it allows for in-depth understandings of phenomena. The systematic characteristics of case study research and its popularity as a trusted and respected qualitative research method in the field of information system and education were encouraging factors. The comprehensive literature review at the start of the research process offered guidance in shaping the research design and helped to focus on the issues that would be most relevant to the research phenomenon. The conceptual framework synthesized from the literature shaped the design of this study, in which selecting cases, collecting data, guiding for data and case analysis followed the principles of case study research. In interdisciplinary research, as the patterns emerged they became important to integrating the communication and practices of key stakeholders relevant to contexts. The method of case analysis, called configuration approach was developed to support the interpretation of patterns emerging from the data and an analysis of the way the whole system works.

Chapter 4 – E-learning implementation at University of Danang

4.1 Introduction

This chapter presents findings from a study on E-learning implementation at the University of Danang (UD) with a particular focus on the process of implementation and factors bounded in its process. The chapter gives an analysis of the data collected from interviews with students, teaching staff and managers at the study site, and of the various documents containing information which helped illuminate the phenomenon under investigation. The chapter has been organized in seven sections. After the introduction, the chapter presents the key background of the University of Danang and its college members, which had implemented E-learning during the previous few years. The next section presents the key findings from the data analysis at the studied site. The following two sections illuminated the features of E-learning implementation from two perspectives: the factors and the process. The next section presents an analysis of E-learning implementation by interpreting the thematic network from data analysis. The following section discusses the pattern which was draw from an examination of the interaction and relations among factors and the process of E-learning implementation. And finally, a conclusion to the chapter is provided.

To make data anonymous, the study used an unidentifiable coding system in the three cases based on the following: The first two letters represent the formal role of participant, followed by a department where participant worked. The final number represents the participant's number in the list of each department. For instance, the first participant in this department, the first teaching staff member (LE) in the Department of Business Administration (BA) was coded as (BALE1).The same coding system was followed in the next two chapters.

4.2 University of Danang and E-learning initiatives

4.2.1 Background of University of Danang

Founded in 1994 by the government, UD merged four public universities, junior colleges and vocational schools located in Danang City, Central Vietnam. Under new legal institution, UD is a multi-disciplinary research university which employs nearly 2,000 employees at eight member colleges and affiliated units. UD has a student population of some 60,000 undergraduate, graduate, and postgraduate students, distributed over eight colleges and

schools, offering a total of 128 academic programs. In 2010, the total budget for the university amounted to about 174.812 millions of VND. UD was incorporated as a public and regional university and is recognized today as one of the top ten Universities in the Vietnamese higher education system. UD offers various academic degrees in areas of business and economics, engineering, education, foreign language, and medical and health. UD has also entered into a strategic partnership, with more than 20 provincial centres of continuing education across the nation to further offer the off-campus degree programs for in-service student. Being a multi-level and multi-disciplinary university, UD holds an important role in training human resources and doing research which meets the needs of socio-economic development in Vietnam.

Strategically, UD positions itself as a research-oriented university which provides diverse research and qualified training programs that promise to help its student to achieve the highest quality performance. UD's strategic mission is to be "the incubator of intellects and talents for the development of Central Area and Western Highlands of Vietnam". In support of the mission, UD offers students and staff working on "a number of modern laboratories and research centres, along with team-based training of staff allowing the institution to speed up the development while expanding the scope of postgraduate training and research".[2] In addition, UD's main organizational strategy is to become a Research University by 2020 with its key role as trainer of a highly qualified workforce and being a major centre for research and international exchange for Central Vietnam and the Western Highlands.

Structurally, UD is organized into eight independent colleges and schools, each of which falls into one of three dimensions: the vertical dimension, which recognizes that the nature of a legal institution required to administrate a public organization in higher education is the same as that required to administrate for another public agency; the horizontal dimension, where colleges and schools provide academic degree programs and other services in specific technology competencies or knowledge expertise; and the geographical dimension, where students in one region and provinces such as Kon-tum campus are handled differently from students on the main campus at Danang City. In addition to these independent colleges and schools, UD has also established around 20 affiliations, called centres for continuing education (CCE), at provinces, with each CCE having a long-term relationship with a specific local in-service student. CCEs function almost as outreach extensions of the client organizations, are independent profit centres, but relatively related to UD colleges and

[2] Messages from President, University of Danang, http://www.ud.edu.vn/en/en.asp

schools. A number of functional departments - human resources, administration, international cooperation, postgraduate and research, accounting and finance, procurement, information system - support the member colleges and schools and work towards effective management of the university's relationships, processes, and projects. For its members, each college or school has conventionally established a number of functional offices and academic departments which are closely related to functional departments at the university to support work and academic activities on their own campus (Figure 4-1). In such a structure, the functional departments and offices have allocated the available resources according to their role and duty to support primary activities of UD-research, teaching and learning. Each department (office) usually has a department head with the title of department manager, called the director, head, chair or something similar.

Three dimensions of structure have created a complex mechanism which governs almost all primary and secondary processes within the University of Danang and its members. It seems to be clearly specified and organized to support the whole system's work. However, it overlaps with the primary and secondary business process of the whole system. Therefore, it is difficult to indentify visibly who carries responsibility, duty and power in making decisions.

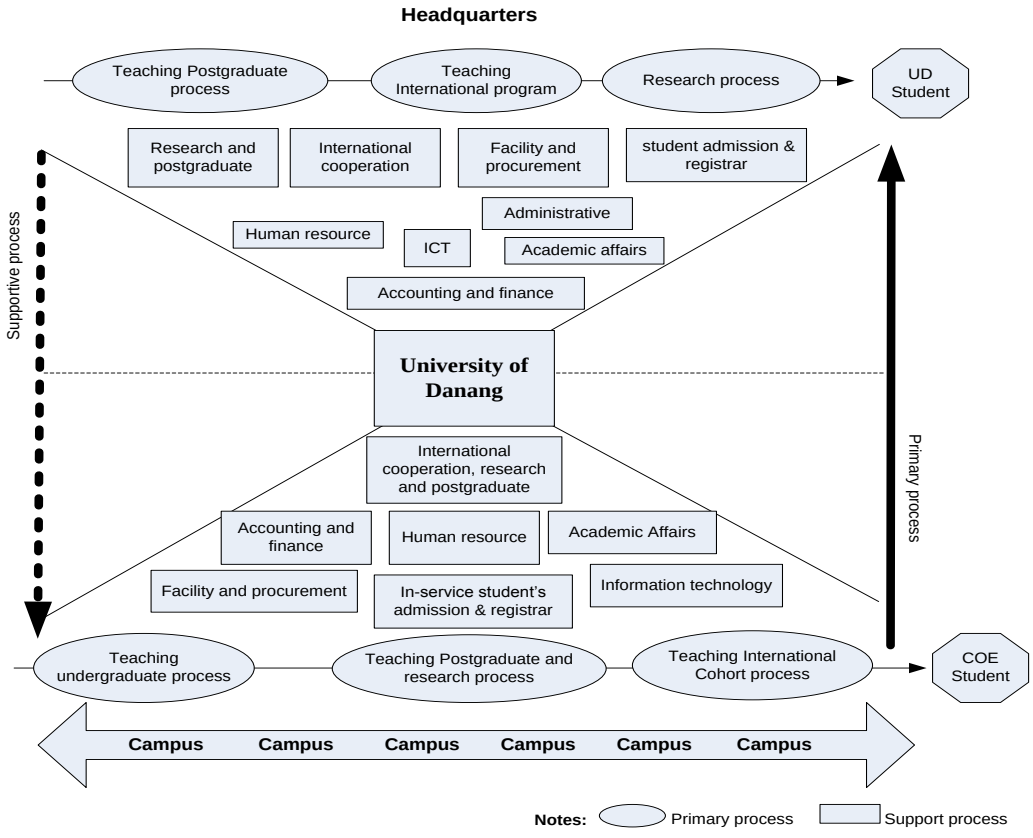

Figure 4-1: Complex business structure of University of Danang

4.2.2 E-learning initiatives at UD

The first E-learning initiatives were introduced at the Department of Business Administration (DBA), the College of Economics (COE), followed by the College of Technology (COT). In 2005, like most other universities around the world, DBA decisively entered the age of E-learning by adopting the *Modular Object-Oriented Dynamic Learning Environment* (MOODLE) that had been originally developed by an Australian software engineer. This system, when it eventually came into operation, was targeted at a limited group of students and lecturers on the business administration programs at DBA. In other words, it was added as an extra service for students, along with the existing learning environment of COE. At the end of 2005, a web-based course system was launched by COT for students on technological and engineering programs. Most courses delivered on academic programs offered by COT are published on the system and there is open access for COT's students. Learning resources on this system have been developed in *Hyper Text Markup Language* (HTML). Students have also downloaded the learning materials, called E-books, in *Portable Document Format* (PDF) files, for their own references. After publishing on the system, authors or lecturers do not need to go online to interact with the end users, except to update the content of materials. It is remarkable that the application of ICT in training at UD has only been introduced at two campuses, COE and COT, while the others have not been involved. However, there is a distinctive characteristic of ICT application at UD. COT has used the static web system to adopt technology, while COE has adopted a virtual learning environment which is more sophisticated and effective than that of COT.

4.2.3 E-learning at the College of Economics

Located in the hub of Danang, the largest city in Central Vietnam, the College of Economics, a member of UD, has been recognized as a leading college in Economics and Management in Vietnam. COE currently offers 19 undergraduate programs, 4 master programs and 2 doctoral programs, which admit 5000 students each year. At present, there are more than 16,000 students studying at COE and on other off-campus programs in the Central and Western Highlands. COE has a staff of 300, of whom 73% have masters' or higher qualifications, 8 academic departments and 4 administration offices.

To ensure the human resources for economic development and restoration of the Central and Western Highlands after the war, immediately following South Vietnam's liberation, the Government decided to establish The Institute of Danang, known today as COT and COE.

Responding to the Party's and beloved Southern Vietnam's call, staff and lecturers from many universities in Northern Vietnam gathered and overcame difficulties and hardships, working together to build the Institute of Danang. Thanks to this enthusiastic and productive working spirit, after only a very short period, the Institute was put into operation in October 1975, when it enrolled students for the first course. Most were cadres and soldiers returning after the war. After the period of supplementing knowledge, on March 1976, the Institute officially started and delivered the first course with 330 students, of whom most were majoring in Economics. In October 1976, The Institute of Danang was renamed the University of Danang, in which the Department of Economics, originally COE, nowadays is one of the key departments, with a large proportion of the total number of students each year. In the past 10 years, the COE has trained 18,387 graduates, of whom 7,546 were full-time students and 9,500 in-service ones.

The E-learning initiatives at UD were first introduced to the Department of Business Administration on 2005. One lecturer, who is interested in research and the practices of applied Information Technology, convinced others to set up a MOODLE site on the DBA's intranet and present how to teach a course in this environment ("1" in Figure 4-2). Right after, DBA agreed to fund the renting of a server from a US-based webhosting company to host the MOODLE site ("2" in Figure 4-2). At the same time, several meetings and seminars were held and training sessions were given, including face-to-face guidance within DBA. After a six-month period of technical preparation and learning, developing the content of courses taught by DBA, including digital materials, PowerPoint slides and course formats, as well as getting familiar with the lecturer interface on the virtual learning environment, DBA started to offer courses supported by MOODLE from the middle of 2005.

Immediately, the new teaching and learning method interested students: not only those on the business administration program, but also all students at COE. In addition, there were also many students from other universities across Vietnam interested in participating on the courses on this system, some having specifically asked for an online degree program. Succeeding more than was expected, DBA's students and lecturers enjoyed the new teaching and learning environment which had created new ways to learn. Lecturers substantively involved it in their courses and discussed, shared and learnt from each other regarding how to adopt and use the tools and functions which were available on the system for their courses further. During this time, introducing E-learning at DBA became a special event in the academic environment, not only on the COE's campus, but also across the nation, as DBA's E-learning initiative was published by many newspapers and online news outlets.

By the end of 2005, a new rector had been selected through election. He was very interested in applied information technology for teaching and learning. The successful pilot project at DBA had led him to adopt a new teaching and learning environment. Thus, one year after introducing it, the DBA's MOODLE system had been transferred from abroad back to the IT platform on COE's campus ("3" in Figure 4-2). The existing resources of teaching and learning were hosted by a high performance server which could serve approximately 500 students concurrently. The rector of COE also wanted to quickly promote the adoption of a new learning and teaching environment for the whole college, by issuing an incentive policy which would pay extra money for courses taught and delivered on the system. Other functional offices, such as Academic Affairs, Administration Services and IT Services, were responsible for supporting lecturers and students in using online services. There were two training sessions held by the office of IT and a written paper of extra payment, prepared by the office of academic affairs for lecturers who wanted to teach and support their course with E-learning. As a result increasing numbers of lecturers from other academic departments joined the system ("4" in Figure 4-2).

At that time, technical issues and the management of the E-learning system had been entirely monitored and supported by the functional offices of COE. According to the rector's decision, the office of academic affairs would monitor the teaching and learning activities on the system to certify teaching records during semester time, especially the timetable of courses registered to teach on systems and other related records. Only paper documents certified by the office of academic affairs were valid for receiving the extra payment at the office of accounting. The COE plan seems to have been very well-planned for the E-learning project. In monthly meetings, the rector usually asked academic Chairs and staff questions regarding their applications for teaching and their motivation and to convince lecturers to use the system ("5" in Figure 4-2).

To host an IT application on its own campus, the IT facilities of COE had to be upgraded and improved. The office of IT had developed several proposals for an IT platform and internet connection for long term development. Then proposals were also submitted for multiple funding sources. As a result, COE's network was invested in by the University of Danang and MOET. In 2009, the COE won funding from the World Bank for IT facility development. One of the reasons that these proposals were funded was the public image of IT application, so this was a successful E-learning initiative from DBA. The University of Danang agreed with COE's proposals and supported it to compete with other proposals from its member colleges for internal and external funds ("6", "7" in Figure 4-2). As a result, the IT platform

and infrastructure were upgraded. Thus, COE offered some network services and internet access for students and staff on its campus, such as Email, Wi-Fi network, and department webpages ("8" in Figure 4-2).

Surprisingly COE's lecturers had not participated, as expected. Teaching on the new system was mostly contributed to by lecturers from DBA. Some of lecturers from the Department of Tourism and Commerce had created courses on the system for their teaching. DBA's lecturers now had extended their use not only to courses taught on campus, but also courses delivered on off-campus programs. When travelling to provincial affiliations, lecturers usually taught for one week per course for in-service students. The system seems to have been very useful for them. On the other hand, when travelling to teach at remote places, they had to monitor and route virtually back to on-going courses on campus. The IT application of E-learning was now spread to other provinces to improve the quality of training ("9" in figure 4-2).

By the end of fall semester 2006, a major problem had arisen in relation to extra payments for teaching on the system. Requests for payment were directed to the office of Academic Affairs for completing the documents and procedure. This office required documents from the E-learning system as the evidence for using the system to support courses during semester time. The office of IT extracted logs of courses during this time period, as required by lecturers. The academic departments, who had the records of lecturers teaching on the system, finally submitted the documents required by the office of Academic Affairs for payments. However, the office of Academic Affairs informed staff that it only certified lecturers who had informed and registered for the supporting courses online at the beginning of the semester. They refused to certify any other documents because they did not know whether those courses were already delivered and supported online. Therefore, no one met the requirements of the office of Academic Affairs for receiving payment from the Office of Accounting.

Technically, the increasing number of students and courses both on and off campus had directly led to several technical issues relating to connections, bandwidth, the E-mail service and system performance. To prevent outsiders accessing the system, students would use the email service provided by COE to register and authenticate their identities before using the system. As a result, the Email service had to be expanded to all COE's students, both on campus for full time and off-campus for in-service students. While the on-going hardware project waited for funding from different sources, the need for a system steadily increased, leading to several impacts on the use of E-learning. The support service was not conducted by the IT office and did not improve and change to meet the needs of students and lecturers. The

complaints and difficulties created very negative effects on other lectures who wanted to adopt the system for their use.

COE completely changed from yearly academic system to a credit academic system in the middle of 2008. Under new academic requirements, MOET's academic policy regulated that the student's final result on a course must have at least three aggregated parts: an individual assignment or group project; a mid-term examination; and a final examination. To fulfil this requirement, DBA and Informatics and the Statistics Department intensively used E-learning for the mid-term exam by conducting a quiz. It was a very useful function to save time, by using the online quiz tool for mid-term exams. Students would access the system to automatically take the quiz following a fixed timetable set in advance. When finished, students would immediately know the marks and the lecturer would not have to mark manually. E-learning became inseparable from learning and teaching at COE. Presently, E-learning is operated as an additional service to COE's learning environment. Statistically, more than 230 courses are on the system. At any time of daytime, there are approximately 30 students learning online with the system.

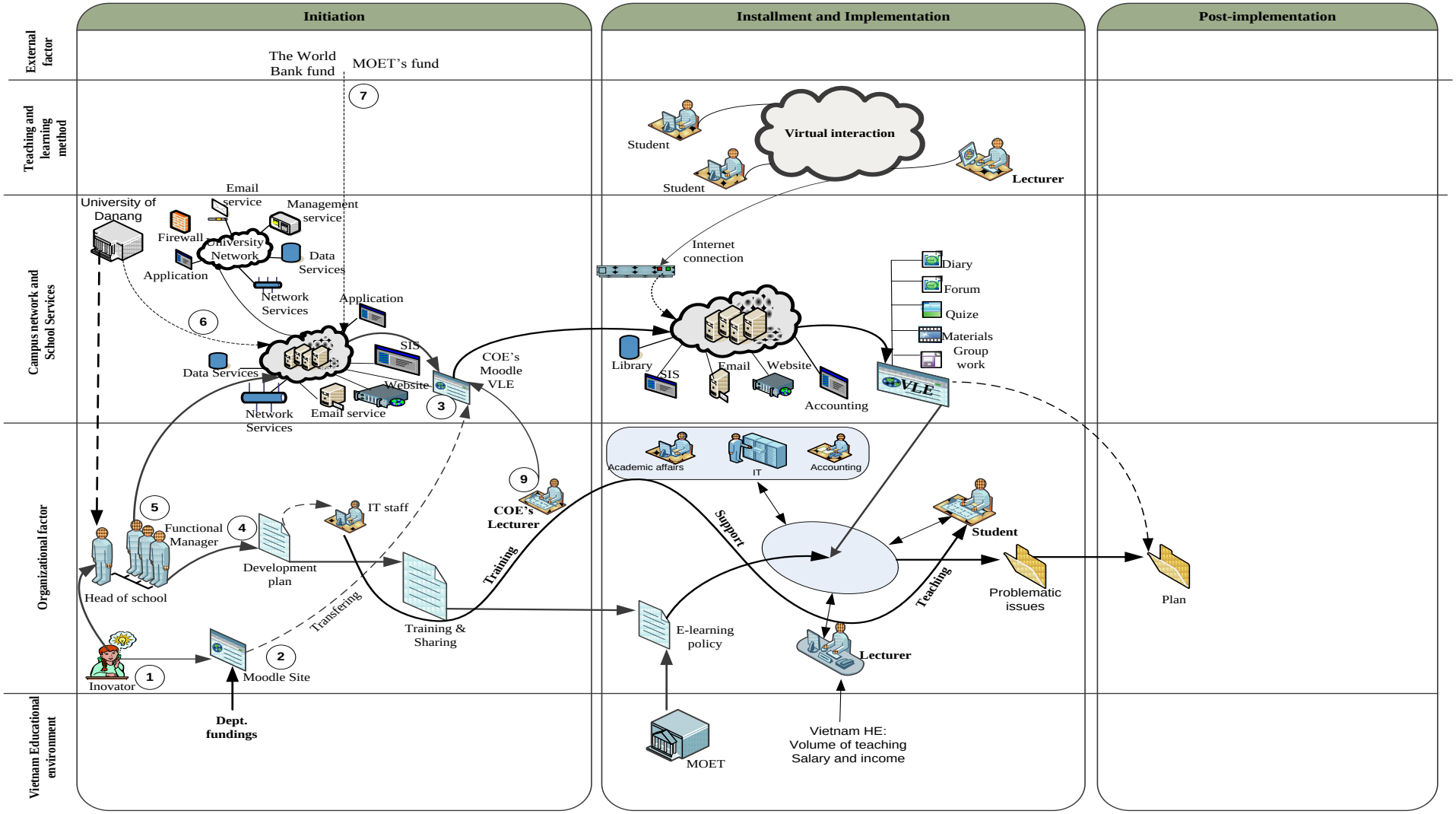

Figure 4-2: Factors and processes of E-learning implementation at University of Danang

4.3 Findings of the case: themes and thematic network

4.3.1 Thematic analysis

From the thematic network analysis perspective, based on units of meaning, text segments were first basically identified with interpretative themes, which were clustered into higher order, or primary, themes (Attride-Stirling, 2001). The conceptual framework was used to code and allocate the issues discussed in the transcripts into contextual and temporal dimensions. In each dimension, the basic themes were merged and arranged, then modified, following their meanings and relationship with others, to represent a higher level of meaning and a closer relationship, called organized themes. As a result, all transcripts of interviews were developed into 208 basic themes along with a list of issues discussed, which were used to develop organized themes (See Appendix E and F). In the case of UD, the study identified 72 organized themes which fell into two dimensions, domains of the stage process of implementation, as illustrated in Table 4-1 and Table 4-2, approximately. In the context of E-learning implementation, the themes were the main points of interaction and interrelation which significantly contributed and impacted on the process and the outcome of E-leaning implementation. The themes in stage process highlighted the main points and problematic issues in implementing E-learning at UD.

4.3.1.1 Themes of context

There are twelve organized themes derived from thirty seven basic themes which associate with aspects of the COE's management and organization. These themes have been merged, based on relationships and meanings. On a higher abstract layer, four global themes emerged over the organizational domain, including management and challenges; capacity and oversize; culture; and working environment. The m*anagerial settings* refer to how the COE's business was handled and is associated with current challenges resulting from COE's management approach. The c*apacity and oversize* is generally understood to mean that the number of enrolments exceeded the "soft and hard infrastructure" which COE could provide on service and maintenance performance. The *college culture and working environment* has been applied to situations where collective behaviour of people, norms and values, benefits and beliefs have been formed historically from the process of the development of COE.

From thirty eight basic themes identified from the data, which indicates the meanings of technology and technical problems, fourteen organized themes have been constructed. The themes have been clustered together to align with its meanings and strong relationships. As a

result, technology data analysed has been built up into five global themes, namely ICT capacity; isolated and separated ICT; fragmented investment; the college's ICT development; and the US's ICT strategic development. The *Strategy and governance* commonly refer to the role and governance of ICT at University of Danang. The *Operation and organization* have been used in the broadest sense to refer to administration and operation of ICT on the COE campus. The *Performance of network services* has been used to describe the quality of network services and ICT support for COE students and staff.

Table 4-1: Contextual factor of E-learning implementation, University of Danang

Themes	Organized	Global	Super Global
Organization	• Academic services • Limitations of facilities • Losing control of policy • Work overload • Challenges in administration • College management • UD management • College culture • Working condition • Salary motivation • Job retention • Job satisfaction	• Capacity and oversize • Managerial settings • College culture • Working environment	• Organizational configuration
Technology	• Network services • Network capacity • ICT skills and task • Security of network • Isolated management • Separated development • Budget limitation for ICT • Fragmented Budget for ICT • Partner cooperation • IT governance • University's ICT strategy • University's ICT technology scope • University's ICT infrastructure development • College's ICT planning & maintenance	• ICT capacity • Isolated and separated ICT • Fragmented investment • College's ICT development • UD's ICT strategic development	• ICT competency
Teaching and learning	• Resource and motivation • Teaching methods • Academic transition and changes • Challenges for academic changes	Academic ambiguity	• NA

Unlike the data of organization and technology, the teaching and learning data sets have been analysed together to see how deeply their relationships have interacted. From eighteen basic themes, four organized themes have been constructed to cluster into one global theme, namely resources and motivation, teaching methods, challenges for academic changes and transition and change. *Resources and motivation* have come to be used to describe the learning attitude of students and the allocation of time resources to teaching staff. The *teaching method* refers to how a subject has been delivered and the relationship and

interaction between teaching staff and students. The *Academic transition and changes* can be defined as the existing changes in academic system and features of academic environments at COE. The *Challenges for Academic changes* refers as unfavourable conditions which limit improvement and development of academic activities in institution.

4.3.1.2 Themes of process

The process of data analysis has isolated and classified data which indicates the meanings related to the conceptual frame of the stage process of implementation, namely initiation, implementation and post-implementation. Consequently, the features of the three stages of the process have been acknowledged by data allocated at each stage. The following section will describe detailed features of each stage of E-learning implementation.

Table 4-2: Process of E-learning implementation, University of Danang

Themes	Pre-implementation	Implementation	Post-implementation
Organized	• Initiative approach • Innovative culture	• Facilitating factor • E-learning awareness • Volunteered vs. obligation • Clarity and guidance • E-learning motivation policy • Resisting factor • Learning environment • Skills & professional development • Developing learning resources • Bureaucratised administration • Poor management • Control and monitoring • Management unsupported • Leadership competence • Technology-based teaching method • Teaching methods • Technical problems of system • Performance of system • Low capacity of E-learning system • E-learning support • Challenges of HR • Time consuming for adoption • Organizational politics • Benefit for adopters • Improvement of E-learning • Benefits of adoption • Reducing teaching volume and workload • Generating revenues or income • Institutional rather than academic function • Frustration of E-learning implementation	• Decline in interest • Different levels of adoption at different department • Damages and risk of E-learning adoption • Self-solving problems • Future plans • Social networking for E-learning • Need for integrated services • Need for digital infrastructure • Needs for E-learning supports • Need for standardization of pedagogy

Global	**NA**	• Positive conditions • Negative conditions • E-learning policy & operation • College management • Managerial competency • Pedagogical method • Inappropriate technology • Challenges to adoption • E-learning benefits	• Outcomes • Risk and damage • Future development • Needs for E-learning

In the initiation stage, E-learning at COE was transferred from DBA, where the E-learning system was in production, with available resources and registered users. Therefore, it is understandable that the study have not gained much data at this stage at college level. However, the innovative spirit of DBA has indicated significantly to promote E-learning applications widely in this department. Data collected at DBA has been grouped into two main categories, innovative culture and the initiative approach to E-learning. Data from DBA indicates that the *innovative culture* of BBA was initially incubated for E-learning development before shifting to COE. On the other word, innovative culture is likely to be a driver for E-learning adoption at COE.

In the implementation stage, data analysis formed thirty organized themes which have been identified from eighty one basic themes. From the factorial perspective, theses have been clustered into nine global themes, namely positive conditions; negative conditions; college management; managerial competency; pedagogical method; inappropriate technology; E-learning policy and operation; challenges to adoption; and E-learning benefits. The *positive conditions* can be defined as any stimuli which accelerate E-learning adoption at COE. The *negative conditions* have been used to indicate any impacts which cause resistance to E-learning adoption. The *managerial competency* refers to the ability of the executive management board in managing COE. The *E-learning policy and operation* refers to strategic priorities of COE and the direction to promote E-learning at COE. The *inappropriate technology* commonly have been used for digital infrastructure from which the E-learning system has been built up and problematic issues which E-learning users has been faced. The *pedagogical method* generally refers to how a subject has been taught on the system. The *college management* refers to commitment and support from top management and procedures for E-learning activities within COE campus. The *challenges* describe the features of the academic environment and the difficulties which students and teaching staff face when adopting E-learning.

In the post-implementation stage, there were twenty seven basic themes identified to create ten organized themes that were clustered into four global themes to present the main features of this stage, consisting of the needs for E-learning; risk and damage; outcomes; and further development. *Risk and damage* refer to the loss of reputation and negative effects on both individuals and organizations when adopting E-learning. The *need for E-learning* can be defined as needs of E-learning users, who want to have more features in, and improvements to, the E-learning environment. The *outcome* illustrates the achievements of E-learning adoption within the campus of COE. *Further developmen*t refers to future plans proposed for E-learning development.

4.3.2 Thematic network

The first three thematic networks, namely *organizational configuration, ICT competency and academic ambiguity* interactively illustrated the contextual settings under which the E-learning implementation process took place. In the process of implementation, the data that was categorized into three stages worked inwards towards global themes. As a result, 13 global themes, namely *positive conditions, negative conditions, E-learning benefits, policy and operation, pedagogical method, challenges to adoption, college management, inappropriate technology, managerial competency, outcomes, risks and damage, future development and needs for E-learning* emerged from the data towards the thematic networks which represented the process of implementation. From a TNA perspective, the outcome analysis is presented in a web-like-network. The super and global themes associated with thematic network developed from the process of implementation and its context make up the over-arching thematic network, illustrating our key findings, as shown in Figure 4-3.

The centre of the thematic network where the global and super themes at different abstract levels configurationally integrate is called a virtual layer. Via the virtual layer, interactions and interrelationships among the individual thematic networks will be defined by acting mechanisms, in order to shape the nature of E-learning implementation. The general thematic network highlights the primary themes that address the nature of E-learning implementation at COE, UD and outline the structure of our interpretation of findings in the next sections.

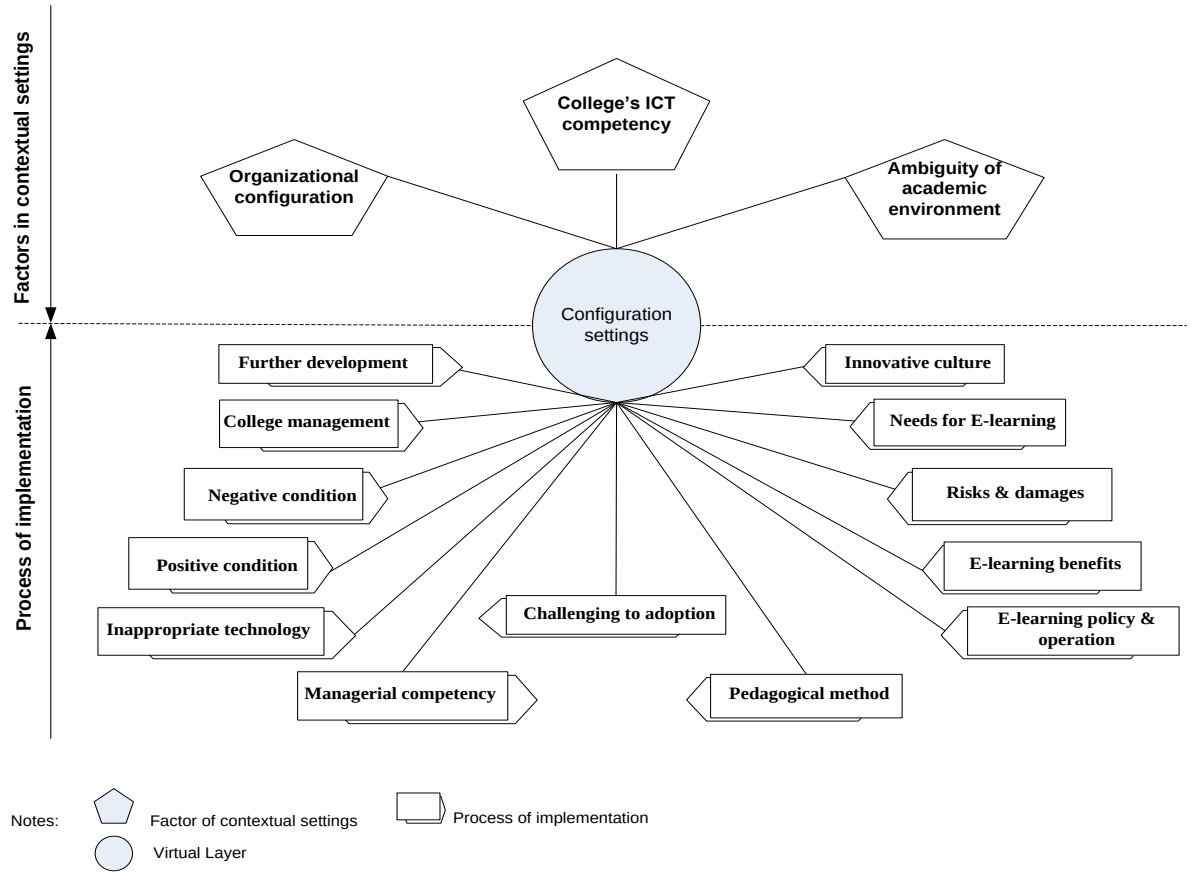

Figure 4-3: Thematic network of E-learning implementation, University of Danang

4.4 Context of E-learning implementation

This section presents the organizational, technological and academic context in which E-learning has been implemented at the University of Danang. Firstly, each context has been documented by evidence, followed by the thematic network which has emerged from the data. Following parts illustrate in details:

4.4.1 Organization

Over 35 years of development, the number of student enrolments has significantly increased, by 800 percent, and associated with this, the student-faculty ratio is presently about 80. However, relevant physical resources have not been developed with the increase in the number of students enrolled. For example, over that period there were only two buildings which had been built on campus which provided about 30 classrooms but lacked space for self-learning. As a result, the physical facilities for large classes to entirely cover the student population and to complete the curriculum are not available at the COE campus. The tension between academic resources and the increase in the number of students requires a new business model and management for COE. However, COE has remained unchanged, as a

dean of department argued when asked for college administration:

> *"Our system is presently chaos, for some reasons, the first is the size. I think that the increase in the scale of enrolment requires an increase in facilities, and a new model of management. We cannot keep the model and manner as ten years ago… Our way is very ragged… I think that the dean is "nothing",* AMCO1

It is likely that the size of the COE has exceeded its capacity, which could provide and maintain the quality of services for academic programs and student learning. At this point, the diseconomies of scale could challenge the COE to maintain academic quality and administration. Instead of changing the business model and management radically, COE has emphasised administrative rather than managerial approaches to managing teaching, learning and support activities. The administrative approach usually leads to much paperwork, meetings and bureaucratic procedures. On the one hand, the increasing number of enrolments usually requires expanding the span of management. The size of the student population leads inevitably to a lack of managerial control. As a result, it is unlikely that COE could monitor most activities and practices carried out by staff. As a dean of department pointed out:

> *"...COE has not been consistent; they mention and forget; no enforcement. If you strongly monitor, they are completely different. It says in this year they will do, and next year you never mention about what has been done, do something by halves... It is very arbitrary."* AMCO1

On the other hand, the academic departments have been swept away by administration, instead of focusing on academic work. Academic staff are usually involved in non-teaching activities, while the volume of teaching in each semester has already overloaded them, as one staff member complained:

> *"... There is so much administrative work I cannot cover. We are exhausted with administrative work, so there is no time for us to be interested in E-learning...."* LECO8

It is like a vicious circle: to deal with too much institutional work, several meetings will be organized; the more meetings are held, the more complex the situations which are created that require other meetings to solve. As a teaching staff said:

> *"... currently, it is only administrative, some meetings a month, all are for discussing administration. When COE wants to do something, the department will discuss until*

the end of time. Departmental meetings are so funny, oh my god, someone speaks, the others make private conversation, and nobody cares about what the meeting is about. I saw my Dean speak from one to four, and then go home; sometimes meetings are held until 6 PM. We have meetings we have to attend but we come to socialize rather than share or work out something". LECO8

The increasing numbers enrolled has led not only to an increase in administrative work but also increases in the teaching volume. Under this circumstance, the overloading of staff is foreseeable. It has put pressure on COE's human resources, in both administrative and academic areas. It was said that staff suffered from the institutional work method and its bureaucratic manner due to the oversized nature of the college. In addition, teaching staff had to load a huge volume of teaching each semester. Thus the quality of work was neglected; pressures on teaching and administration increased; and institutional work required more time, which staff needed for their teaching preparation. In other words, staff almost had to reserve their time for teaching and institutional work only, as confirmed by a senior manager:

"...Too much teaching was required, a strong pressure on teaching in classrooms, so that many staff wanted to adopt but there was no time for them to go online to interact with their students... with more than 20,000 undergraduates and 2000 postgraduate students enrolled while, we have only 200 teaching staff, teaching in classrooms could not bear such amounts of work, then do not mention adopting E-learning more. Replying to email, interacting and communicating with students daily yeah, where is the time for us to do these things..?." ADHR10

As a public institution, the income of COE is also regulated by the Ministry of Education and Training (MOET) and Ministry of Labour, Invalidity and Social Affairs (MOLISA). Like other developing countries, working in the public sector normally involves lower incomes than in the private sector. Payments and income for support staff are likely not to motivate them to dedicate themselves to their work. The support staff were very unhappy with their income when working for COE, as the head of the IT division complained:

"When working for the college with a lower salary than an outsider, they do not make an effort in their jobs… rewards and incentive policies for IT staff makes them depressed, they have too much work but a low income, therefore they work ineffectively" ADIT11

The low level of income could impact negatively on work attitudes. COE's staff seem to

reserve their time to look for other jobs to earn more income. As a result, the work will be impacted on, due to the lack of dedicated time resources and accomplished tasks. As staff evaluated their motivation:

> *"Currently, everything is related to benefit, the motivation for anything will be dominated by economic benefits. Instead of taking time for academic discussion and organizing a seminar, they will reserve their time to teach for earning: teaching for other schools that can earn millions of VND is much better."* LECO8

In conjunction with low incomes, IT staff were stressed by relations with their managers. Differences in expertise can lead to misunderstandings when commanding and controlling subordinates from management. IT staff felt unhappy when working with the line manager, which meant that they were not permitted to perform to their full potential. As an IT manager commented on the work relationship in their department:

> *"...If you are the technological manager, you should understand a little bit about technology. My manager has no knowledge of technology at all but he has the right to say and make decisions about anything. This made us very upset, I really do not want to work; it's very difficult to propose anything."* ADIT11

It is clear that work environments at COE did not motivate staff who want to dedicate their time and achieve higher levels of performance in assigned jobs. As a result, academic services and support will be impacted on by less motivated and desired staff. When IT staff do not work effectively, the college cannot check how the IT services work and whether technical problems have been solved. For example, IT staff could explain why a particular technical problem could not be solved immediately, as this IT staff member explained:

> *"The IT division did not have enthusiasm. For instance, when network is congested then staff just restart the DNS or restart the server. However, they did not; the network could not hang up for a long time like that..."* SSIT12

It is likely that the attitudes and lack of enthusiasm of IT staff could be the reason for the poor quality of network services provided by COE. COE's staff were not dedicated to their work because their salary was too low, compared with working for other employers.

The global themes determined aspects of organization and management at COE discovered from the data, as depicted in Figure 4-4.

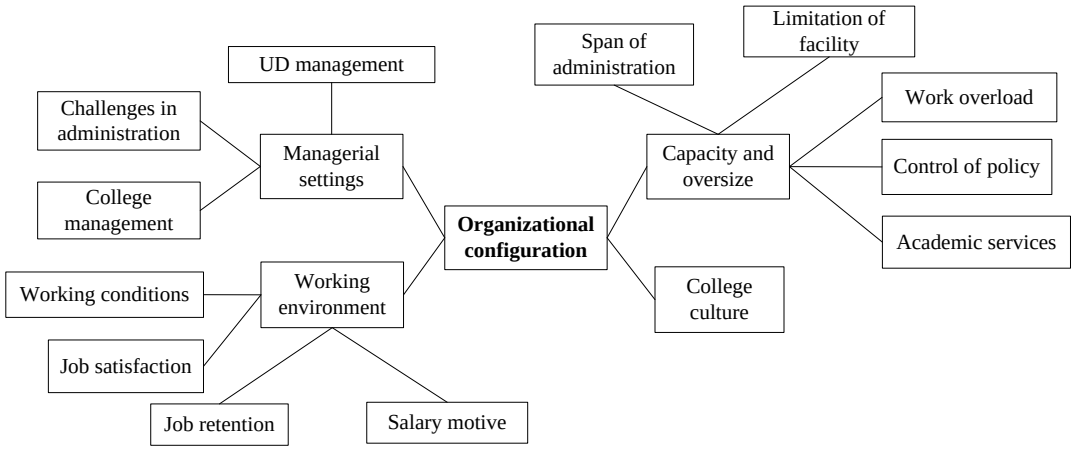

Figure 4-4: Thematic network - organizational configuration

The consequence of the increase in the number of students has put pressure on college work. The size of the student cohort has significantly impacted on the working environment and challenged college management. In addition, the bureaucratic structure and procedure has led to loss of monitoring of college policy. As a consequence of these conditions, it appears that staff have been stressed by overload and tension. This suggests that the link may exist between population size and college operations and management. A lack of motivation and low wages can result in low job retention and satisfaction. As a result, the poor quality of academic services is associated with inadequate working conditions and environments at COE. However, the college culture appears to be a positive driver for innovation and fostering technology adoption in one place. It may also cause dissatisfaction and constraints in another.

4.4.2 Information and communication technology

For the last 5 years, COE's IT infrastructure has developed through three projects funded by the state. The first rebuilt the campus network; the second invested in hardware and services; and the last introduced student computer labs and teaching and learning devices, and a Wi-Fi network. Compared with other college members in UD, COE has heavily invested most of its budget on its IT platform. However, a quality network has not been gained as expected because of a lack of balance between "hard and soft" infrastructure. Under government regulations, state funding must only be invested in physical assets (for checking and monitoring the funding) rather than on invisible infrastructure, such as professional training or software. As a result, the budget for IT training and development of new technology entirely depends on the annual budget allocated from the college budget. In the case of COE, IT staff did not have a chance to be trained in new technology. It is more dangerous to COE

networks when security devices are equipped with but have not installed the secure COE network. In addition, a software firewall was also bought but did not have a filtered connection to the system. This seems to be a reaction from IT staff to their own issues, and nobody at COE or any college leader knew about this or was in a position to control the issue. As an IT manager said:

> *""During time working for the college, I have to seek everything on the internet. There is no training for staff. I have seen that the project budget for the IT facility is very high but there is not a budget for training in technology. College technology has not been taken care of… security currently is empty. Firstly, the network is not protected by ASA, it opens all ports. The WinRoute firewall software does not protect internet access. NAS and ACS have not worked as the configuration of the project design"* ADIT11

In addition, the operational budget allocated to IT services seems insufficient. Therefore, the maintenance of the campus network and facilities is worse. One student said that:

> *"I see that some of my friends bring their laptop to the computer room and connect to networks. In the PC room of the college with 100 PCs, only 20 PCs work."* BAST1

At COE, IT management and organization are dominated by a localized mindset in which a digital platform should be physically owned and controlled by themselves. ICT has been organized based on functions and specifications. To manage and provide ICT services in the campus, two IT units exist: the first is responsible for the digital platform, network services and some applications for the whole college; the second one manages only the academic applications, which are hosted independently on a separate hardware platform, and an access system operated by the office of academic affairs. COE currently has internet access, an email service and E-learning, an academic system, and an online library catalogue on campus, in which the library and academic system service have been developed and run by the office of Academic Affairs. As a result, students and faculty have to use several different authentication and authorization methods when using these services. When asked about ICT management of the college, an IT manager said:

> *"The IT division of the college is different from the IT unit of the office of Academic Affairs. They are not compatible and integrative in terms of software, hardware and firewalls..."* ADIT11

The separation of the management of ICT could have led to limitations in developing and using ICT services. On the one hand, it could bring more complexity to the end-user when authenticating and authorizing, before using the services, if COE does not provide a single sign-on service. On the other hand, there will be barriers to the management and development of ICT services, such as maintenance, staff and integrated services. In addition, overhead costs for ICT could be doubled when the services are separated and different locations require different budgets and labour. A senior manager recognized the technical issues of the college's ICT:

> *"A long time ago, we built the platform under the local mindset, the library system had its own database, the accounting and financial system was separate and the academic system was different to the others. All had their own hardware, servers so that integrating them together has been a big problem"* ADBM14

With a rigid boundary from one IT unit to another, ICT development and application are likely to face obstacles. Definitely, the quality of service provided will be impacted on. When problems happen, the college could not determine where it had come from and who was responsible for the issue because the quality of IT services depends on it being built from a smooth combination of software and hardware. For example, the student registration system has shown very low performance, but the office of academic affairs concluded that it had optimized development, and that the poor performance was due to the network service run by the IT Unit, not them. Meanwhile, the IT staff said:

> *"For the software programmed by the academic affair office, I think that there are some problems on student registration. I think that some algorithm should be improved".* SSIT12

Organized and managed in such a way, the maintenance and support services of the college's IT will be very poor. Recognizing problems in separation, the Director of Academic Affairs was promoted as vice-rector to being in charge of ICT of COE. With a background in accounting, the new vice-rector was likely not relevant to IT jobs. An IT job strictly requires people with knowledge and professional skills. It is not easy to be an IT manager if someone has only management experience. Therefore, technical staff seem to be stressed when working under such supervision. As a former IT manager of COE said:

> *"Managing that division, actually, I have no power so that when making decisions, staff are not listening. When IT has a problem, I report to Mr. Toan but he does not know*

anything about IT… My managers do not have knowledge of IT, they have seen servers still working, they do not think that the hardware platform meets the needs of the college… Leaders without knowledge of IT have organized some meetings and made decisions, making subordinates angry and depressed." ADIT11

The global themes illustrating aspects of technology are indicated in Figure 4-5 below.

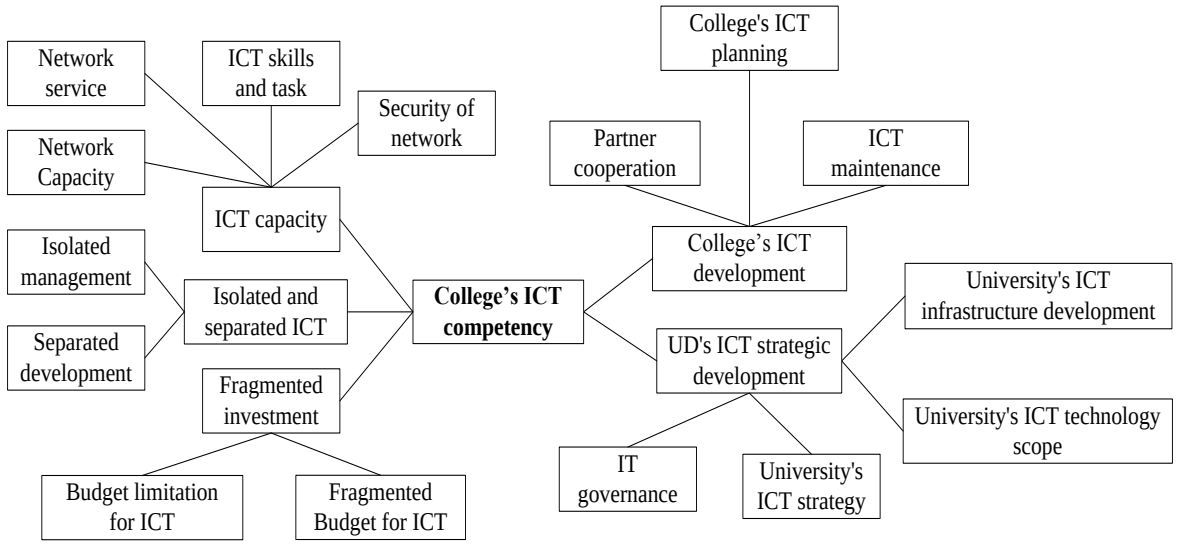

Figure 4-5: Thematic network- ICT competency

Currently, the strategy of UD is delegated to college members responsible for their own development and operation of ICT. Because of this, COE has independently invested in digital infrastructure and developed the application based on their needs, following its priorities. It is apparent that a delegation in governing ICT from the university impacted on how ICT was operated and managed by college members. Hence, it is possible that ICT has been organized and operated separately under control of individual departments in the case of COE. As a result, the ICT budget may be allocated and operated at different locations. Along with limitations of the operational budget, it may suggest that the ICT infrastructure may result in incomprehensive solutions. In addition, operational budgets and human resources are important factors for the quality of ICT services. In the case of COE, it may suggest strong links between the lack of budget and the poor work attitudes of ICT staff with the poor quality of network services and maintenance. As a consequence of this influence, students and staff have been provided with a low connection speed, unreliable network services, unavailability of materials and an unsecured virtual environment.

4.4.3 Teaching and learning

The Vietnam higher education system has been transformed from a yearly to a credit system since 2006. Under new regulation of MOET, HE institutions has been required to open access to information about the profile of graduates; resources for quality of training and budget. With the involvement of the public, it is expected that the academic environment of HE institutions should have more freedom, transparency and demography. However, the academic system is in a transition period. Student feedback and public review have not been actively involved in renovation. Like other academic institutions, COE still needs more transparency and standardization in teaching and learning because of the ambiguity in academic policy and discipline. It is also required to define the relationship between teaching staff and students in its academic environment. As a dean of department mentioned:

> *"... These challenges require teaching staff actively to evaluate the entire process of teaching because in the past what you taught could not be official and standardised. It is time for official standardization. You must be transparent during the process of delivering knowledge in the relationship between teacher and student. Open access to the public means that everything must be clear"* AMBA2

The changes, as expected, have not been achieved yet. HE institutions need time to prepare staff, as well as facilities which support these changes. Lacking resources and time, COE has carried out a pilot project, which is called an advanced program in which COE will reserve the best resources for the quality of training and learning performance. The advanced program has been viewed as a strategic development for improving and enhancing the quality of training. As a college manager pointed out:

> *"... Develop some advanced courses with high quality of training. They should be the flagship in our college. They are the kernel to pull the others ..."* ADBM13

Although COE tried to improve the quality of services to support student learning, positive achievement from the advanced program has not been delivered to its campus yet. Students have suffered with the academic support services provided by the college on computers, and in the library and registration. Problematic issues are the result of old facilities and out-of-date technology. For instance, registration services are the most complained about by all students interviewed. In 2010, major newspapers in Vietnam reported that COE's students seriously suffered during the online registration of courses. A group of students were infuriated, one saying:

> *"Not sleeping, there are many times we have to wait until 3-4 am when registration has been done. Students want to register with qualified lecturers so that, at the beginning, everyone will log in at the same time, and the network gets stuck."* COST1

To support student learning, COE provided several computer labs on campus with internet connections. However, when students needed to access it, it seems not to have been available. As a result, most of students had to access learning resources from home or internet cafes. From the customer service perspective, students were not satisfied with what they had paid for. From a behaviourist learning perspective, learning in these conditions is far from ideal because environmental factors impact strongly on learner's concentration and consciousness. In such conditions, the learner finds it difficult to acquire knowledge, improve skills and achieve academic performance, as they are bothered by external factors. As a teaching staff member said:

> *"... The learning environment lacks privacy features, such private rooms, and there is no internet connection on campus. Students have to learn at home or in internet shops... The learning process without such pedagogy is terrible..."* AMIS3

Along with IT service and support, other academic services have been poor and have involved impropriety. For example, students have complained about the inconvenience of the timetable of the library service and book lending. COE's library served for no more than 8 hours per working day. Furthermore, the library set the specific time for borrowing specific books for specific courses or groups of students. Sometimes students are too busy to attend the class and cannot attend the library at the appointed time. Another issue reported was that the library service depended on the college network. If the college network had problems then the software could not complete the task, as a student reports:

> *"The library sets a fixed schedule for borrowing and collecting books. However, we worrying about the network because the librarians said that the library network is down, we have to come another time or wait. But the timetable of courses is fixed in advance; we cannot come there to wait any time they want. Last semester, we went there and had to wait for the services.* BFST1

Due to the increasing number of students admitted, the teaching style at COE is classified as 'teaching for large groups', which challenges lecturers to generate and maintain students' interest, engage students and structure lectures. Thus, it is impossible for instructors to give feedback for their student. In addition, other learning forms, such as learning collaboration,

group learning and project almost can not be designed in learning and teaching process which is nescessarily to develop teamwork skill for student. As a result, COE's teaching staff has typically used presentational techniques with LCD projectors and the circulation of hand-outs to deliver content, as in face-to-face settings. Actually, slides and study guides are the main reference sources for student learning and tutorial activities in the classroom. All of these materials can be used iteratively from one classroom to another. At COE, the pedagogical activities include preparing reference materials in text or PowerPoint slides and speaking in the classroom. Without a quality assurance, peer review or lack of academic discipline, it is very difficult for the COE to check and monitor for the quality of teaching and student performance. In addition, equipped with modern technology, the teaching staff misused information technology when designing and preparing the content of courses, as mentioned by a lecturer:

> *"... PowerPoint slide-based teaching has been increasingly misused. Actually, they have read something somewhere without citation to put on slides instead of seriously research a discipline to build up an official reference source."* LEBF7

Therefore, several subjects on the curriculum lacked official references and sources. At COE, most teaching staff took for granted that the quality of a course or subject was the same, whether taught with published textbook or not. In other words, textbooks seem to be a quality standard to evaluate the quality of a subject or course. Due to a shortage of textbooks relevant to each subject taught, and a lack of references to sources, a subject taught by different teaching staff may vary in quality and approach. Therefore, to improve educational quality, the most effective intervention identified is providing relevant textbooks. Teaching staff have called for standardization among courses offered by COE, in which textbooks are taken as primary standards to develop curriculum and pedagogical methods. This learning and teaching approach is likely to have adopted the principles of instructivism, which is based on the availability of resources of the institution, both human and non-human, rather than what learner wants to learn. As a staff memeber commented:

> *"... A course must be a unified outline of content, have textbooks, a syllabus, the same standards, prerequisites, and assessment... so that teaching staff professionally understand and know what to each week. Teaching staff must plan academic activities in each week in advance...."* LEIS9

The relationship of global themes in this context is illustrated in Figure 4-6 below.

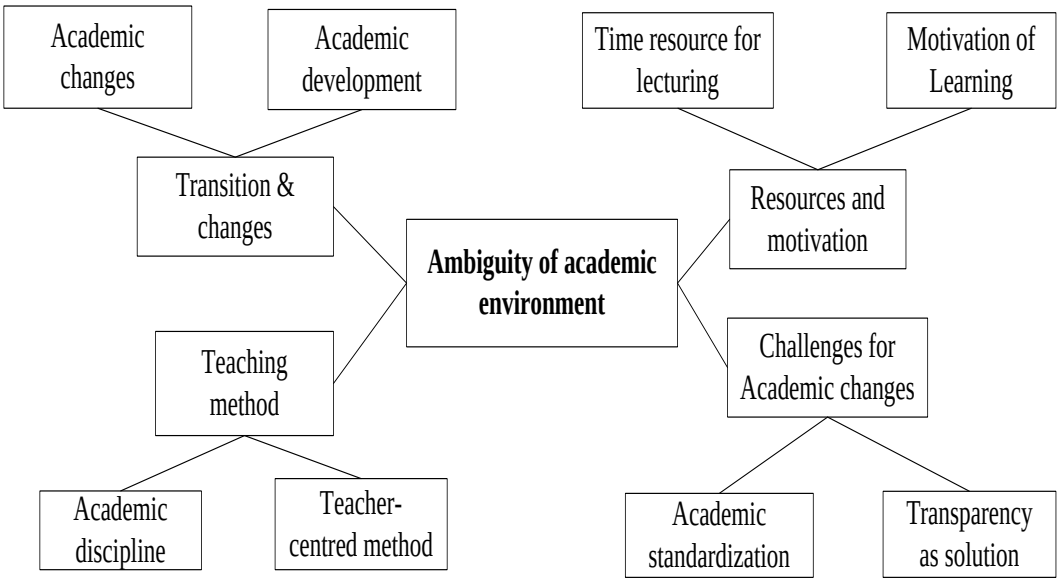

Figure 4-6: Thematic network- Ambiguity of academic environment

In the case of COE, as a consequence of the ambiguity of the academic environment, academic discipline is probably very hard to maintain and become the barriers to academic development. If academic discipline has not been strictly respected, it is impossible to motivate student learning. At COE, therefore, students seem not to have worked hard in their study. Transparency is also an important factor for facilitating intellectual development in higher education. Under new governmental regulation, educational institutions must open access to its academic policy and resource. The government has expected that enforcement could bring more transparency to students and stakeholders. It suggests powerful links between academic changes, development and transparency. In addition, changes in education also impact on the traditional role of the teacher in pedagogy. However, a positive signal on pedagogy does not existed yet. It is possible that teaching staff may be interested in student feedback to improve their methods, instead of continuing with delivering knowledge entirely in their own way.

4.5 Process of E-learning implementation

The process of data analysis has isolated and classified data which indicated the meanings related to conceptual frame of stage process of implementation, namely pre-implementation, implementation and post-implementation. Consequently, the features of three stages of process have been acknowledged by data allocated in each stage. Following parts describe details features of stage sequenced process of E-learning implementation.

4.5.1 Pre-implementation stage

The E-learning initiatives at COE stemmed from DBA where an idea to build an E-learning system at a small scale for staff and students has been supported. Learning by doing, DBA staff had worked together to develop learning materials and organized some internal training sessions for other faculties. Explaining the application of E-learning at DBA, the dean of the department said:

> *"...Starting with our acknowledgement, we recognized that E-learning is the key role in supporting teaching and learning in HE."* AMBA2

After launching the new teaching and learning environment, students and teaching staff were very interested in applying E-learning in their work. It gave very positive signals in academic environments. It is clear that E-learning activities at DBA produced remarkable results in academic society, as major newspapers have published information about changes and impacts of HE learning and learning based on technology in DBA. As a reult, DBA, on behalf of COE, was invited by MEOT to present their experiences of implementing E-learning, learning and management of E-learning for leaders from other Universities and MOET officers. Successfully launching an E-learning application for the first time, DBA has been viewed as a pioneer for E-learning applications in Vietnam. Thanks to the departmental culture, E-learning operations have been adopted which stem from the innovative ambitions at DBA. As a teaching staff mentioned:

> *"Our culture always encourages us to apply for innovation and use innovation as much as possible. Moreover, we were the pioneers in introducing E-learning, so it would be easier for us to adopt it than the others."* LEBA6

4.5.2 Implementation stage

4.5.2.1 E-learning policy and management

After transferring from DBA to COE, the domain to access the system was changed from *dbavn.com* to *elearning.due.edu.vn,* so that the E-learning system officially became one of COE's digital assets. In other words, E-learning was no longer in the early adopter phase. It totally eliminated any barriers and limitations to the use of E-learning once owned by DBA. Surprisingly, COE's lecturers had not participated, as expected. Teaching on the new system mostly was contributed to by lecturers from DBA from the previous system. Some lecturers

from the Department of Tourism and Commerce and Information Systems created courses on the system.

It is likely that teaching staff were not clear about COE's plan of E-learning implementation. Although E-learning had been adopted broadly within DBA, other departments have waited for an official message, policy and confirmation from COE. The lack of information about E-learning was mentioned intensively by teaching staff. They needed more information to figure out how to adapt and what resources were required. As one chair of an academic department reported:

> *"The college has never organized officially information about how E-learning has been implemented and how it should be carried out... The college should have some training sessions or seminars about E-learning for everyone."* AMBF4

COE should recognize that, to get people involved in E-learning, teaching staff need to know not only "how to implement E-learning", but also understand "why to implement E-learning" with regards to strategic development. Therefore, providing information and communicating on the right channel enables staff to participate actively in E-learning implementation. However, it is likely that the implementation plan and policy of COE was not communicated in an effective and sufficient way, as one dean pointed out:

> *"It is important that the mission must be communicated to people involved in this task, and to know why they had to do. The leaders should know that they have to give the message about the benefits of E-learning to every teac hing staff member and student then it can be done"* AMIS3

Information and communication have significantly important roles in technology adoption. On one hand, it can help to address changes and challenges in organizations. On the other hand, information and communication could level up the awareness of technology adoption within entire organizations. In the case of COE, illustrating the lack of information and ineffectiveness of communication about E-learning made a different recognition of the potential of IT in general, particularly E-learning among staff and academic departments. It is likely that understanding E-learning plans has an important role in motivating staff to participate in new teaching environments, while the need for good quality communication and information were essential for the adoption of technology and future development. As one lecturer who regularly used the system confirmed:

"There are some people who have very good recognition, some have not, therefore, we need to communicate" LEBA5

In addition, COE made the situation more difficult for itself with lack of control and commitment to E-learning policy; it could not convince and motivate its staff. For instance, COE proposed and issued an incentive policy in which teaching staff would be paid extra if they used E-learning system to support student learning. However, this policy was never carried out. COE should have officially explained why staff could not get payment. Even if teaching staff were involved in E-learning adoption without targeting extra payment, the difference between policy and reality created negative impacts on engagement and involvement in E-learning. From a strategic thinking perspective, IT adoption and innovation should be straightforward in order to motivate the whole organization to achieve strategic objectives. Extra payment for teaching on the E-learning system had not been accomplished because COE could not determine how much teaching staff had worked on the system in terms of time, tasks and support. As a lecturer explained when COE had refused to pay her for her teaching:

"That is paperwork, they have promised but to receive that money, several procedures you have to pass. Nobody has been paid from that budget yet." LECO8

If COE really wanted to carry out its policy, it would not have been difficult to clarify what was going on the E-learning system because the MOODLE system already provided a system log to track every activity on the system during a specific period of time. The log file per user can be exported directly from the system without intervention for certifying by any procedure. Moreover, it is acknowledged that spiritual motivation is also never less important than financial incentives. In the case of COE, however, staff achievement on E-learning participation and contribution was never recognized. It is very peculiar of COE's management to do this when motivation is a very important function to get staff involved in the organizational objectives, as an academic manager noted when evaluating their contribution to the college's E-learning:

"College's evaluation and appreciation are nothing to the Department of Business administration… Barriers have been created by the way top managers do their work. They think that E-learning is an unofficial activity. I think that it is the biggest barrier… how college defines the concept of E-learning. The role of E-learning in teaching and learning has not been defined clearly yet." AMBA2

Beside enthusiastic lecturers from DBA participating into the process of E-learning implementation, the lecturers from the other departments were considered positively to join the system at that point. While lacking motivation and favourable conditions from the college, it is likely that the internal innovation and local culture paved the way for recognition of the benefits of technological innovation and adoption. The departmental culture helped lecturers not only to overcome difficulties but also to explore new ways to apply new things in the new environment. The sharing culture from the department has the role of enabling ideas to come to fruition, as this teaching staff member, proud of her department's culture, put it:

> *"Finding out any key things, we will share together; it's a process of learning together."* LEBF7

Learning to use a new technology is always a challenge for adopters. However, the DBA had a plan to reduce challenges in the new environment:

> *"It is voluntary to exchange ideas, have group discussing, implement "learning organization process, learning together, and transferring tacit knowledge."* AMBA2

In the case of COE, a local culture impacted powerfully on engagement and involvement in E-learning on two sides, active adoption and resistance. Although collective culture is dominant in Vietnam, sharing and supporting culture within DBA allowed the E-learning inadequacies and limitations of the college to be overcome. However, collective culture was also the shelter for resistance to E-learning adoption when most of the faculty from other departments looked to make a deal. As a dean of a department commented:

> *"It is fine if I order teaching staff to upload and publish materials and content of courses online. It can be done… One staff member has done this, and six staff who teach the same courses can benefit from the work of one person. To deal with the college, those six staff can explain that we have collaboratively developed that course together. The materials are collective works, so we can all use them."* AMBF4

The levels of E-learning's interest and use were different among academic units, depending on where innovation was introduced and how high IT literacy levels were. For lecturers at DBA, E-learning was easily accepted and appreciated because they were pioneers and innovators. They also claimed that others have not participated in E-learning because they have not recognized the benefits brought by E-learning at that point.

"The other departments have hesitated because the reason has come from college communication. Because we are the first ones introducing E-learning, we know what benefits it can bring to us, but, they do not have such conditions. Therefore, the college should take the role to make them know how E-learning can support them." LEBF7

It is likely that innovation is an enabler for the dissemination of technological innovation within DBA while other departments have to apply new technologies themselves because of a lack of support and training from the college and university. In other words, preparation for going online was not well planned so that E-learning adoption among academic staff at the whole college was limited. As an evaluation from a teaching staff when comparing the use of E-learning among departments:

"I think that the difference has come from the nature of the discipline and the profession of management because management lecturers have the habitats and teamwork skills… and active involvement in new ideas is better than in other department; that is the big difference." LEIS9

4.5.2.2 E-learning technology and problems

The quality of network and IT infrastructure seems to have been a major problem for E-learning users with regard to network performance and connection. Most users complained that the COE's network connection was very low and unreliable. It took time for students and teaching staff to learn online. Because the cost of bandwidth is expensive in Vietnam, the internet connection was limited at COE. In 2005, the whole college had only 2 Mbps connection to share for all network services due to a limited budget. Therefore, low connection speed wasted students and lecturers time, not only in general internet use but also in terms of learning and teaching on the E-learning system. As a manager said about the college network services:

"One test takes 30 minutes, three times is 90 minutes, in order to have 30 testing minutes, they have to connect 15 minutes in advance to sit and wait. Hence, the fee for student using E-learning is increased due to the college's bad network... Networks must be 100% uptime and have enough capacity for participants... The very low speed of connection wastes time for learners." AMIS3

Difficulties in using E-learning are not only related to the network service. Students and lecturers were faced with unreliable functions from the E-learning system itself. E-learning environment has been significantly depended on the quality of network technology. When the network is not reliable, the process of teaching and learning on the system will be impacted. For example, during the process of online examinations, the E-learning system was stuck. All the answers from the test were lost and the system could not return the final result. As explained by a lecturer, when asked about the quality of the system:

> *"When students submitted their work they automatically got a zero mark. I could not check whether or not students have already submitted or whether the network had made a mistake. Generally speaking, that is problem."* LECO8

In addition, faced with such technical problems, the need for support from IT staff was not responded to on time, when users demanded it. While other repairs and maintenance seemed to have met the needs of users, the support service for E-learning seems not to have changed to meet users' needs, as reflected by a member of staff:

> *"We already have given feedback about the E-learning system, we see that problems with classroom facilities, such as lights, have been repaired but student's feedback on E-learning have not yet changed"* LEBA5

Most interviewees thought that the technical problems mainly came from unsystematic investment, due to a lack of resources for hardware and qualified IT staff. Although the technical problems could have stemmed from user's IT literacy and skills, if IT training and development has been organized by COE it could have improved and enhanced IT skills for users to overcome the technical issues and avoid technical mistakes. In this case, training and professional development is a solution. An academic manager said:

> *"Human resources, the main factor in managing E-learning technology does not exist yet; both hardware and software do not meet the demands… The college's teaching staff are tinkering their work on E-learning, in an unprofessional manner. Therefore, if human resources have not actually been improved, it will not match with E-learning at our college… Although E-learning does not require very high IT literacy, you have to know a little. It is evident that many people use E-learning but some cannot."* AMIS3

It is clear that both IT as well as teaching staff should be professionally trained to offer a reliable service for learning on the system. COE's IT capability currently does not meet with the needs of E-learning. If the COE really wants to promote E-learning, COE should improve human resources to support academic services and E-learning activities.

4.5.2.3 Teaching and learning on E-learning system

Launching the new teaching and learning environment, E-learning is very attractive to teaching staff and students. They were excited and jumped into the new environment and actively used it for their work. One of reasons given by lecturers to explain why they used the E-learning system more extensively than the others was the recognition and awareness of E-learning. For them, E-learning benefited them in several ways. From a learning theory perspective, technology-based learing and teaching has been improved by two way communication and interaction. A teaching staff member mentioned:

> *"The interaction between teacher and student is better than before. We can apply a lot of new tools in lecture, assessment methods are much better, and knowledge delivery is also better."* LEIS9

Nevertheless, teaching staff were usually excited about how E-learning tools helped to control and deliver the volume of teaching and academic work, rather than how pedagogy was applied to the digital learning and teaching environment. The available functions and tools on the E-learning system are helpful for teachers, enabling them to automatically handle teaching activities, instead of them having to attend the classroom. The characteristics of interaction have been emphasized. The more interactive it is, the more useful it is for automatic academic activity. There are two benefits to the automatic tools and interactive functions of the system: improvements in teaching and learning and non-attendance in the classroom. From a constructivist perspective, it is likely that both students and instructors working on the E-learning system do not recognize the technology and social aspects of E-learning, which are equally important for learning. Technological mistreatment can diminish the human aspect of real life interactions and lead to social isolation. As a teaching staff member who recognized the benefits of E-learning said:

> *"….It solves the pressure of huge volume of teaching… E-learning will take more time but the pressure of teaching volume will be lowered."* LEIS9

The positive signals of innovation have not continued. It seems that E-learning has reduced users' interest and involvement at COE. Along with technical challenges, the E-learning system was not maintained at a relevant level. Therefore, the teaching staff and student have been left far way from an E-learning environment, as, an academic manager explained:

> *""There is enthusiasm to learn and explore and then gradually it goes down. There is something they want to do, they have done and then they are depressed. They are sceptical about themselves, about students, about the college even."* AMCO1

4.5.3 Post-implementation stage

At the current stage, it is very challenging for teaching staff to use E-learning systems while lacking support and having limited time. These psychological effects make students feel unhappy and that things are unfair. In the case of DBA, where E-learning has been widely adopted in all subjects and programs, staff and students still have determinedly continued using E-learning by developing another way to get a better service. They have an intention to build up another system separate to the existing one, because they think that E-learning has become an essential part of their work. As an academic manager said:

> *"They participated in our courses, but teaching staff felt… more pressure… There is an unfriendly relationship between staff and students, and an unfriendly academic environmen,... Finally they asked themselves what the good things are which E-learning brings, and why teaching staff have to use E-learning. The department will definitely find a way to use E-learning on another platform that will not be managed by the college...."* AMBA2

Secondly, both students and staff have faced technical problems with the network and E-learning system, especially when students take quizzes online that contribute to their final performance. Student has pressed the college on the form of the quizzes because of technical issues related to the network connection or the system, as a teaching staff stated:

> *"It caused so many complex problems in term of wasting time and persecuting individuals, like taking several hours to sit an online exam because they could not log onto the system. They are stressed, call for help, curse and insult so much..."* LEBF7

For technological innovation and adoption, an organization should encourage all users' involvement and adoption. Using E-learning will require teaching staff and students to undertake extra tasks. Some departments had ready adopted, while others had not. As a result,

the student who studies with adopting departments normally made a comparison with the others who did not study on the system, especially when faced with technical issues. As a dean complained:

> *"It possibly impacts on the college's reputation, especially staff reputation and image, when we have mandated students to participate on the course but the system has prevented it, and did not support it. Thus, this made students very unhappy."* AMIS3

Teaching staff could have intensively applied E-learning in their work if the system had provide extra services and integrate them with the other applications. They really wanted the E-learning system to provide them with a multimedia service to make the lectures better for students. In addition, the needs for standardization of teaching and learning on the system should be emphasised. As a teacher suggested:

> *"It is very good if we have the WebCT system. It will support us in teaching and managing students. It can provide us with storage space to share resources, using multimedia to deliver a course. How to create a system like that is what we need. How to integrate all into one interface, only one system to manage student registration and learning processes are the most wanted."* LEIS9

However, it is likely that COE has not shown the same interest in E-learning development as staff. COE has proposed that it should offer distance learning programs based on the existing E-learning system. It is noticable that, although there are problems of pedagogy, support and technology on E-learning, COE virtuaally neglected one of the most important principles of learning, the learner-centered mindset. Instead of improving the E-learning platform and staff professional development, future development of E-learning within this college should be focused on the economic aspect. As a Vice-rector mentioned:

> *"Shortly, COE will promote the development of E-leaning further by offering new undergraduate degree programs to substitute for the in-service student programs."* ADBM14

4.5.4 Thematic network of implementation process

ICT knowledge is helpful for recognizing the potential role of ICT. High level knowledge of ICT can give rise to high awareness of ICT adoption. In the case of DBA, most teaching staff agree that recognition of the benefit of E-learning led them quickly to adopt technology. As a

consequence, it appears that ICT knowledge is one of the causative factors as to why individuals and departments have adopted E-learning while others have been reluctant to consider it. Lack of knowledge and awareness from management could explain why the existing policy and operation could not facilitate and promote E-learning adoption campus-wide. Moreover, it is possible that underestimating the role of ICT may impact on support and commitment to ICT implementation. In the case of COE, it is likely that a lack of interest from management may result in poor support services for adopters. Therefore, there is strong link between the underestimation of ICT and E-learning challenges at COE.

Another important factor is the conservative mindset, which believes strongly that traditional teaching methods (without applying ICT) are the best approach, as in the case of the Tourism and Commerce Department. Therefore, the combination of limited ICT knowledge and conservatism exerts a powerful effect on E-learning adoption. In addition, E-learning was preferred by students for assessing their learning and accumulating their study results from E-learning activities. Besides a lack of commitment and support from management, E-learning users have also faced technical problems. In the case of COE, these come from two sources, human and technology. Due to limitations of budget and unqualified staff, the capacity of the system and inappropriate technology can cause technical problems in E-learning environments.

Currently, most complaints from E-learning adopters relate to technical problems and IT support services. The technical problems in teaching and learning on E-learning system have seriously harmed teaching staff who actively adopted E-learning in their work. Without problem-solving from COE, adopters have had to seek other solutions not related to the E-learning system operated by COE. Actually, adopters wanted to intensively apply E-learning further but COE has proposed another approach which offers a base to develop the distance learning degree program, rather than blending with E-learning.

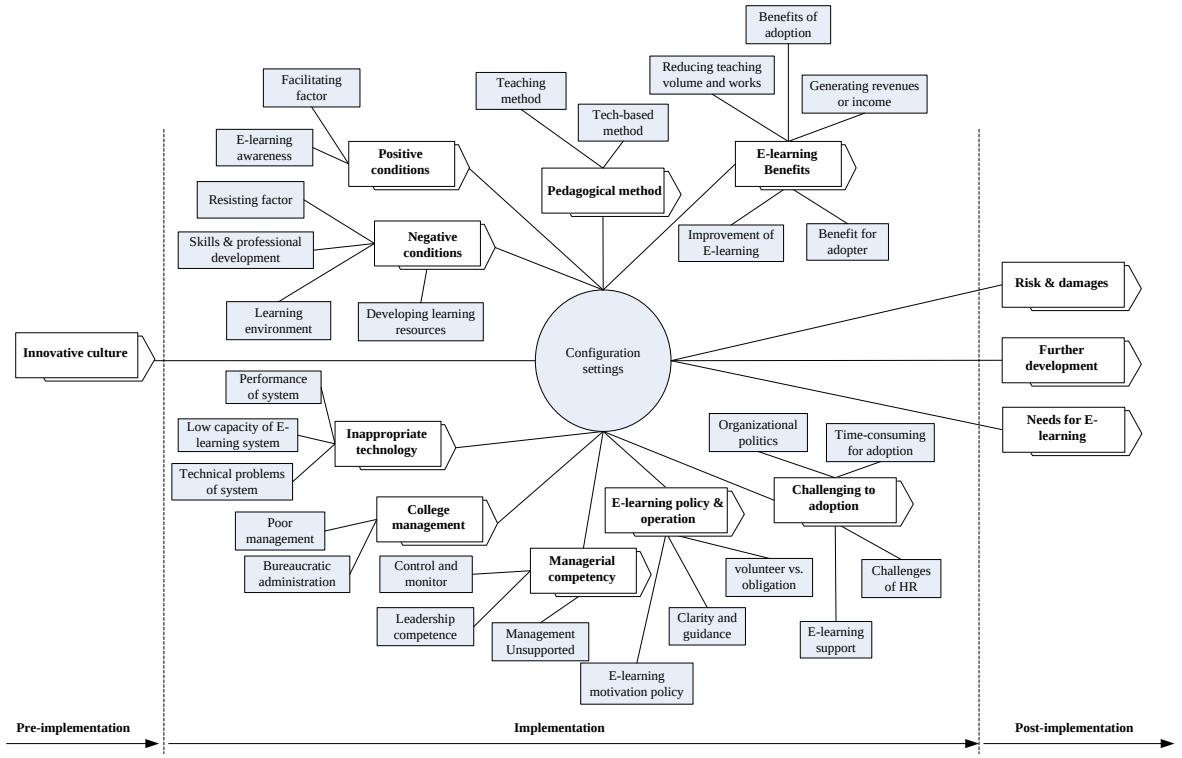

Figure 4-7: Thematic network - Process of E-learning implementation

4.6 Configuration-based Interpretation

Instead of isolating and standing alone, the process of implementation should be interactive and incorporative with contextual settings. When encapsulating contextual settings with sequenced stages of the implementation process, the outcome will present an integrated view of E-learning implementation, both process and contextual settings. The contextual settings will impact on the process of implementation. It is likely that the nature of E-learning implementation should result in (i) Configuration interaction among contextual settings as a bounded system of the implementation process; (ii) Sequential effects configurationally leading from one stage to another; and (iii) Configuration interaction between contextual settings and the sequenced stage process. The following sections will develop this model in more detail.

4.6.1 Factor-configured implementation

Viewed as a macro-environment to E-learning implementation, the interaction of contextual settings might impact on one or more stages of the implementation process. As a consequence of low incomes, it appears that staff did not entirely dedicate their time and endeavour to their work. Furthermore, it is likely that the bureaucratic culture of appraisal did

not motivate staff towards the COE's objectives. Thus, along with the limitations of facility, the working environment may not have produced a high quality of academic and support services on campus.

The capacity of COE could not bear existing enrolment. On the one hand, the increasing numbers enrolled challenged quality assurance and maintenance. On the other hand, it led to an increase in work for academic and support staff. Over-capacity may lead to tensions related to resource allocation for teaching and learning services. Where an adequate resource for academic work is not allocated the academic discipline will not be respected. Decentralization of ICT governance by the University to each college member along with the bureaucratic structure may be barriers to inter-functional cooperation among departments on ICT management. In the case of COE, ICT development and investment suffered from the lack of cross-functional cooperation, while the nature of ICT requires cooperation and involvement across the organization. In line with this point, an ICT development may be better locked inside the boundary of an individual department. The isolated and separated management and operation of ICT may be suitable for COE in this period; however, the integration of service and system could face obstacles in the future.

4.6.2 Process-configured implementation

E-learning systems have been transferred from DBA to COE to be disseminated widely over the whole campus. At the beginning, the innovative culture of DBA promoted the creative idea that faculty members could discover new ways to improve their work. In addition, sharing culture also had the key role in which almost all faculty members participated in adopting E-learning. At the initial stage, therefore it appears that cultural factors promoted E-learning adoption as a starting point for implementing E-learning adoption across the whole college later.

At this stage of implementation, serious technical problems, poor support services and a lack of commitment from management radically affected the use of E-learning. Under college operation, E-learning adopters faced technical difficulties and challenges. However, the collective culture still had a key role in overcoming these obstacles. At the DBA, the collective culture in which peer-to-peer support in designing E-learning content and solving technical issues was very helpful. It is likely that cultural factors facilitated and fostered E-learning adoption in the stage of implementation. In addition, although the performance of the E-learning system at COE damaged both the reputations of both individuals and the

organization, E-learning adopters had taken such risks because it had brought a number of benefits to users. This suggests that only adopters who love ICT will actively participate in virtual learning environments in unfavourable conditions which may damage their reputation. Meanwhile, resistant staff argued for unsupportive conditions in policy, management, time resource and technology to avoid technology being adopted. Therefore, COE should be improved and further services to the system to motivate increased adopting effectively and sufficiently in teaching and learning.

4.6.3 Configuration of factor and process

This case report primarily analysed data from ground level, aiming at deeply understanding E-learning implementation within COE, UD, which has been successfully recognized across Vietnam. Within the Vietnamese educational settings in general, particularly in the context of COE, UD E-learning implementation has been scrutinized to explore factors and process perspectives. The data analysis has illuminated several findings from the process of E-learning implementation at COE. There are five remarkable issues indentified in E-learning implementation, including the role of local culture in technological innovation; the lack of support and commitment from management; the non-priority of E-learning; poor academic operations and bureaucratic procedures; limitations of resources; technology-emphasized pedagogy; and the risks and potential damage of adoption. Their relationship and interaction is depicted in Figure 4-8 below.

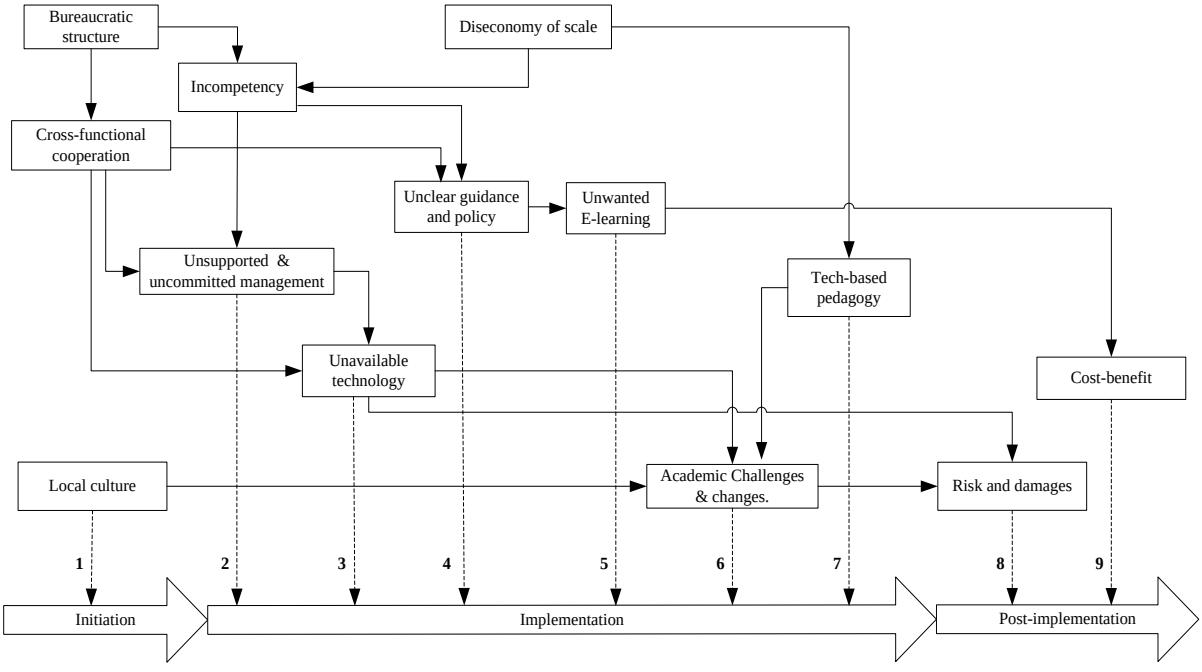

Figure 4-8: Configuration of factors and process of E-learning implementation

The findings indicate that, stemming from an innovative idea, E-learning has been adopted widely from departmental to college level. At the beginning, E-learning was introduced and facilitated within a department by its shared and collective culture. During this stage of implementation, when E-learning system were operated by COE, although adopters faced serious obstacles from technical problems and support services, the department culture continuously fostered E-learning adoption at DBA. It is clear that local culture paved the way for technological adoption and innovation at departmental level. In other words, the case data suggested that E-learning implementation from the bottom up was promoted by a local culture which sustainably facilitated in all stages of implementation, regardless of what happened at higher levels of the organizational structure (1 in Figure 4-8).

With the regulation-based charter, UD historically had been organized into a pyramid-shaped structure in which several divisions of labour were ultimately involved in all aspects of its activities and administration. This structure, called a bureaucratic structure, relied on functions and work specification which operated within rigid boundaries and were separated from one another. As a consequence, the bureaucratic organizational structure was naturally limited in effectively promoting cooperation across-department within organization. In addition, the increasing number of students exceeded the COE's capacity to bear it and led to diseconomies of scale. When the size of COE increased, it required an expansion of the span of management in operation and administration. If the span of management is too large, management cannot be competent. These factors may explain why E-learning could not be supported and committed at this stage of implementation (2 in Figure 4-8) at COE. E-learning implementation, like the other ICT projects, needs to be supported and committed to by the top management. Without commitment and support, an ICT project could fail during this stage of implementation. In the bureaucratic structure, cross-functional cooperation was limited, so that E-learning was not supported and commit to through services or resources, but also technology was not appropriately developed to adopt technological innovation (3 in Figure 4-8). Cross-functional cooperation and the incompetency of management caused ambiguity about the policy (4 in Figure 4-8). In this circumstance, E-learning adopters needed information through the right communication channels, which was lacking. As a result, everybody understood the policy in different ways.

With a voluntary policy, teaching staff may (not) adopt E-learning without worrying about their performance. Encouraging and motivating staff to voluntarily adopt E-learning, COE clearly determined that E-learning was not prioritized in strategic development. This policy

could indicate that COE actually do not need to apply E-learning to its academic environment (5 in Figure 4-8).

The student population was too large so that COE's resources were exhausted. Staff were under pressure due to the huge teaching volume and institutional work. E-learning adoption needs time to be learnt and used effectively, but staff may not have had enough time for this. It is likely that they could resist adopting E-learning in teaching. On the other hand, to cover all teaching and institutional work, the E-learning system could be used as an automatic teaching machine. By using available tools designed on the system, automatic academic activities could be done without requiring attention. Therefore, technology-based pedagogy is logically applicable in the case of COE's implementation rather than E-learning pedagogy (7 in Figure 4-8).

As the consequences of inappropriate technology and unreliable system, E-learning adopters take risks when adopting in use. Meanwhile, COE has proposed a distance learning program as a further development of E-learning. Unlike blended E-learning, which has been used to support learning on campus, the distance learning program, if offered, could generate revenue for COE. Blended with learning, E-learning currently does not make any marginal revenue, but distance learning based on E-learning could. It is clear that the cost benefit analysis has a vital role in decision making for further application of E-learning at COE (9 in Figure 4-8).

In short, E-learning implementation at COE when explored from multiple perspectives indicates that local culture is the most important factor which fosters adoption at all stages of process implementation. It is likely that, when implementing from the bottom-up, E-learning is sustainably adopted, although it faces with several obstacles related to management and technology. During this stage of implementation, E-learning did not receive support and commitment from top management because there was actually not a real need for E-learning adoption within campus at COE. With unfavourable conditions, E-learning adopters damaged their reputation. However, they also took risks to adopt E-learning to solve several problems in their academic activities and institutional work. It is likely that E-learning implementation sustainability at COE is challenged if COE will only invest based on cost-benefit decisions.

4.7 Pattern of E-learning implementation

Integrating all global themes together will illustrate the whole picture of E-learning implementation at COE. The bounded system, in which the super global themes of technology, organization and teaching and learning have been configured dynamically with

global themes of process, has shaped the nature of E-learning implementation at COE. The pattern that has emerged from the configuration of the case has converged in *E-learning need, E-learning demand, E-learning capacity and E-learning competency,* as illustrated in Figure 4-9.

4.7.1 E-learning need

Over-sized enrolment and over-capacity may explain the relatively strong connection between E-learning constraints with E-learning need. Meanwhile, college culture seems likely to have played a key role in facilitating E-learning adoption, through an awareness of ICT. In addition, data has also indicated that management really want to adopt further in the future by promoting distance learning degree program in which E-learning technology will be adopted to deliver the curriculum. E-learning needs, in the case of COE, could result directly from innovative culture, further development, positive and negative conditions of E-learning implementation.

4.7.2 E-learning demand

Interplay among global themes mainly appears at the stage of implementation. In the case of COE, innovative culture is viewed as the starting point of the E-learning process. Beside the endeavour of applying ICT to the curriculum, the overload of institutional and teaching work may have led to motivating COE's staff to adopting E-learning technology. At its current status, the risks and damage for adopters mainly comes from technical problems and network services. However, adopters still want to apply E-learning in teaching activities because they recognized the benefits from E-learning. As a result, further development of E-learning at COE should be focused on improvements in technology and network services rather than shifting to another form of E-learning, such as distance learning, as proposed by COE's managers. Findings indicated that E-learning demands were mostly determined by end-users who adopted technology and thereby suffered risk and damage from their adoption.

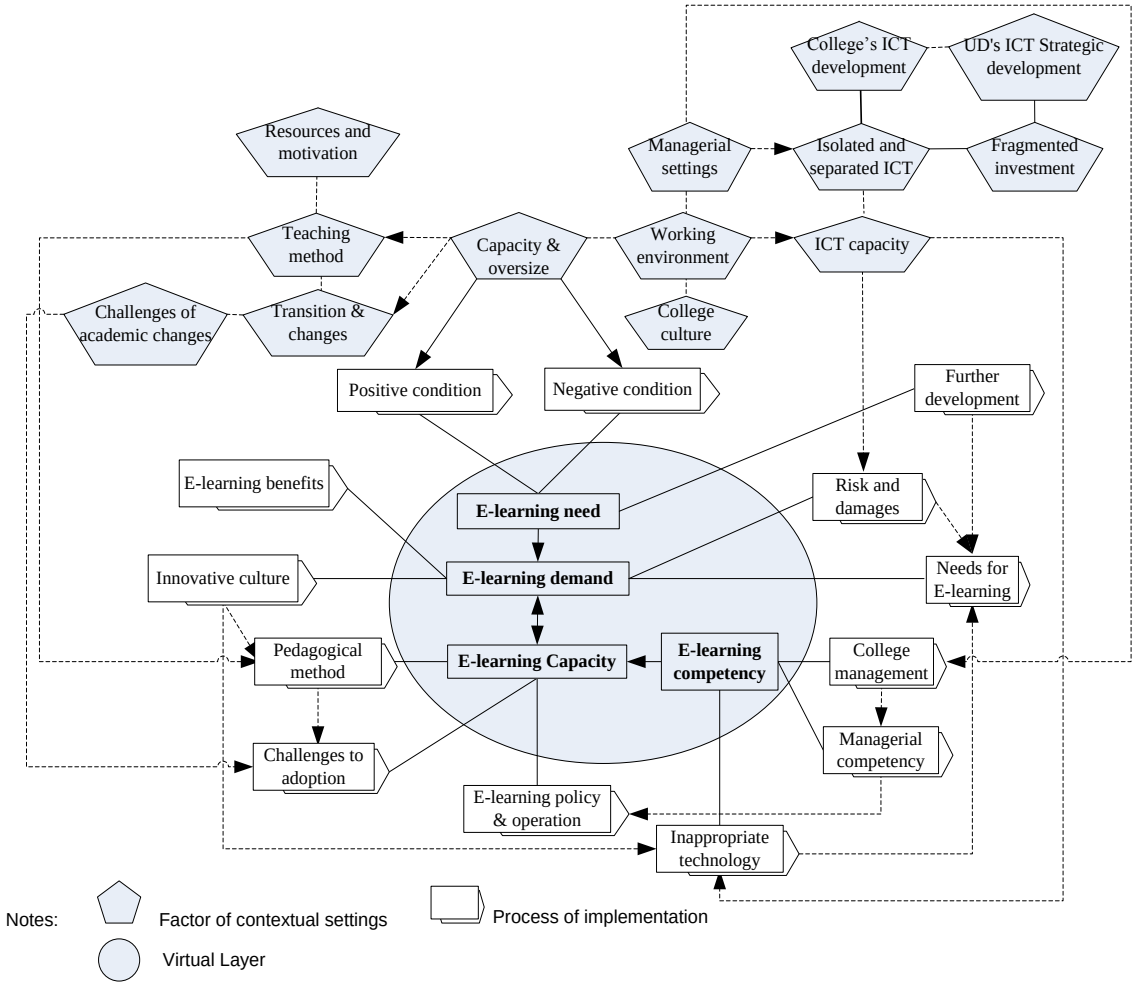

Figure 4-9: Configuration-based pattern of E-learning implementation

4.7.3 E-learning capacity

By using the tools embedded within the E-learning system, staff may automatise the teaching activities to reduce the amount of work. For such reasons, it is likely that teaching methods may be dominated by technology. In addition, given the role of educational culture, teaching staff are likely to have more power to dominate in the classroom. An inappropriate pedagogy used on the E-learning system, lack of time and weak discipline limiedt the use of E-learning. Given such conditions and academic environments, a voluntary and motivated adoption policy may be the most suitable choice for the college. This policy may avoid risks and not commit to allocating limited resources for implementation. At this stage of implementation, teaching staff and students actually had not received enough support from COE in training and professional development, or to solve the technical problems of the poor network services.

4.7.4 E-learning competency

College management has not strongly committed and supported to E-learning adoption at COE when the E-learning policy has not been carried out as planned. Financial incentives have been given but not monitored. It is clear that the college management lacked of commitment, consideration and support for E-learning implementation on campus. The capacity of the network and technology invested and developed in the past did not provide sufficient technology for E-learning implementation. Moreover, the isolated management and organization of ICT was a barrier for E-learning adopters, who called for further integration and better support services.

It is recognized that configuration of the case led to the central area where interlaying results impact on shadow layers which could lead to meanings to explain features of E-learning implementation. There are significant differences between E-learning needs and demands, as well as E-learning capacity and competency at COE. The findings of the case indicate that COE really desired to adopt E-learning, but actually adopting E-learning is another matter. Moreover, E-learning competency probably limited COE's provision in its potential capacity to promote E-learning adoption on campus. It can therefore be assumed that the nature of E-learning at COE could be determined by applying an acting mechanism on the configuration layer, which will be addressed in Chapter 7.

4.8 Chapter conclusion

This chapter presents the nature of E-learning implementation at UD, both from a factor and process perspective. The comprehensive thematic network has emerged from data analysis by applying thematic network analysis. The individual global and superglobal themes have been interacted and interplayed via the virtual layer at the centre of the network. The pattern of E-learning implementation has been draw from the configuration method, which indicates that E-learning implementation has been significantly determined by the E-learning need, demand, capacity and competency.

Chapter 5 – E-learning implementation at Cantho University

5.1 Introduction

This chapter presents the merger of a long-established E-learning environment, with international support and funding to build capacity, and create a more flexible learning environment at Cantho University (CTU). The chapter is divided into seven parts. Firstly, the history of CTU will be outlined, regarding its establishment and development over 45 years. Secondly, the role of capacity building projects, supported and funded by international agencies, is highlighted. Then the process of E-learning implementation at CTU is described from the first initiatives to its current status summarised in a rich picture diagram. The following parts will highlight the context in which the process of E-learning implementation has taken placed. Then the pattern of E-learning implementation is drawn, from a configuration-based approach. Finally, the discussion and conclusion of the case study will be summarised.

To prepare this section, the researcher met face-to-face with IT managers, lecturers, academic managers and students who were the most influential and involved in, and most closely related to, the process of CTU's E-learning implementation in several interviews, and had conversations at study sites. After transcribing the interview's records, the researcher used software to analyse the data collected. The report also used project documents as sources for writing the case report that reflected the primary interests and concerns of the research.

5.2 Cantho University and E-learning initiatives

5.2.1 Background of Cantho University

CTU is currently one of the largest universities in the Mekong Delta of Vietnam and located in the city of Cantho, Cantho province, the capital of the Mekong Delta (MD) region. Cantho province is located at the centre of 12 other Delta provinces, which have a population that is approximately 2 million. CTU comprises three campuses and occupies approximately a total land area of 90 ha. It has around 2,000 employees in 13 schools and colleges, with more than 80 academic departments and research centres. Since its foundation, CTU has been improving and developing itself as a multidiscipline university. Currently, it reportedly offers 77 undergraduate, 28 Masters and 8 Doctoral academic programs. More than 40,000 students are currently enrolled at CTU.

CTU, an important state higher education institution in the Mekong Delta, is the cultural, scientific and technical centre of the Mekong Delta and Viet Nam. CTU's main missions are training, conducting scientific research, and transferring technology to serve regional and national socio-economic development. In addition to its training responsibilities, CTU has actively taken part in scientific research projects, applying advances in scientific and technological knowledge to solving problems related to science, technology, economics, culture and society in the region. From achievements in its scientific research and international cooperation projects, the university has developed a variety of products and technological production processes that have benefited people's lives, and promoted export and thus helped the university to gain prestige in national and international markets.

As a leading university in the MD of Vietnam, CTU's strategic goal is to build up its reputation within Vietnam and be recognized by the international ranking systems. Therefore CTU is committed to constantly improving its capacity in research, teaching, know-how transfer, and services. To this end, CTU targets the professional development of its staff, aiming at high quality and prestige. Within this context, staff members are encouraged to take part in scientific research and publication and to apply an active teaching methodology while students are trained to become more independent and critical thinkers. To promote its "brand-name", CTU strives to expand international cooperation and recruit more international students. All these efforts reflect CTU's strong commitment to improving its quality and reputation within Vietnam and internationally. CTU's annual revenue exceeds VND262 billion. State budget subsidies and research grants account for about 50% of CTU's revenues and student tuition constitutes approximately 32%. CTU considers itself one of the premier research universities in MD. Currently, the university receives about VND 9 billion annually in research grants and contracts. Remarkably, during the period of 1997-2007, CTU was funded by several international agencies with total amount of VND.266 billion, approximately $18 million, for capacity building and facility development.

CTU's administrative structure includes the rector, five vice-rectors, and an academic board. The rector of CTU is also the chief executive officer and is responsible for overseeing its entire operations. Like other public universities in Vietnam, this position is approved by MOET, although the rector is elected by university employees after being promoted by CTU's local communist party. The academic board, whose members mostly come from academic schools and colleges, is responsible for the academic governance of the university. The 12 functional directors, along with 5 vice-rectors selected and appointed by the rector are

responsible for the administration of CTU's property, revenue and research and academic affairs. The daily operations of the university is managed by the rector; vice rectors, heads of functional departments and 13 deans.

5.2.2 E-learning initiatives at Cantho University

In March 1998, CTU was funded by VLIR to build the capacity of the university to meet the needs for training for the Mekong Delta, Vietnam. The project management consisted of a steering committee, which was jointly Flemish, and local managers and coordinator groups, which were responsible for sub-programs. Routine work was ensured by these groups ("1" in figure 5-1). The project included two phases. Phase I (1998-2002) aimed at strengthening the teaching and research capacity of staff members of CTU by developing human resources and upgrading laboratory facilities. The successful results from Phase I paved the way for CTU funding to continuously expand in the second phase. Phase 2 (2003-2007) was focused on further strengthening of staff and on specific research developments which was concentrated on the effective contribution to the development strategy and development dynamics of the Mekong Delta region.

Phase I of project had several components, one of which involved developing a distance learning programme by using the computer network for Mekong Delta region's learners ("2" in Figure 5-1). The project sent two groups of CTU staff to Belgium's partner universities to learn both in technology and pedagogy. The technical group had been trained in internet technology, network services, and multimedia production. The second group of lecturers selected from the college of education had been trained in how to develop, design and teach through virtual learning environments ("3" in Figure 5-1). After returning to CTU, they became trainers and joined the consultancy team that included CTU staff and foreign experts to support and train all other CTU staff for designing, publishing, teaching and supporting learner on the E-learning system ("4" in Figure 5-1).

Firstly, the web-based courses were developed in HTML and open access formats for in-service students at Mekong Delta provinces, where CTU delivered distance learning. To support the development of digital materials and design the electronic content of course, distance education had been equipped with a multimedia studio, funded and installed through a VLIR project ("5" in figure 5-1). Claroline, a virtual learning environment, was developed and popularised by the Belgium university partners and chosen to be deployed on CTU's network by foreign experts who had experience and were familiar with it. With technical

support and assistance from foreign experts, the Claroline system was set up and run on CTU servers with an internet leased line 2Mps at INMC on campus ("6" in figure 5-1). This was the first time in Vietnam an LMS hosted by a digital platform of institution had been introduced.

To learn about the courses offered on the network, students needed to have a computer with internet connection. However, at that time, the internet had just been introduced in Vietnam, and was low speed. Normally, an internet connection used dial-up technology below 56K. As a consequence, web-based courses were not compatible for the end users. In addition, HTML courses were very limited in design and delivered the contents of courses, including multimedia, image and sound.

Another limitation to this approach was the inability to access the internet because of the cost and devices ("7" in figure 5-1). Thus, the courses were redesigned and developed under a CD-based format equipped with a multimedia studio to produce video for teaching ("8" in figure 5-1). Finally, because of the limitations in learning on CD-based courses and low user interest, the project was stopped, and courses for distance learning developed instead ("9" in figure 5-1). They shifted to a virtual learning environment program, while deciding to apply E-learning on-campus in Phase II. It is clear that the failures of distance education came from the lack of available internet access and digital devices for users to access the learning resources with. The project had not taken into account accessibility and the needs of users.

Thus, in 2003, the approach changed from distance education to learning support. Phase II concentrated on improving the existing learning environment to support on-campus students. These changes in Phase II were suitable for the existing context of CTU, as well as having an accessible capacity to projects by students. On one hand, students on campus were able to access digital learning resources based on campus network services. On the other hand, this approach strengthened and consolidated the results of Phase I by utilizing infrastructure and having capacity invested in and improved ("10" in figure 5-1). Thus, the School of Economics and Business (SEB) and the College of Aquaculture and Fisheries (CFA) were chosen to join the E-learning pilot program. Although SEB and CFA joined to develop courses on the system, SEB focused on academic programs, while CFA mainly concentrated on short training courses for fishery farmers, and technical transfer. However, initially only two postgraduate courses were selected at each place to develop learning resources as pilot E-learning courses. The failures of previous distance education, as well as CD-based courses, had led managers to carefully implement the E-learning plan on campus. The project selected

the Dokeos platform, a replacement for Claroline, which had more functions, a friendly user interface, and open source software to deploy in the virtual learning environment at CTU ("11" in figure 5-1). Step by step, CTU saw that supporting on-campus programs was the right direction to go in with instructional technology. As a result, using a virtual learning environment to support academic programs was sustainably prolonged until 2008, when the VLIR project finished.

It had been said that CTU benefited largely from technical assistance and consultancy on the project. The IT capacity of CTU was well-directed and planned from the beginning. The building capacity project had also invested in information technology for CTU. Much IT hardware was funded by the project, including a server farm, a network, internet connection, desktops and application software. A single-sign on the system was deployed to help to integrate other authenticated software and applications provided by different developers and vendors. In addition, the project also funded a multimedia studio which was able to produce rich media courses in different formats to the learner. It was quite suitable for many academic programs in the fields of agriculture, aquaculture and fisheries, which were taught in virtual environments ("12" in figure 5-1).

Table 5-1: Result of distance education and E-learning program

Indicator	Training	Learning resources developed	Human resource development
Phase I	• 4 courses by INMC (DE, Using Internet, Web page design, using PowerPoint) • 3 courses by AFSI (Using Internet and HTML)	• 7 web-based / CD-ROM courses by SEBA for teaching at CTU • 12 web-based / CD-ROM courses, 1 DVD and 1 video by AFSI / CAF • 12 courseware packages by INMC, of which 1 on CD	• 42 local training classes by INMC • 565 participants • 70 Local seminars and workshops • 4 Courses by visiting Flemish professors at SEBA
Phase II	• 9 courses by SEBA, of which 7 on the network	• More than 100 courses transferred to electronic versions and available on CTU network • Learning Management System (Dokeos LMS) available and functioning supported by manuals and guides, with 300 teachers. • 10,000 LMS student accounts.	

(Source of project evaluation of CTU 2008)

At the end of 2008, the project outcomes satisfied donor and local managers. In the case of E-learning, more than 80% of total lecturers of School of Economics and business had been trained in teaching with the virtual environment. Based on favourable conditions yielded by the project, CTU continued to maintain E-learning activities in its academic environment. The Learning Management System, namely Dokeos, ran well and functioned across the

campus. Lecturer and student guides, both in technical and pedagogic aspects, were provided. According to the E-learning manager, during Phase II, more than 100 courses were converted to electronic versions which were compatible with the E-learning system. For the whole project, the distance education and E-learning system had created 33 course-wares on CD-ROM and most courses offered by academic programs at CTU had learning resources which were available on the system, such as lecture notes, course handouts, multimedia presentations and the like ("13" in figure 5-1). Statistically, all teaching staff and full-time students had active accounts on the E-learning system in which there were more than 400 courses. At the end of the project, distance education at CTU had been introduced, and the results are shown in Table 5-1 above.

After the project had finished, CTU continued to run and manage the system as an add-on service for the academic environment on campus. The E-learning system has been directly managed by INMC. This centre had simplified E-learning participation by providing support and training for teaching staff and students. All student and lecturer accounts had been imported into the system to make E-learning available for everyone whenever they wanted to adopt it.

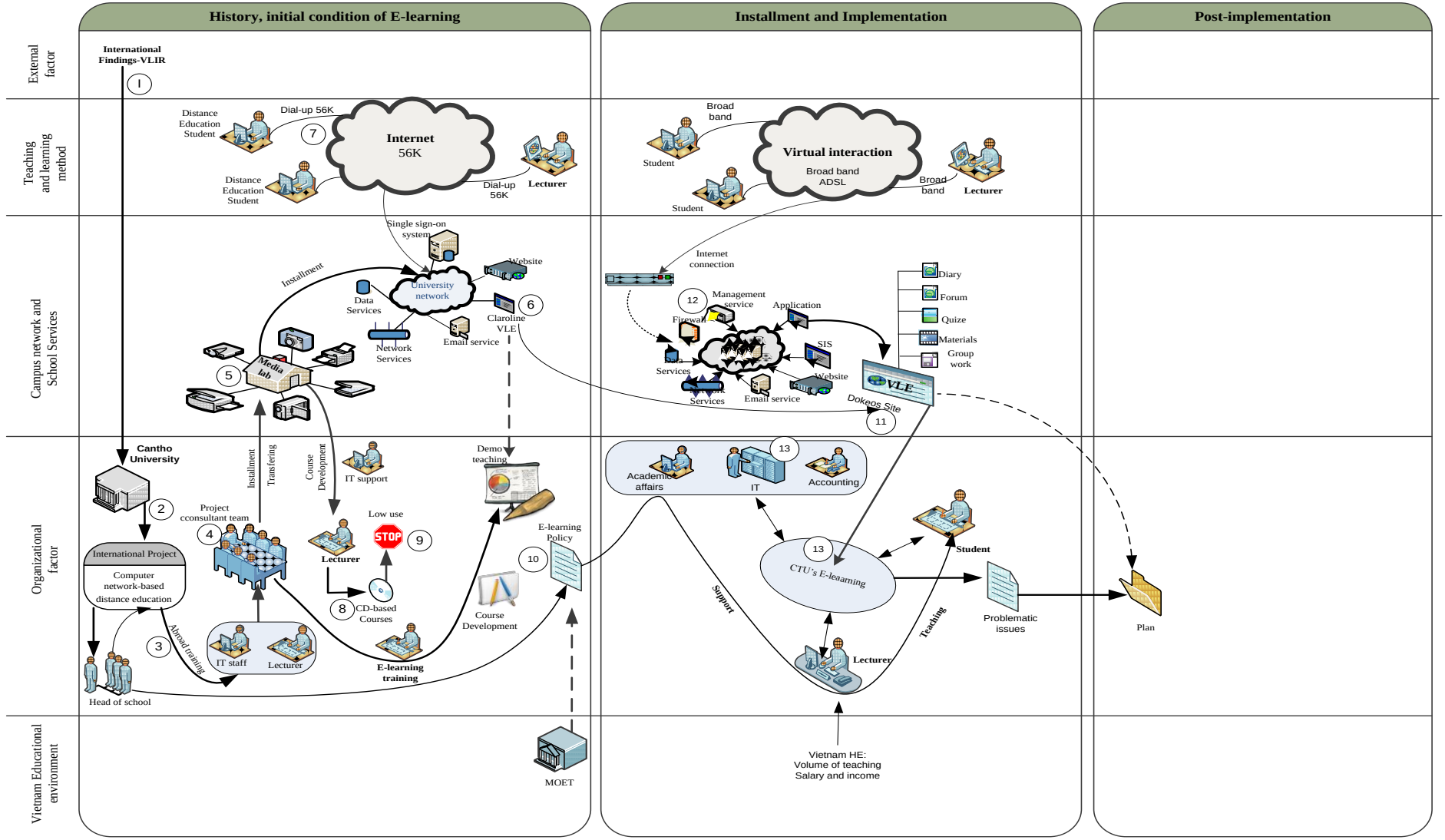

Figure 5-1: Factors and process of E-learning at Cantho University

5.3 Findings of the case: themes and features

5.3.1 Thematic analysis

The conceptual framework was used to code and allocate the issues discussed in the transcripts into contextual and temporal dimensions. In each dimension, the basic themes have been merged and arranged, then modified, following their meanings and relationship with others, to represent a higher level of meaning and closer relationship, called organized themes. In the case of CTU, the data collected was developed into 158 basic themes associated with issues discussed, which were used by implication to develop organized themes (Appendices E and G). In the case of Cantho Uni**v**ersity, the study identified 64 organized themes and 28 global themes, which fell into contextual and temporal dimensions, illustrated in Table 5-2 and Table 5-3 approximately. In the context of the case, the themes were the main points of interaction and interrelation which significantly contributed to and impacted on the process and outcome of E-leaning implementation. The themes in the temporal process highlighted the main points and problematic issues in implementing E-learning at CTU.

5.3.1.1 Themes of context

Organizationally, there are ten grouped themes derived from twenty basic themes relating to organizational aspects of CTU. These themes have been levelled up into the higher abstract layer, based on relationships and meanings. In this layer, there are five global themes, consisting of organizational setting; ICT governance; challenges of ICT development; ICT-based administration; and poor services & support. In the case of CTU, the *organizational setting* refers to the college and school members of CTU, the membership and functions of statutory bodies which were determined in its structure. The *ICT-oriented administration* refers to managing and carrying out functions and making decisions based on information provided by ICT. *ICT governance* refers to IT resources managed in a specific form as well as the relationship to ICT within this structure. The *challenges of ICT development* is related to the necessary conditions for applying ICT within an educational setting. Poor support and service refer to the evaluation of general quality of academic service provided.

Technologically, twenty one basic themes that were identified from data indicate the meanings of technology, there are nine grouped themes that have been constructed. The themes have been clustered together to align with its semantic meanings and strong relationships. As a result, technology data analysed was built up into two global themes,

consisting of ICT strategy and ICT policy and management. The *ICT strategy* refers to the long term objective of ICT development to meet the university's mission and vision. The *ICT policy and management* refer to how the ICT resources are managed and used for specific purposes and institutional functions.

For teaching and learning, there are two global themes constructed from four organized themes, namely challenges in the academic environment and passive learning. Passive learning refers to the general style and attitude of student's learning at CTU. The challenges of the academic environment refer to student's curriculum structure and the academic support service provided at CTU.

Table 5-2: Contextual factors of E-learning implementation, Cantho University

Themes	Organized	Global	Super Global
Organization	• Organizational structure • University charter • ICT development and investment • Management and leadership • Time requirement for ICT • Highly qualified manager • ICT-oriented administration • Administrative improvement • Quality of academic service • Public working environment	• Organizational setting • ICT governance • Challenges of ICT development • ICT-based administration • Poor services & support	• Organizational configuration
Technology	• Technological strategy • Enterprise integration • ICT investment and resources • ICT strategic development • ICT organization • IT support services • Shortage of network access • ICT capacity • Network capacity and performance	• ICT strategy • ICT policy & management	• ICT competency
Teaching and learning	• Changes of academic system • Unsupported learning • Student laziness • Student learning	• Challenges of academic environment • Passive learning	• Learning motivation

5.3.1.2 Themes of process

The conceptual framework, with three stages of implementation, has been applied for data analysis. The full process of E-learning implementation at CTU will be outlined in the next section. The data analysis of the initial stage has been developed into two global themes, the trial and error approach and external support. It is a special case of E-learning implementation, driven entirely by international funds and technical assistance. In the implementation stage, there are thirty one organized themes developed from eighty two basic themes during the process of data analysis. The organized themes are grouped into eight

global themes, namely positive conditions; negative conditions; skill & professional development; pedagogical method; E-learning policy & operation; challenges of adoption; E-learning technology; and learning method.

Table 5-3: Process of E-learning implementation, Cantho University

Themes	Pre-implementation	Implementation	Post-implementation
Organized	• International training support • International funding • Early adopter • E-learning Preparation • Developing distance learning • Gaining experience • Encouragement of adoption	• E-learning skeptical mindset • Resisting factor • Technical training • E-learning training • International support for training • E-learning awareness • Facilitating factor • Communication and support culture • Managerial involvement • Benefit of E-learning adoption • Teaching method • E-learning pedagogy • Technology-based method • E-learning organization • Volunteer and self-motivation • Mandatory adoption • Promoting adoption policy • IT support service for adoption • Learning by doing • Blended E-learning • Pedagogical support • Influential factors to adoption • Out-of-date learning material • Online communication • Lack of IT skills & literacy • Integration of E-learning • System as file server • Integration of E-learning • Technical problem and limitations • Non-teaching activities • Student learning on system	• Volunteered adoption • No strategy for E-learning • Reducing adoption • Needs of adoption • Needs of further adoption
Global	• External support • Trial and error approach	• Positive conditions • Negative conditions • Skill & professional development • Pedagogical method • E-learning policy & operation • Challenges of adoption • E-learning technology • Learning method	• Voluntary development • E-learning needs

The *negative conditions* have been used to indicate any impacts which cause resistance to E-learning adoption. *Skill & professional development* indicates training activities and programs to support the adopter. The *positive conditions* can be defined as any stimuli which accelerate E-learning adoption at CTU. The *pedagogical method* generally indicates how a subject has been taught on the system. The *E-learning policy and operation* refers to strategic guidelines to organize and promote E-learning adoption CTU. The *challenges of adoption* describe the features of the academic environment and the difficulties which students and teaching staff face with when adopting E-learning. *E-learning technology has* commonly been used for

digital infrastructure, through which an E-learning system has been built up and problematic issues have been dealt with. The *learning method* defines how students learn and are supported in the E-learning environment. In the post-implementation stage, five organized themes identified from 10 basic themes have been reduced to two global themes, namely E-learning needs and voluntary adoption. *E-learning needs* indicate what students, lecturers and mangers want, given the current status of E-learning implementation.

5.3.2 Thematic network

The process of E-learning implementation at CTU took place within its contextual settings determined by the global and super-global themes associated with thematic networks, including organizational configuration, ICT competency and motivation for learning. Working interactively among these thematic networks generates influential factors in the process of implementation. The data of implementation was a three stage process which merged 12 global themes, presented here as thematic networks, namely *positive conditions, negative conditions, E-learning technology, learning method, pedagogical method, skills and professional development, E-learning policy and operation, influential factors, trial and error approach, external support, E-learning needs and volunteer-based development.* All thematic networks, from contextual settings and the process of implementation, made up the over-arching thematic network of E-learning implementation at CTU, illustrated in Figure 5-2. Working interactively among these networks will shape the nature of E-learning implementation at CTU.

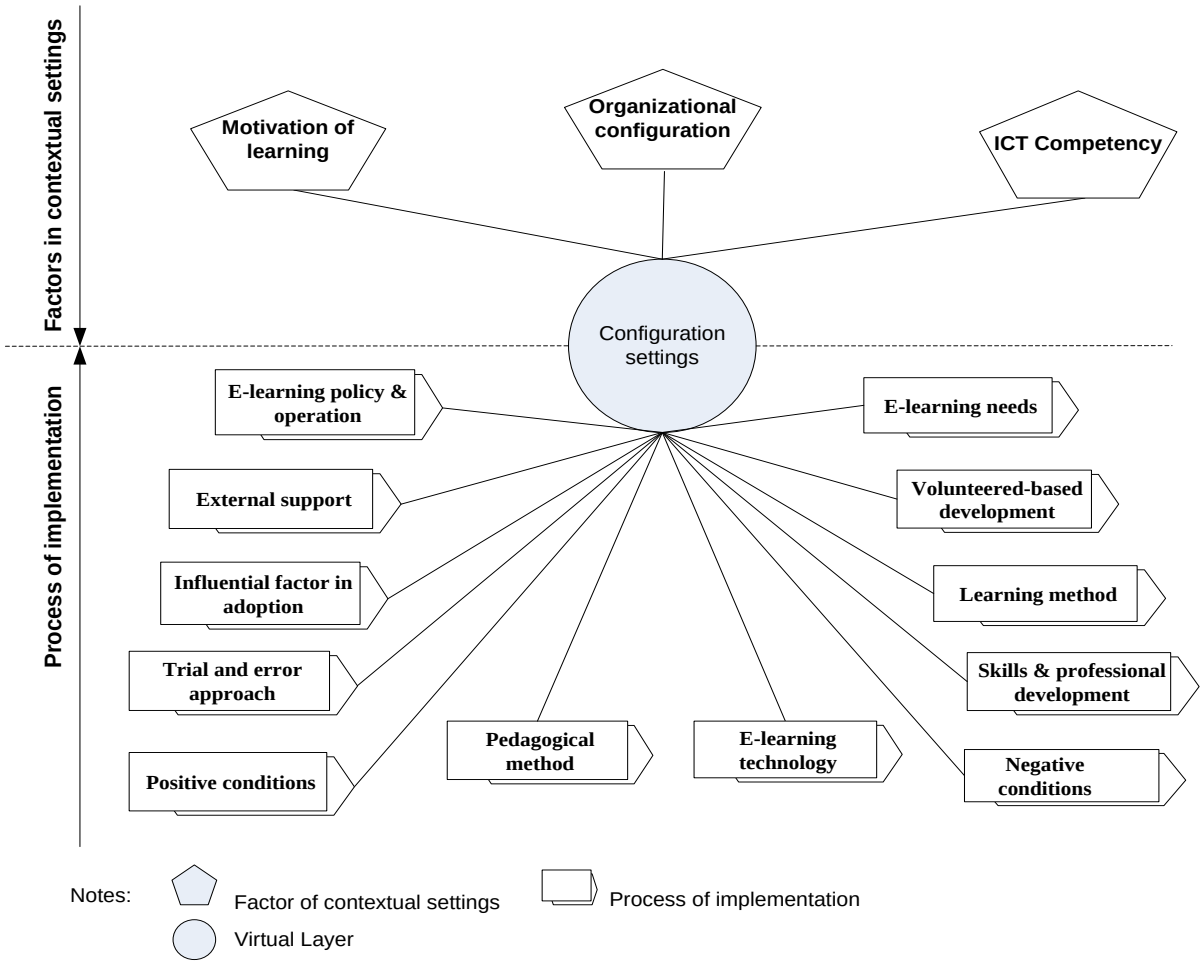

Figure 5-2: Thematic network of E-learning implementation, Cantho University

5.4 Context of E-learning implementation

5.4.1 Organization

Before becoming the largest university in the Mekong Delta, the university originally consisted of four faculties in 1966. Unlike other comprehensive universities in Vietnam, which merged existing colleges and universities by governmental regulation, the members' college and school belonging to CTU was established based on needs and strategic development. Like a member of one family, the college and school of CT is familiar with its own culture and shared developmental history. In other words, the relationship among university members is strong, and so helps build the solid and united university structure. CTU is proud of its history, which is an advantage for the university management. From the united structure and organic relationship, the CTU has readily delegated decision-making to its members, without losing overall control. CTU has emphasized respect for line command, and formalization of the sharing of administration and management in line managers. As a senior manager said:

“All the relationships couldn't have been established in one day but my university started from one university then it established new departments or schools therefore that link has continued from the start to the present. If you formed a new organizational structure on the top then how can it be stabilized at the bottom? CTU is the only one which could achieve that and the advantage is a common foundation.” ADBM2

In the field of ICT, for instance CTU has developed a balanced power in decision-making between centralized and decentralized management. The physical infrastructure has been centralized in developing and operating, while application has been decentralized. As a consequence, the mechanism required a reasonable operational budget and so was supported for academic and administrative use in each department and division. As a manager said:

"You said that you have servers, which means when you login then you can operate with the domain then everything is fine. You don't need to know where it is and I will explain to you how this works… However, the part of the information related to each department was delegated for them to update, so the university website was edited and contributed to by everybody across university." ADBM5

The delegation of decision-making required a significant amount of credentials; only managers had enough skill and expertise to confidently share decision-making and to develop the well-defined tasks to lower-levels. Thanks to the vice-president, who was in charge of ICT as a whole, the university was very competent in information technology in both knowledge and skill. Under his leadership, ICT staff were inspired to attempt to organize and apply ICT in university administration. Particularly, CTU paid attention to change the work flow processes and procedures, which were oriented to and accelerated the digital approach. In addition, the functional departments were incorporated with the IT department to work out the approach for improving university services and operations. The involvement of top management was successful. As a senior manager said about his involvement in the process of software system development:

“The first thing about programming is to construct a business process for the university. I think the CTU able to change the system from working by their hand, to the next stage, which is working by machine. We know how computers work, but, in the end, programming is very hard” ADBM2.

However, like other Vietnamese public bodies, the staff working for CTU had a low salary. Moreover, it was difficult for unqualified and low performance staff to be fired after they had been officially recruited, due to complex procedures and government regulations. As a result, CTU suffered from the number of unqualified staff which could damage its endeavour and quality of service. It is clear that, with low pay, it is not easy to recruit high qualified staff or guarantee their dedication to university missions and objectives. A human resource manager for ICT complained:

> *"Vietnamese recruitment procedures do not have immunity at all. It has not eliminated those who do not have high enough qualifications. A degree is only evidence of studying at a specific period of time. When a PhD is admitted, whatever you have done, right or wrong, no one could blame you. An unqualified PhD staff member in a high position cannot be fired." ADBM5*

From the profound history and common culture, CTU was formalized in its organizational structure and system in which the unity of command was stressed in decision-making, communication and control at the university. Therefore, it is likely that features of organization of CTU impacted significantly on managerial mechanisms at CTU. On one hand, formalization and unity of command facilitated centralization in CTU. On the other hand, the common culture and history paved the way for decentralization to college and school members, involving them in decision-making. Therefore, CTU worked through the challenges of balancing centralization and decentralization, so that it could meet the needs for creating low-cost shared resources by centralizing; and improving "market" responsiveness through decentralized decision-making. Moreover, another favourable condition for greater decentralization at CTU is likely to have derived from IT expertise and the skills of top management. The Vice-president in this case had competency which led all other functional departments to find solutions to improving administration by applying ICT. As a result, it is likely that structure and leadership at CTU resulted in ICT-oriented improvement. However, CTU still has room for improving its service, as dissatisfaction seems to come from the income limitations and public working relations. Therefore, the relationship among the main themes of organizational context can be illustrated in Figure 5-3 which has been derived from the grouped themes above.

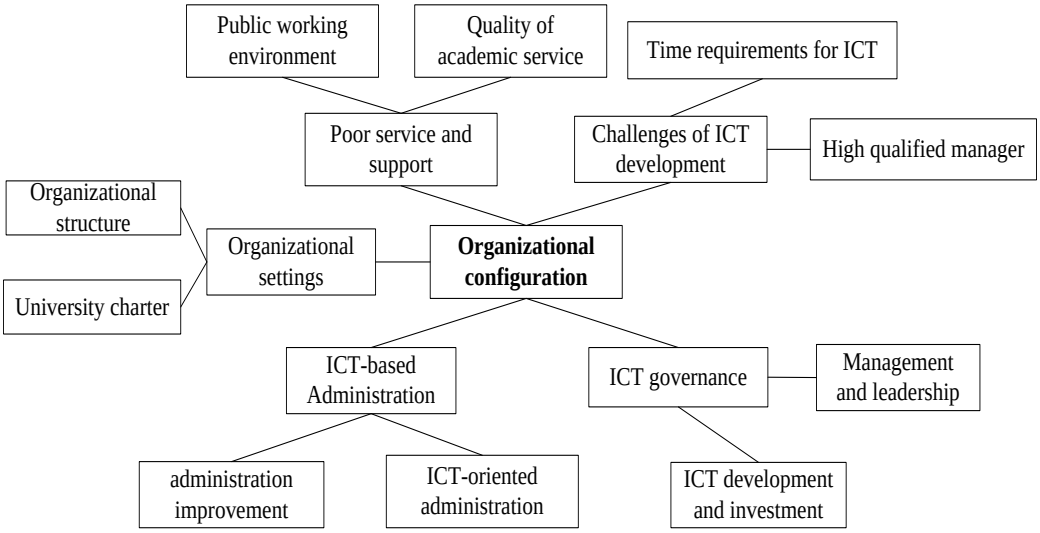

Figure 5-3: Thematic network – Organizational configuration

5.4.2 Information and communication technology

CTU has already taken steps towards a neutral vendor and cloud computing approach to build an open technological architecture. CTU achieved considerable benefits in efficiency and agility in support of the university mission. In 2008, from international support and assistance, CTU realized that it needed an open architecture to develop an information system for supporting academic and administrative work. CTU aimed at designing a system based on well-established standards independent of a single proprietary vendor. CTU chose the free-available SaaS solution for the Email service and portable system architecture. This solution met their unique security needs, fulfilled all of their functionality requirements, and was delivered at a fraction of the time and low cost required to build its legacy system. CTU placed a very high priority on security when considering its open and free solution. Before choosing a free and portable solution, the CTU carefully weighed the sources of value and readiness of potential solutions. As mentioned by an IT manager when interviewed about the university strategy development of technology:

> *"We think that when users adopt free services, suppliers already benefit from an ecology application. We have adopted the Google email service to develop a communication system because communication is very important to the university. Without an information system and communication, you, a manager will be a loser. IT is a comprehensive system which works on wide scale and has not been tied to differentiation among different vendors" ADBM2*

To achieve the strategic goal of technological development, the most important thing was changing the mindset of ICT management and operations. CTU tried to shift the mindset of

each functional unit and college member by delivering the strategic message in ICT management "focusing on service and software application development rather than physic hardware management". The "shared service" approach facilitated centralization of ICT and implementing the distributed software system to all units for development, operation and management. A manger said:

> *"To each department, I stated straight away that you should give up the mindset where safety means having physical contact with the servers. That thinking is still alive. While IT resources serve for university activities, they should be flexibly modified to meet with the university's needs." ADBM5*

At first, most colleges and schools had their own IT resources – including servers, networks operations and application system development people, help desk and desktop staff. However, to implement the strategic "shared services", most of the IT resources in the individual department and university departments were centralized into the Centre for ICT for the entire university. CTU united all application servers into one, eliminating a large number of IT divisions and units, and brought their support and system development people together, and established university-wide support. As an IT manager said:

> *"...The centre for ICT's main duty is to ensure universal networking, website management and to maintain the hub of information. Although everything is located there staff were previously located in different departments. Centralized management meant that the hardware was not distributed but the information system was distributed to each related department. Generally, all things related to the information technology infrastructure of the university is physically managed by that centre." ADIT3*

Prior to this centralization of IT resources, each functional unit and college member had its own unique application systems for all of its systems. However, soon after centralizing, CTU carried out a single sign-on application that would allow the legacy software applications to be integrated and ported. This was installed so that each department and member could keep and develop their own application, since the existing application system had been difficult to migrate around, while moving to a common enterprise system brought cost savings to CTU. An IT manager said:

> *"We have a single sign-on system. All applications must be integrated with this system to pass this check. It means that everyone already has a unique account."*

ADIT3

Facilitating the system integration and neutral vendor approach, CTU protected its investment on IT resources and application management. The open architecture-based network offered flexibility in adding or replacing individual vendor's equipment without having a significant impact on network resources, applications and procedures. In addition, neutral vending and integrated technology enabled CTU to manage its network and digital services more effectively and economically. As a senior manager noted:

> *"We have an advantage of accumulation which means the new project was built on the previous one. I used its budget for maintenance and to upgrade the old one. Investing and upgrading in a server is a bad idea. At the moment in order to make that server strong and the server used to deliver this to other departments, they didn't use all of the server's power. Potentially you can cluster them together. For example, I have a full server, normally run by Webserver. However, at the period of registration we virtually gathered all of these servers at one place to turn them into a stronger one." ADBM2*

At the time of writing, CTU had about 30 servers, and a staff of 9, including desktop support for more than 1000 PCs and a helpdesk for the whole university. Computer operations were reliable, with good response times from the helpdesk and excellent availability. However, there were complaints about the performance of the LAN and the capacity of servers was not as good as had been anticipated, but the IT centre staff worked to improve performance in these areas.

With technical assistance and support through international expertise, technological development at CTU was well planned in terms of scalability, flexibility and availability. A neutral vendor and portable technology created the most favourable conditions for implementing the integrated enterprise system within the CTU campus, indicating that these are the important driving factors of integration. Based on the integration capability of technology, CTU could centralize its IT resources in one place while distributing the development and application to all units without limitation of location. Therefore, the balance of centralized-decentralized management of IT at CTU and enterprise integration had a strong relationship. Integration enabled CTU centralization of IT, and vice versa, the more centralization, the more integration could be implemented. In addition, when IT resources have been fully integrated it will offer a logical adjustment to network capacity to meet

changes of needs from the network, without requiring more physical resources. On the other hand, the centralization of IT organization will potentially create sufficient support services to make the user experience straightforward. Therefore, it is likely that integration and IT centralization will ensure a levelling up of network capacity and performance at CTU. The main themes of the technological context are described in Figure 5-4 below, which is derived from grouped themes interaction and relationships, above.

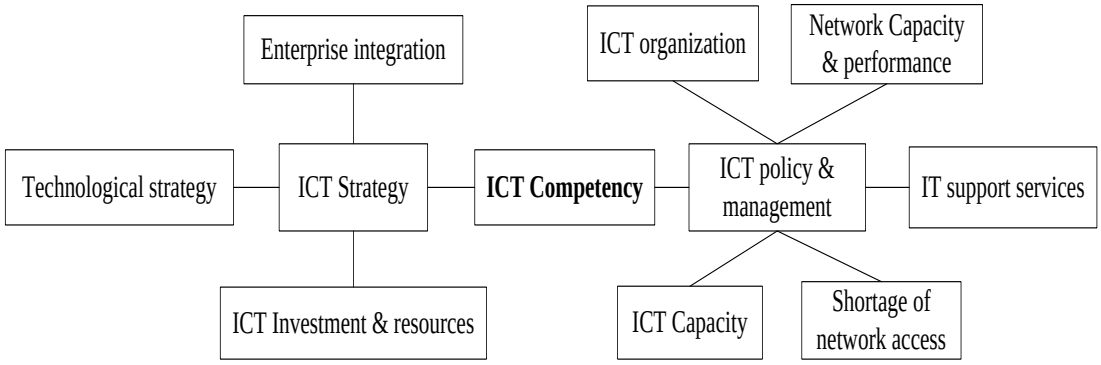

Figure 5-4: Thematic network - ICT competency

5.4.3 Teaching and learning

In the year of 2005, MOET began converting the yearly-academic system to a credit-academic system. Before 1975, the Institute of Cantho, formerly named CTU, had applied this system to the academic environment. Unlike other universities, CTU benefited from past experiences during the period of transition but the process was not well planned. The registration for studied subjects took a lot of time because of the complex procedure. A month after the semester started, students and lecturers received confirmation of the final list of registration. This impacted on teaching and learning, especially in terms of organizing coursework. As an academic manager said:

> *"The change to a credit system was very chaotic, due to a lack of knowledge about innovation, because it created an anxious feeling amongst the staff. Registering subjects for the first time each semester was still complex and takes a long time. Until the third registration was finished, it took 4 weeks for lecturers to have a full list of student, which caused administration and the progress of assessment and review many problems" AMBA1*

The low quality of academic services stemmed from the incompatible design of academic administration procedures, which were based on digital services and manual works. The

academic procedures and administration were not straightforward. Therefore, students were confused when registering on courses. As one student said:

> *"When registering, if the course we intend to take is full, we have to write a letter to ask for it. We do not know why the feedback does not come back, either at all. The deadline for registration has passed so we have to change our learning plan." STBA1*

In addition, when changing to the credit system, the credits were reduced. According to MOET's regulation, the curriculum of an undergraduate degree must be 120 credits. The reduction was not derived from the requirement of a discipline; it was decreased to 120 credits. As a result, CTU reduced all subjects to within this level. Responding to govermantal regulations for training, CTU was only changed to the number credits on the curricula, the number of teaching sessions in each subject, without providing any support and pedagogical training for its teaching staff. As a result, this caused psychological effects for both students and lecturers. A lecturer complained about difficulties related to changes in the academic system thus:

> *"Applying credit system for training programs started by converting the number of credits from a yearly system to a credit system, but the teaching staff didn't get the training and new pedagogical methods that are suitable in a systematic and successful way, having students as the centre." AMBA4*

When changing to a credit system, the number of students registered for class increased, especially on foundation courses, such as economics, basic maths, basic marketing or introduction to management, which had large classes with no less than 80 students. As a result, this was very challenging for lecturers who taught these classes at CTU. Because all students must take these foundation subjects, the number of classes was very high across CTU's degree programs. On average, the lecturers who taught these classes had at least 8 classes per semester. This volume of teaching and the number students registered per class led to overload for teachers. In this circumstance, it is likely that the principles of modern learning theory, such as constructivism or connectivism, cannot be applied in CTU's academic environment in an effective way. Ensuring students are motivated in the learning process, build their own knowledge and collaborate in learning with others is almost impossible in very large classes. In addition, instructors also have no time to manage the teaching activities, prepare their work and assess learning progress.

As a consequence, academic requirements and disciplines were easily violated, but CTU

could not correct this. It has been said that the root problem was over-capacity. Teaching a large number of classes has not only been a challenge to lecturers, but the quality of teaching and learning was affected when lecturers could not manage the academic requirements.

Teachers normally passed the deadline and students did not focus on their learning. Students commented that they were not working hard on the courses. As an academic manager said:

> *"The time it takes to give reports on students' progress is, in reality, really slow in some subjects, due to teachers taking their time to do their reports." AMBA1*

Along with poor network speed during registration time, the library service did not meet with student learning needs. As a student complained:

> *"Reference books at the library are very old, and out of date while we need the new editions… There was one time the network malfunctioned when registering us for courses. The network administrator informed us that we had to wait for the restart of the service because the server had not responded" STEC2*

The relationships of global themes in this context are illustrated in Figure 5-5 below.

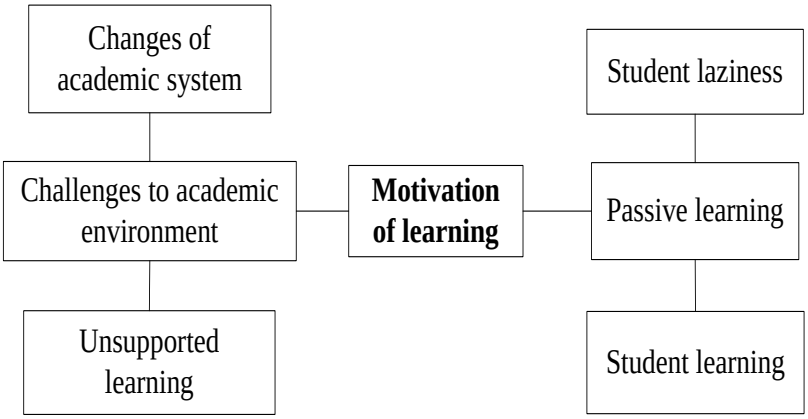

Figure 5-5: Thematic network: conflict in academic environment

In the case of the COE, as a consequence of changes in the higher education system and a lack of academic support, studying at CTU is likely to be challenging for students who want to work hard. However, the CTU's students actually did not work as hard as expected. As a result, transformation in the academic system and poor academic services could explain the learning performance and style. In the other words, the motivation for learning became an issue for academic administration at CTU.

5.5 Process of E-learning implementation

The data analysis has separate features of E-learning implementation related to sequenced stage processes of implementation, from pre-implementation, implementation and post-implementation. As a result, the features of three stages of process are recognized by data allocated in each stage. The next part illustrates the features of the stages of the E-learning implementation process at CTU.

5.5.1 Pre-implementation stage

CTU's E-learning was originally one part of a Master's project for building capacity at CTU to level up the leading role of CTU in the Mekong Delta region. CTU had invested in servers, built LAN and trained technical staff from the project budget. Benefiting from the project, CTU updated its IT infrastructure to meet the needs of digitalization in academia and administration. Without this source, CTU could not upgrade its resources due to limitations of budget. The international sponsor not only supported building a physical infrastructure, but also developed and trained technical staff and managers. As a manger noted:

> *"In MHO, there are 9 sub-programs and administration includes managing and information technology. I was head of the IT group that was sent abroad to train in 1994, 1995. Therefore I was the head starting in 1995, but I was in the Netherlands studying network administration, Unix OS, Windows NT. Then I went to the UK for another week for Netware, I studied networks from a very early time." ADBM2*

The E-learning project was well planned under the support and assistant by foreign partners. Early in the project cycle, two project teams were sent abroad for training, both in teaching methods and technical operations. After the system was installed, only two departments, the Department of Business and Economics and Freshwater Aquaculture, were selected to apply E-learning because they were offering the distance learning programs that had the largest number of students enrolled. Even foreign experts directly organized seminars related to the pedagogical approach and gave samples of good practice. The project sponsor and CTU wanted to deliver a small scale program as an incubator to spread E-learning adoption on the whole campus later. As a manager said:

> *"It has been designed for a distance learning program. After that the university would choose a few departments that they were interested in, instead of developing it on a massive scale. Alongside them, the educational department is responsible for*

pedagogy because it knows how to teach online, and is called a consulting unit for project. For participating in VLIA, we send some staff to take the training sessions. Then these staff will guide others to learn E-learning." AMBA4

When the trained teams came back they held several training sessions at CTU. However, the selected teaching staff involved in the projects passively adopted E-learning. After some courses were published on the system, CTU encouraged all staff to be willingly involved in E-learning. Actually, the teaching staff participation in the project was enthusiastic, due to their love of technology. Most adopters did not recognize that involvement in the project could bring benefits for them too. To motivate staff, projects also used a budget to pay extra money to staff who taught on the system. As a technical leader of E-learning project evaluated:

"The Educational Department was also trained in Belgium; they also did it just like us. They were trained in how to design courses on E-learning system, in different ways, to teach the E-learning network. Teacher training classes got the resources, instructions resources, and how to design a lecture. At the beginning of its development, it was too new to people. Secondly, its advantages weren't understood by all, they only think of it as doing extra work without any rewards. At the beginning, only enthusiastic people joined." ADIT3

CTU and partners paid a significant amount of attention to the challenges and difficulties they would face with pilot implementation. The pilot was well planned, motivated staff and supported technical adoption at the beginning. However, it did not achieve expected results. The most challenging impact on implementation was out of the control of CTU and its partner because it came from external conditions and end-users. At that time, the E-learning system was used to deliver a distance learning program at the Centre for Continuing Education at each province in the Mekong Delta region. Both students and centres were not able to access the system due to the lack of learning devices and internet connection, as the internet, which was introduced in Vietnam on 1997, had a very low bandwidth and was very expensive to subscribe to. As a result, learners and the centres could not be affordable the cost of new learning methods. It is likely that the pilot project was very good and well planned internally but it failed to consider the ability of end-users and technological readiness for educational environment. The right economic factors and technological conditions were not available to spread innovation in technology and learning. As one manager commented:

"Implementing after some time is likely not successful. Back then, also in VLIA, at the beginning, the goal was to train students in distance learning programs via the internet network. At the beginning of the project, the goal was massive, after being developed for some time, it seemed we would not be able to develop it, also in remote areas, students were not ready for change; distance training centres were not ready also." ADBM5

5.5.2 Implementation stage

5.5.2.1 E-learning policy and management

After finishing the pilot project E-learning was shifted to support teaching and learning on CTU's campus in the second phase of the project. At this stage, E-learning implementation at CTU had several advantages, as well as challenges, to adoption, both at user and institutional levels.

Experiences from the pilot project significantly paved the way for facilitating implementation in the second phase. The key leaders recognized the important role of IT in administration and academic activity. The recognition of E-learning led to significant involvement of top management during the implementation of the project. Equipped with ICT knowledge and experiences gained from the previous phase, E-learning implementation was facilitated by monitoring directly from a top manager at CTU and heads of academic departments.

"With the general administration of the university, ICT played a really important role, very important. The survival of this university depends solely on the applications of ICT in managing the whole school; teaching and studying must use ICT and not be done by other means." ADIT3

From the user side, CTU has benefited from the skill and experience of young staff who graduated from abroad, in universities with equivalent teaching and learning environments. In addition, E-learning also gained the professional development of E-learning technology and pedagogy which was provided by international partners. As a result, the trained staff were actively enthusiastic adopters of E-learning to support student learning on the system. CTU also organized several training sessions to support later adopters. A manger mentioned training sessions for teaching staff thus:

"That group has got 2 branches: one is ICT where I work, as for the other one, which is about pedagogy the educational department controls that, in terms of how they

develop lectures. Excluding support from the project, CTU develops them by itself. That's why the university offers training classes for staff. At the beginning, lecturers who taught the pilot courses were not interested much in participating in training; after a while, they could tell it was good at assisting them in teaching." AMBA1

Another important factor mentioned by teaching staff who had significantly applied E-learning to their teaching was peer support and sharing with colleagues. The early adapters became the coaches for designing and running courses on the system for their colleagues. Although they could easily get support from IT staff, having supporters was more convenient to solve their inquiries quickly. E-learning adopters at CTU appreciated the guidance. As a lecturer said:

"Teaching staff in several groups facing problems discussed them together and when there was a problem that could not be solved, we contacted the university. If it was simple then we would swap courses beforehand, if complicated then we would contact the university. We support each other a lot. If a course is similar to someone else's then I would review that person's resources; through that p-rocess, I can share much information". LEBA8

One of the most challenging tasks to E-learning adoption was the difficulty of changing the mindset related to E-learning applications and time resources for learning and practicing E-learning. It is likely that teaching staff and key managers were not convinced about the reliability and creditability of the new learning environment. To them, the face-to-face learning method in Vietnamese education meant it was still hard to monitor and control the quality of training and learning via the network. Assessing the students' learning performance via a network is out of the teacher's control. Despite E-learning having been encouraged, CTU does not accept any assessment taken from the E-learning system. The sceptical mindset of leading staff was completely obstructive to facilitating E-learning adoption across the university. As a manager admitted:

"There's no guaranteeing students who use E-learning are actually learning. E-learning used to assist students in studying is Ok, but E-learning that gives a degree doesn't make me feel assured." ADBM5

E-learning adoption also required teaching staff investing and dedicating their time and endeavours to learning and developing digital resources on the system. However, teaching staff did not have enough time for this. Moreover, applying E-learning also required more

time than traditional teaching methods, when it needs teaching staff spending their time online discussing and interacting with students on the system. When asked about requirements of E-learning adoption, an academic manager mentioned:

> *"It takes time to learn to use this tool, it asks lecturers to invest more of their time in this, to interact with students more. Using E-learning would take more time for teachers. if I were using it I would also take more time" AMAC6*

The limitation of time resources led to many issues related to learning with the system. Many courses and materials were out-of-date. Students also complained about learning materials published on the system not being updated for a long time. As a student who used E-learning regularly commented:

> *"There were a few subjects that lecturers could support us with online because its resource already was available on the system. Because they have taught that subject for a long time those resources are sometimes outdated, their lessons have been updated but not online and that confuses us sometimes. Teachers have uploaded them but they're old, from a few years before, so we can't use them." STEC3*

Faced with challenges and the difficulty in E-learning adoption, CTU selected a neutral policy associated with E-learning adoption at CTU. Emphasising volunteering and self-motivation, CTU encouraged teaching staff. As an academic manager said:

> *"From the university's perspective, they only create the environment; they don't force students to use them. When teachers understand the advantages then they would do it instinctively, people who have got time, people who have got the love of teaching, people who have got the conditions to use them and people who have got the enthusiasm. It depends on the teacher really; if he likes it then he'll develop it." AMAC6*

The current regulations in Vietnam do not allow assessment of student performance in any format, except the traditional examination method, a written exam with a supervisor. It is likely that this impacted significantly on E-learning adoption not only at CTU but also at other academic institutions across Vietnam. Therefore, there are no differences between E-learning adoption and non-adoption, even if that involves resistance. Teaching staff should not been affected in their job performance whether or not the staff adopt E-learning. As a member of staff said:

"There's a problem. Because MOET's regulations do not permit it, I can't use the program fully to teach, only a few parts. Even if we have the marks of online activities, final exams to assess student learning is on paper." LEAC9

In operation, CTU prepared carefully to support its staff to go online. An E-learning office was setup to run the E-learning project managed by an IT expert. This office operated as a bridge to coordinate E-learning adoption in academic departments and the management board of CTU. Therefore, E-learning implementation at CTU was professionally carried out to a high standard through consultation with international experts. As an academic manager said:

"The university also formed an E-learning team with an office to run it, focusing on managing. The Department of Economics and the Marine Department were chosen for pilot implementation. Alongside them there's the Education Department, responsible for pedagogical consultancies because it knows how to teach online, called the consultancy unit." AMAC6

During the process of learning and practicing, when faced with technical or pedagogical issues, it was very convenient for staff and students to solve their problems by telephone or email, seeking staff support. As an IT manager noted:

"As for teachers, they phone us straight away, because they know which manager to contact; as for students, they send us emails. If they phone the centre, the staff will solve any technical problems. If they send an email then they are answered right away". ADIT3

5.5.2.2 E-learning technology and problems

With digital infrastructure invested in by international support, E-learning has technologically the most favourable conditions to develop. The E-learning system was deployed with strong digital resources and up-to-date hardware. In addition, information technology at CTU was planned for scalability and performance. Therefore, a new application could be easily deployed and integrated smoothly with existing resources and other application. The technological advantages have paved the way for E-learning implementation at CTU. If the teaching staff want to adopt E-learning, the challenges might come from their endeavours, not from technology. Actually approaching CTU's E-learning was very simple when every teaching member of staff and student had already automatically registered an account on the system. Students could access the system to learn if their registered subjects were supported

by a lecturer. Teaching staff could log onto the system to design their subjects if they wanted to support their student at any time. As a manger said:

> *"As long as students have got their accounts and can log on, but we can set them in groups then give them access. Each lecturer is provided with their own account by the school, where they can design a subject and manage lectures, For example, right now I'm teaching ICT. I go on E-learning to design the lecture then upload it so students can go on it like a website," LEBA7*

Although having technical advantages, CTU made mistakes in selecting LMS to deploy for the E-learning environment. At the beginning, an LMS, called Claroline was installed in CTU's E-learning environment. It is likely that the Claroline platform lacked functions and was slowly developed. Since CTU changed to the Dekeos LMS with more advanced functions and friendly user-interface, the IT department tried to save all resources designed on the old system, as far as possible. However, the compatibility between the LMSs had not been completely agreed. As a result, teaching staff who had already adopted E-learning lost resources that had taken a lot of time and labour to develop. Although this failure was not expected when an open source LMS was chosen to save the budget, the failure of selection of LMS software disappointed many teachers who had already trained and used the old system to support their work. This led to individuals discontinuing their use of the system. As A lecturer complained:

> *"Changing the format two or three times because of the lack of functions, in general after going through the re-development process, lecturers prepare to redo their work. After each change, lecturers were told to copy important resources; unimportant resources were thrown away then readymade resources uploaded. However, they were also lost, although the new system has more functions. Changing the format forced me to redo everything". LEAC9*

From the student point of view, learning materials on the system were limited by network traffic. It is not clear where students accessed the E-learning to upload or download the learning materials, their home broadband subscription, and the CTU network or internet service providers. A student mentioned:

> *"The limiting factor is the amount of disk space for uploading, if a teacher has got a lecture but it's heavy, that teacher can't upload it. The amount of disk space is really limiting, sometimes: students can't upload their own work, and uploading resources*

is really slow and takes up lots of time." STEC3

5.5.2.3 Teaching and learning on the system

At CTU, E-learning used to support student learning was not entirely a replacement for teaching and learning on academic programs. The courses designed on the system followed functional tools which were available in LMS. The course syllabus, forum, link, quizzes and test were normally applied in E-learning design. However, teaching staff tended to use functional tools which required their students to study by themselves, such as the quizzes, etc. In this regard, E-learning can help to reduce the time for interacting with students on the system. However, it is likely that they are not developed, keeping in mind the experiential and constructivist perspectives of learning, although instructors adopting E-learning at CTU have been trained in theories of learning for E-learning pedagogy. Their design was constructed in a way that did not help students on an E-learning-supported course learn in better and more effective ways, to be active learners, or construct their own understanding. Intensively using automatic tools on the system did not orient students towards constructivist goals. In addition, the level of use depended on how E-learning design had been applied to the courses by each lecturer. As a system admin person mentioned:

> *"Teachers go on and apply it at different levels. There are teachers who upload resources for learning, create discussions, then build up work for students to decrease the amount of class time. There are teachers who only upload study resources, so that students can review them; other than that students go to class as usual ". ADIT3*

In applying E-learning at CTU, It is likely that the teaching method on E-learning depended principally on how the LMS software had been developed and the availability of functions. Although staff had been trained in technology and pedagogical methods, they used E-learning in a simple way, uploading learning materials and giving references for students. In this sense, the E-learning system at CTU was likely operated as a file server.

> *"For other subjects, mainly one-way, lecturers upload lectures, they upload materials and also lecture notes and we just download them. In my opinion, because E-learning isn't really used a lot, it's hard to differentiate. Notably, uploaded resources are easy for download. To be honest, there aren't many, normally teaching materials and lecture notes lecturers upload from the beginning of the semester. In the middle of the semester, if there's a new assignment or revision then the teachers would continue to*

upload them. At the end of semester, answers and scores are uploaded once more". STEC2

Because E-learning activities mainly focused on supporting learning materials and references the CTU's student log into the system to download the files provided. In this aspect, E-learning support for learning at CTU is too far away from the project's objectives. Actually, the E-learning system was used where the learning materials have been digitalized and organized at one place for convenient access by students, rather than the printed ones which are handed out in classroom. As a student said:

"At the beginning, lecturers would introduce content and plan, and then upload it on the system for us to download. After getting materials uploaded, students would study themselves. If we have a question, need for reference, we might request more support from lecturers on the system." STBA1

Therefore, with or without E-learning implemented, the CTU student still had to study learning materials and references by themselves. The E-learning activities at CTU involved a lack of interaction between lecturers and students. The interactional teaching and learning method requires a relevant allocation of time resource that is limited by lecturers having so many teaching sessions. Perhaps limitations of time prevented the development and adoption of E-learning at CTU. As a student commented:

"There are students who want to communicate information with teachers but teachers are possibly busy so there isn't a lot of interaction between the two and even students aren't that active in discussing with one another. There are students who post topics that aren't relevant to the subject, like making friends, it's making them look like they're covering a lot of stuff but they're not relevant to the subjects". STBA5

From learning and teaching on CTU's E-learning system, it is likely that the principles of learning theory, for example constructivism, are not respected. The way in which CTU's student learn on the system is not an active process. CTU students had no opportunity to contextualize their study, either by being placed in a practical situation or by being given real E-learning courseware relevant to their topic to interact with the group and instructor. In other words, constructing their own knowledge by learning on E-learning modules, discussing online with other student and instructor, collaborating and cooperating with the other student member in their group were not present in CTU's academic environment. From

a constructivist perspective, such learning was not interactive enough to promote higher-level learning and social presence.

5.5.3 Post-implementation stage

When ending the project, E-learning at CTU usually fell into disuse. Most academic departments have neglected E-learning in teaching and supporting student learning. Further detailed development of E-learning at CTU has not been clearly defined. Trying to maintain the E-learning system and keeping the adopted achievements was very difficult for CTU, when a lack of budget was allocated for E-learning. Developing E-learning more might be impossible. As a technological leader of the E-learning project commented:

> *"The development project is not definite. Right now, it's about encouraging people to use it. There isn't a project to push it further; what's going to happen in the E-learning development is still unknown. Right now, the management board doesn't have a long term plan for it, but written format communication and resolution had already mentioned it". ADIT3*

However, one direction for further development has been communicated at CTU. A project proposal for E-learning was developed calling for donations from international partners. In this proposal, CTU will shift back to using E-learning for distance learning, which might generate revenue for E-learning adoption. In other words, a budget limitation was likely the major problem for continuing adoption at CTU. Therefore, a senior manager recommended further development of E-learning thus:

> *"The university is still writing the project proposal for phase II; if possible, it would be put into use for distance learning programs. Instead of delivering the distance learning programs in which lecturers would also have to go to classes, if successful, the headmaster would put E-learning into use for distance learning". ADBM5*

Without a budget allocated for E-learning, the achievements of E-learning adoption at CTU are in danger. Instead of using the system to support students, E-learning adopters have changed to using E-mail to communicate and support students. A student disappointed about E-learning said:

> *"There are a few subjects that we told teachers to upload but sometimes they used e-mail instead of going on to E-learning. Probably creating a new subject is arduous and managing subjects by E-learning isn't suitable to lecturer's own time. In the students'*

perspective, they really like to use it. I think that it possibly let students in the same group exchanging directly like yahoo". STBA4

In addition, E-learning has faced a lack of teaching staff who can continue to use E-learning. Some have gone abroad for study. Therefore, the level of use was likely lower than before. A manager explained one of reasons his department reduced the use of E-learning thus:

"To be honest, in recent years, there has been a halt. Both Management and Marketing departments are still developed. Generally speaking, maintaining it like before, it can't be expanded right now due to the lack of people. In the future, they'll come back then we can continue to develop it". AMAC6

5.5.4 Thematic network - process of implementation

At CTU, E-learning implementation has been driven by external direction and consultancy rather than reformed teaching and learning by itself. Targeting distant learning degree programs, E-learning initially was not applicable to the distance learning student when economic and technological conditions were not suitable for learning via the internet. As a result, the E-learning approach was changed from distance learning to regular programs on campus in the pre-implementation stage.

The experience of this stage was for CTU in implementing the next stage of the project. ICT knowledge and E-learning awareness meant a significant involvement of top management at CTU. Benefits gained from E-learning adoption, such as convenient communication with students, also encouraged teaching staff to participate actively in developing resources for their academic work. Along with training sessions provided by university, the sharing and support culture in academic departments motivated later adopters confidently to learn and apply the new technology. However, it is likely that a sceptical mindset about learning with technology prevented further E-learning adoption. One reason for the low credibility of E-learning has been the contemporary regulation of Vietnamese education. When student assessment on E-learning was not officially accepted, an individual or educational institution could explain why they had not adopted E-learning at that stage. Therefore, a voluntary policy was suitable in implementing E-learning at CTU.

To support staff and students, E-learning was organized centrally in an office to support and solve technical issues as soon as possible. Gaining advantages from digital resources invested by partners, the E-learning system was completely integrated into the university platform,

creating easy access to the system. However, changing the LMS during the implementation stage impacted on users who had developed and uploaded a large amount of resources on to the system. The disappointment of users related to technical issues may have led them to cease adopting new technology. Although E-learning adoption achieved a certain result and was appreciated, the quality of the result was questionable. Teaching and learning on the E-learning system was mainly about downloading and uploading materials. Teaching staff significantly depended on functional tools of LMS to lead student study by themselves. Without interaction between lecturer and student, interest in E-learning was lower than before. When the project ended, E-learning was forgotten. At this point, CTU tried to maintain the E-learning system to meet the needs of some teaching staff still interested in it. Without a feasible plan, the development of E-learning at CTU is unclear. The thematic network of the implementation process is depicted in Figure 5-6 below.

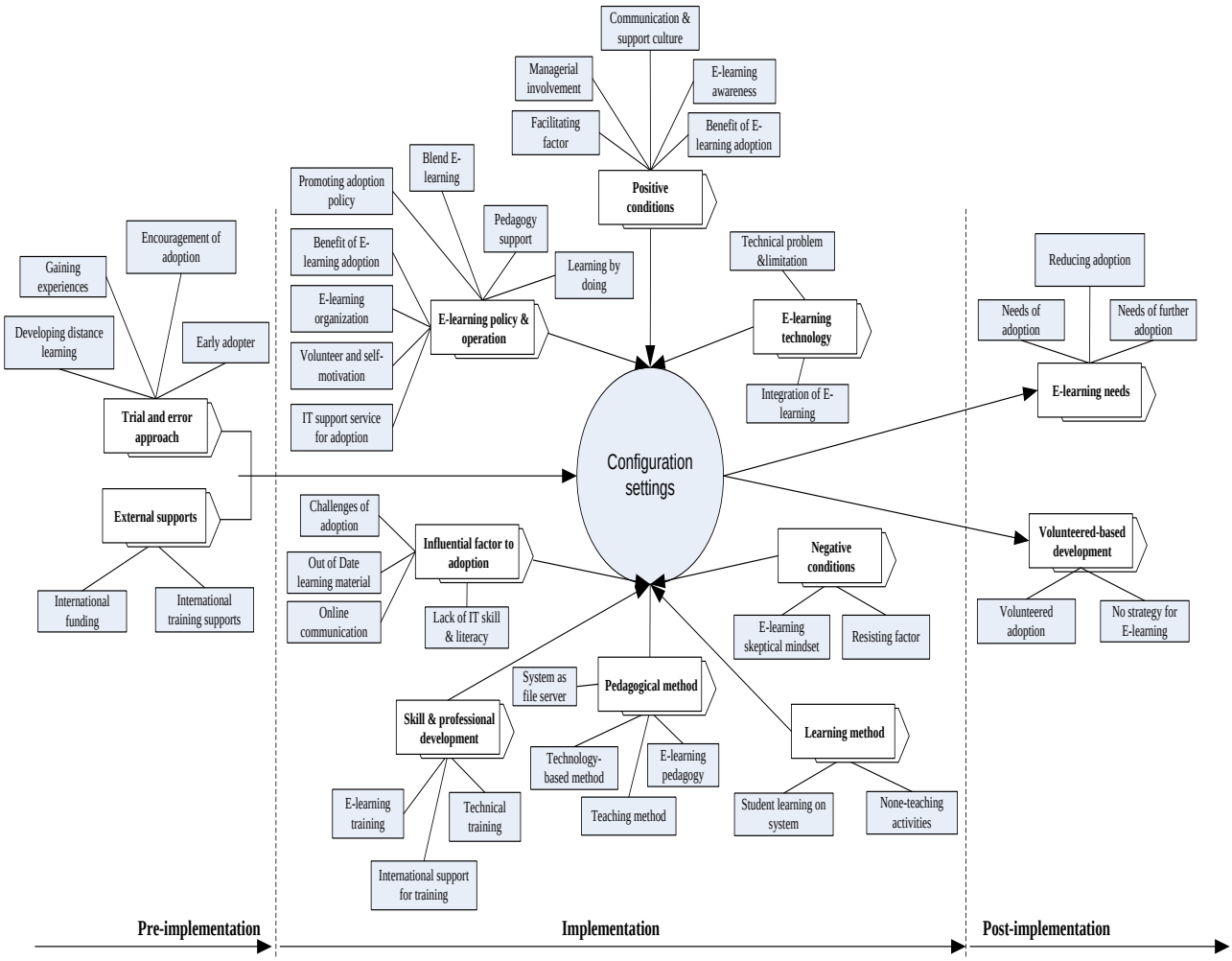

Figure 5-6: Thematic network - process of E-learning Implementation

5.6 Configuration-based Interpretation

To shape the nature of E-learning implementation at CTU, the individual thematic networks were configured interactively to identify aligned relationships within contextual settings; within the stages of the process of implementation; and between context and the process of implementation. The nature of E-learning implementation should be determined and shaped by (i) Dynamic interaction among contextual settings as a bounded system of implementation, (ii) Sequential effects which could lead from this stage to another; and (iii) Dynamic interaction between the context and the three stages process of implementation. These interactions and interrelations will be addressed in more detail in the next section.

5.6.1 Factor-configured implementation

Built and developed on strong culture and history resulting from an organic charter, the structure of CTU is strong in supporting management and operation at CTU. The balance in the centralization-decentralization of IT governance radically supports the ICT development and application at CTU. It is likely that university performance has been achieved from its managerial mechanism. It allows continuous improvements, based on intensively applying ICT in university operations. As a result, the academic service and ICT support have been improved to meet the needs of its users. In addition, an ICT qualified leader, both in knowledge and skill, has significantly impacted on ICT strategic development. Open and neutral-oriented technology is capable of being integrated into the existing university technology. On one hand, the integration of technology allows the mobilization of ICT resources for a specific purpose at a specific time, to overcome the shortage of capacity. On the other hand, it facilitates straightforward access to ICT resources without limitation by location and application, as well as offering support services for its users. In conclusion, a better performance and capacity of technology has been achieved, resulting from a solid structure and managerial mechanism on a limited budget and with limited investment at CTU. However, the endeavours and improvements at CTU have not brought returns in student learning, especially in student attitudes. Beside the changes in the academic system and the Vietnamese education transformation, students have not been really working very hard: this suggests that E-learning implementation at CTU has not been appreciated, which might be the result of a shortage of ICT skills and relevant knowledge.

5.6.2 Process-configured implementation

As the first university providing an E-learning environment in higher education in Vietnam, the CTU's E-learning implementation was supported and consulted by international partners for offering a distance learning degree program for in-service students. Although the implementation plan was carefully prepared, funded and trained up in technology, the operation of and pedagogy on the program did not survive, as expected. Because the internet technology in Vietnam were not mature enough to support online distance learning at that time, both in cost of use, in bandwidth and speed, and especially in the low level of literacy ICT, the distance learning students were not interested in learning with technology. From experiences gained from failure in the pre-implementation stage, the well-prepared plan and efficient operation created more favourable conditions for adopting E-learning on campus for teaching staff and students. Equipped with state of the art technology, E-learning was completely available, supportive and accessible for all students and staff.

Although the institutional policy, operation and technology were already supportive, the quality of E-learning adoption was different. The overload of teaching work radically prevented allocating personal resources for teaching on the system. Except for the ones paid for demonstrating on the system, who were very active, most teaching staff already had passively gone online with their subjects. As a result, the out-of-date content and material even serving as a file server, the adoption of E-learning did not meet with student learning needs. After the funded project ended, the E-learning system was maintained but there were few active users on the system. Only the student's learning assessment in the classroom was accepted by the current regulations of Vietnamese education, so that learning online instead of face-to-face learning is still questionable in relation to quality. Thus, E-learning implementation likely needs time to change at CTU.

At the time these data were collected, the E-learning system had been maintained with most inactive adopters, except students and staff from the computing department. CTU called for new funds to support a levelling up of the system. One direction mentioned was offering a distance learning program which would generate revenue for lecturers and resources. At the end of the funded project, without a budget allocated for E-learning, it was likely that E-learning at CTU would be postponed.

5.6.3 Configuration of factor and process

The findings from the case indicate that E-learning implementation at CTU was facilitated by external support, including budget, technical assistance and expertise. It is obvious that E-learning was impossible to introduce at CTU without external support and funding. Introduced for the first time into the Vietnamese education system, E-learning was carefully implemented and prepared with the purpose of learning from online distance learning (1 in figure 5-7). Experience gained from previous stages meant E-learning was focused on supporting on-campus learning. On campus, E-learning had the advantage of being an environment where intuitional conditions were oriented to ICT-based operations and administration (2 in figure 5-7). Technologically, E-learning was facilitated by the readiness of technology. The end-user had easy access to the system if they wanted to adopt E-learning (3 in figure 5-7). To encourage E-learning adoption, CTU provided several E-learning training programs and development for staff, as well as financial rewards. In addition, technical support services were available at all times to solve problems as soon as possible whenever the end-user was faced with technical issues, even pedagogical consultancy was provided with demonstrations on the system.

It is clear from all this that institutional policy, organizational conditions and social factors were very supportive and integrated to encourage people to adopt E-learning (4 in Figure 5-7). At this stage, E-learning was ready to be implemented on a large scale. Teaching staff used the system as a tool to deliver learning content and materials. Without investing relevant personal time on designing and updating learning materials and contents, the subjects published on the system gradually become out-of-date and did not meet with students' learning needs. Even the technical abuse of the E-learning system changed E-learning from an environment for learning and teaching to a computing tool for distributing learning materials. Teaching staff and CTU were too focused on having a subject published on the system rather than using new instructional technology to enhance the quality of academic training. It was definitely a problematic issue of CTU in term of organization and politics (5 in figure 5-7). For people who were involved in E-learning during the previous stage and had been paid to participate during training sessions, they expected to be paid during the implementation stage when supporting students on campus. It fostered the concept of being paid for E-learning adoption in the thoughts of teaching staff at CTU (6 in Figure 5-7). Therefore, the expectation of payment for work impacted psychologically on the voluntary policy of E-learning adoption implemented at CTU (7 in Figure 5-7).

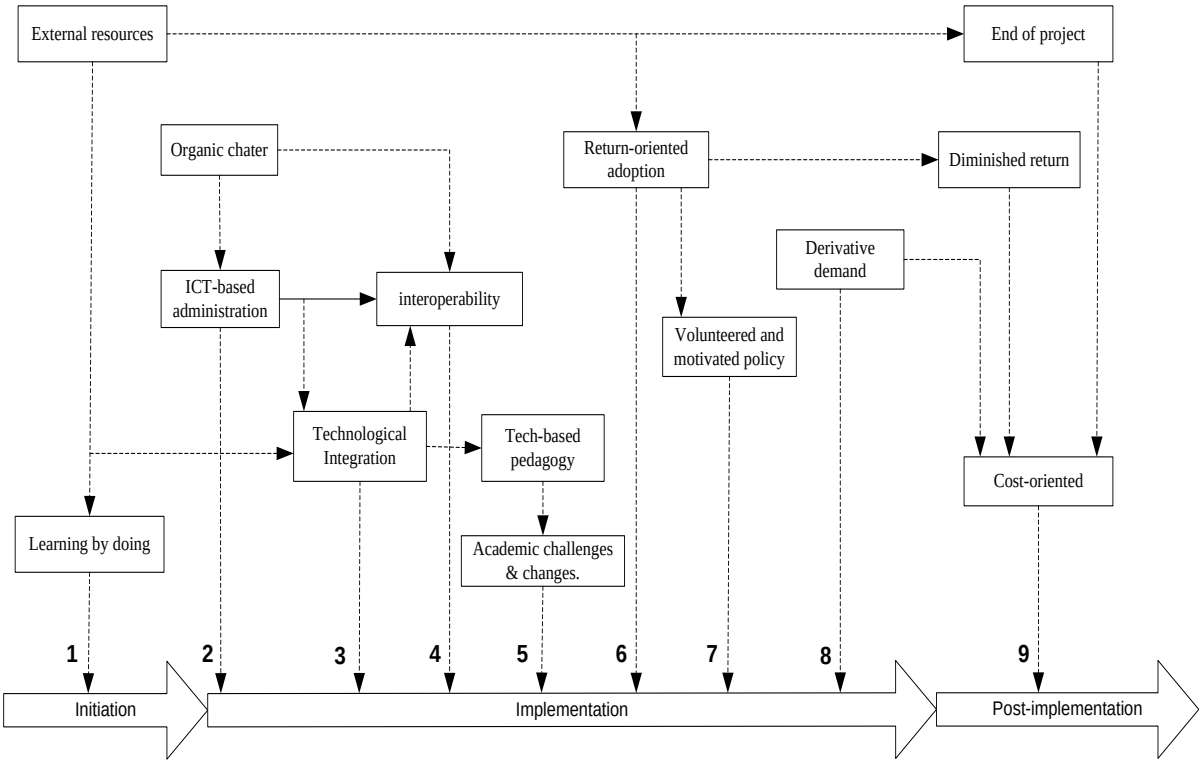

Figure 5-7: Configuration of factors and process of E-learning implementation

The volunteer policy was entirely in line with current regulations in Vietnam. Without compulsory adoption, teaching staff might or might not apply E-learning in their academic work with worry-free performance. Therefore, it was applicable to staff who might not be ready to adopt but could easily be involved in the system. On the other hand, voluntary adoption likely lacked strong commitment to E-learning. This implies that the demand for E-learning adoption could come from external factors or conditions which motivated them to participate into E-learning adoption (8 in Figure 5-7).

At the time of writing, the psychology of payment for adoption was still being fostered, so that the strategic development of E-learning at CTU emphasised distance learning where the application could return for re-implementation. Even, re-implementing E-learning depended completely on seeking potential funding from external sources, rather than allocating institutional budgets to get started (9 in Figure 5-7).

In short, resources for E-learning implementation at CTU had a key role in implementing and adopting E-learning at all stages. CTU depended completely on external sources for preparing infrastructure, developing and motivating staff adoption. The technological integration and interoperability were clearly an advantage one, changes in the mindset of E-learning was more important in the case of CTU. It could overcome the current challenge of E-learning interest within CTU campus. Choosing directions for further development was

questionable when CTU targeted generating revenue from the E-learning system rather than focusing on improving students' learning performances.

5.7 Pattern of E-learning implementation

The boundary of the case, in which the super-global themes emerged from data of technology, organization, and teaching and learning contexts, has been configured with the process of implementation, which is represented by themes of the three stage process shaping the nature of E-learning implementation at CTU. The pattern drawn from the configuration settings of the case have congregated in E-learning need, derivative demand, and funding-based capacity, as depicted in Figure 5-8.

5.7.1 E-learning need

E-learning was desirable at CTU due to internal factors which were identified from the case, such as E-learning benefit and recognition, ICT awareness, and sceptical mind-set. However, the need for E-learning was different with actual E-learning demand. In the case of CTU, E-learning implementation showed that E-learning was an action plan to cope with challenges in administration, regulation and the trend for technological innovation in education, rather than actual action for renovation and improvement of the quality of training.

5.7.2 Derivative demand

Based on international support, the available resources of ICT and staff development facilitated E-learning introduction at CTU. The specified funding for E-learning in the second phase of the project helped CTU to continuously offer E-learning environments for students within the campus only. E-learning implementation at CTU was derived from external sources, which could imply that the actual demand for CTU for E-learning was not created by the need for improvement and renovation of academic training. In other words, the need for E-learning was derivative and dependent.

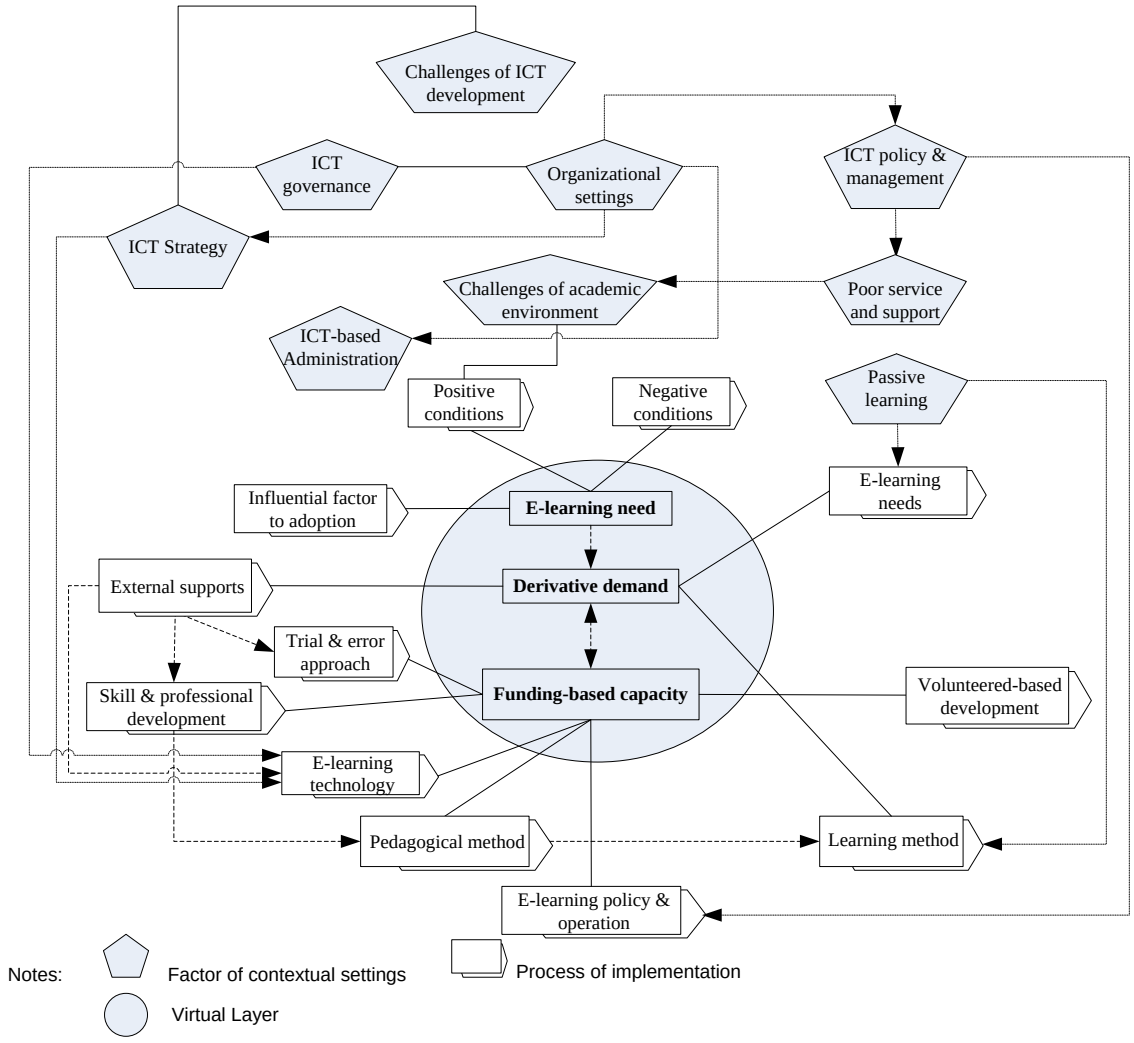

Figure 5-8: Configuration-based pattern of E-learning implementation

5.7.3 Funding-based capacity

Besides the endeavours of adopters, E-learning at CTU also depended on external resources in term of expertise and budget. Technologically, E-learning infrastructure at CTU was planned to be deployed at a very large scale with an incremental investment. However, the potential capacity of the system was never reached. The actual capacity was determined by several factors, such as institutional policy, operation, pedagogical method, technical infrastructure, professional training and staff development. The E-learning implementation at CTU was vulnerable because of the lack of commitment to adoption, with a voluntary policy, and the principles of pedagogy and institutional investment. External support and funding were a necessary condition, but not enough to foster continuous adoption in technological innovation. CTU had much determination and ambitious but it did not undertake relevant activities to level up the available advantages of technology and qualified staff.

Configuring the contextual factors with the nature of the implementation process gradually converged to the virtual layer where the the nature and process of E-learning implementation at CTU could be shaped by the key concepts constructed. The desire for E-learning at CTU did not lead to a demand for E-learning. The actual demand came from external factors, so that the satisfaction of E-learning implementation at CTU really actually met the requirements of external partners rather than institutional need. In the light of this point, E-learning implementation at CTU demonstrated that the E-learning project already utilized the infrastructure. In practice, the infrastructure funded had been used for carrying out a large scale reform on campus. However, the system being turned on is one thing, using the system to enhance the quality of training is different. Actually, E-learning capacity at CTU had a large potential, but ultimately only met the demand of outsiders.

5.8 Chapter conclusion

The nature of E-learning implementation at CTU has been presented in this chapter in terms of the factors of contextual settings and the process of implementation. By applying the thematic network analysis, the comprehensive network of E-learning implementation has emerged from data analysis. Each individual network of the context and implementation process has also been addressed in detail from evidence and documents collected at the studied sites. At an abstract level, the themes have been entirely integrated at the virtual layer in the centre of the network. From the configuration approach, the pattern of E-learning was drawn, interacting and interlaying among themes. The E-learning need, derivative demand and funding-based capacity significantly determined the nature of the E-learning context and shaped the process of E-learning implementation at CTU.

Chapter 6 – E-learning implementation at Hue University

6.1 Introduction

This chapter presents findings from the study at Hue University (HU) and its members on E-learning implementation. The findings have been explored through interviews with students, teaching and IT staff, and managers across the university. The chapter is structured in seven sections. Following the introduction, the background of HU will be presented, along with E-learning initiatives, which are visualized in a rich picture diagram. The next two sections illustrate the context in which the process of E-learning implementation took place. Then the pattern of E-learning implementation is drawn from a configuration-based approach. Finally, the discussion and conclusion are summarised.

6.2 Hue University and E-learning initiatives

6.2.1 Background of Hue University

Back to history, higher education in Hue city has had a history of more than two centuries (1803-2008). Before reunification in 1975, HU was initially founded with four higher education faculties: the Faculty of Teachers' Training, the Faculty of Sciences, the Faculty of Letters, the Faculty of Law and the Faculty of Medicine, later. After 1975, these faculties were upgraded to independent university status. In 1983, the University of Agriculture and Forestry was founded. Hue University (HU) was officially established in 1994 as a regional multi-disciplinary university, formed by the merger of existing universities in Hue City. Chartered as a regional university, HU's mission is to be Vietnam's premier institution of higher education, so as to better serve the country and its community. HU currently comprises seven member colleges, two faculties and a number of research and professional service centres. HU has over 2,400 employees and more than 60,000 students enrolled. Presently, it offers 90 academic programs for bachelor degrees, 61 for masters, 23 for doctorate degrees and several training programs for medical specialists. With government support, HU is also building new, modern and well-equipped campuses on a 645 hectare area, where its administrative headquarters are now located. With its long history of establishment and development, HU has trained thousands of scientists, medical doctors and teachers. Thanks to continuous endeavours and great achievements, HU has been awarded with many honourable titles.

Today, HU is a multi-disciplinary university, diversified in training methods. It aims at training highly qualified scientific and administrative officers; providing a wide range of dynamic careers which carry the typical cultural characteristics of the region; and offer suitable solutions for the full growth of training activities in both quantity and quality. HU is a centre for scientific research with a large number of important research projects and programs. These programs are not restricted to limited fields. On the contrary, they can be combined with other sciences or can be expanded to meet the short-term as well as long-term demands of the region and the country. HU pays special attention to the combination of fundamental and technological science, of research and application, in order to best accommodate the process of industrialization and modernization in Vietnam.

6.2.2 E-learning initiatives at Hue University

Initially, applying ICT for teaching and learning in classrooms was introduced early at HU, specifically in the Medical School, where the needs for visual illustration in lecturing and learning were high in the 90s. However, E-learning initiatives were officially introduced through the ICT project, called the Phase C project, funded by the World Bank, in 2005. The project was aimed at building the ICT centre and serving the needs of ICT applications for administration at university headquarters ("1" in Figure 6-1). Through this project, a data centre had been set up to develop an executive information system to share and exchange information among college and school members using web technology. The project also had another component, called development of digital content which set out to develop E-learning at HU. As a result, an ICT infrastructure had been set up at headquarters location ("2" in Figure 6-1). HU had delegated this project to the Centre of ICT, to manage and monitor all project activities ("3" in Figure 6-1). In order to develop the digital content of the course, the Centre for ICT motivated teaching staff by making payments for materials developed ("4" in Figure 6-1). These digital materials were imported onto the LMS platform, which was developed from the MOODLE platform ("5" in Figure 6-1). With a finance-oriented policy, the centre of ICT had intended to get as many courses on the system as possible, which became the E-learning portal for the university as a whole. Teaching staff and students from different campuses, on both degree program and in schools, could use the system via an internet connection for teaching and learning ("6" in Figure 6-1). A "communication campaign" was introduced to acknowledge and attract end-user's involvement, which was advertised directly to students and teaching staff at all schools and to all college member of HU. However, the final results were not as expected. The E-learning system run and managed

by Centre of ICT at a centralized location was ignored completely by students and teaching staff. Although there were many available courses on the E-learning system, ordered and paid for, students were not interested in those resources and teaching staff did not consider applying E-learning in their teaching at all.

One key point regarding the ICT project relates to the executive information system, which is used for reporting and exchanging information related to administration work among college and school members with the university board of management. Each school and college member had to develop their own ICT solution on their campus to meet the need for academic activities and management. In the case of HU, it could not wait for ICT application due to pressure to change the academic system and policies ("6" in figure 6-1). When changing from a yearly system to credit system, the College of Economics (COE) tried to apply ICT to managing academic activity because it was recognized that, without ICT, they could not achieve this. CMC, a software company, had been chosen to implement an academic management system at its campus. The CMC solution had offered consultant services to COE related to a digital campus as a whole ("7" in Figure 6-1). There were several meetings to discuss how to undertake the software system and what activities should be prepared and changed in order to applyit. Finally, the solution was given by the Department of Academic Affairs. This department mainly sought an academic management system rather than other ICT services which could be implemented by the software system. As a result, the system installed and implemented in this project lacked many functions needed for teaching and learning ("9" in Fgure 6-1). By focusing on the academic viewpoint, it is clear that this ICT project was targeted at applying ICT to handle the changes in the academic system rather than to promote E-learning activities on the COE campus. Unacceptably, the division of ICT on COE campus had tried to setup another E-learning platform based on MOODLE to meet the needs of COE's teaching staff and students ("10" in Figure 6-1). However, the E-learning system seems to have been a pilot rather than an official teaching and learning environment. Therefore, E-learning activities completely depended on the user's enthusiasm, interest and voluntary use. User's involvement was motivated and encouraged by the college but was not required for academic work.

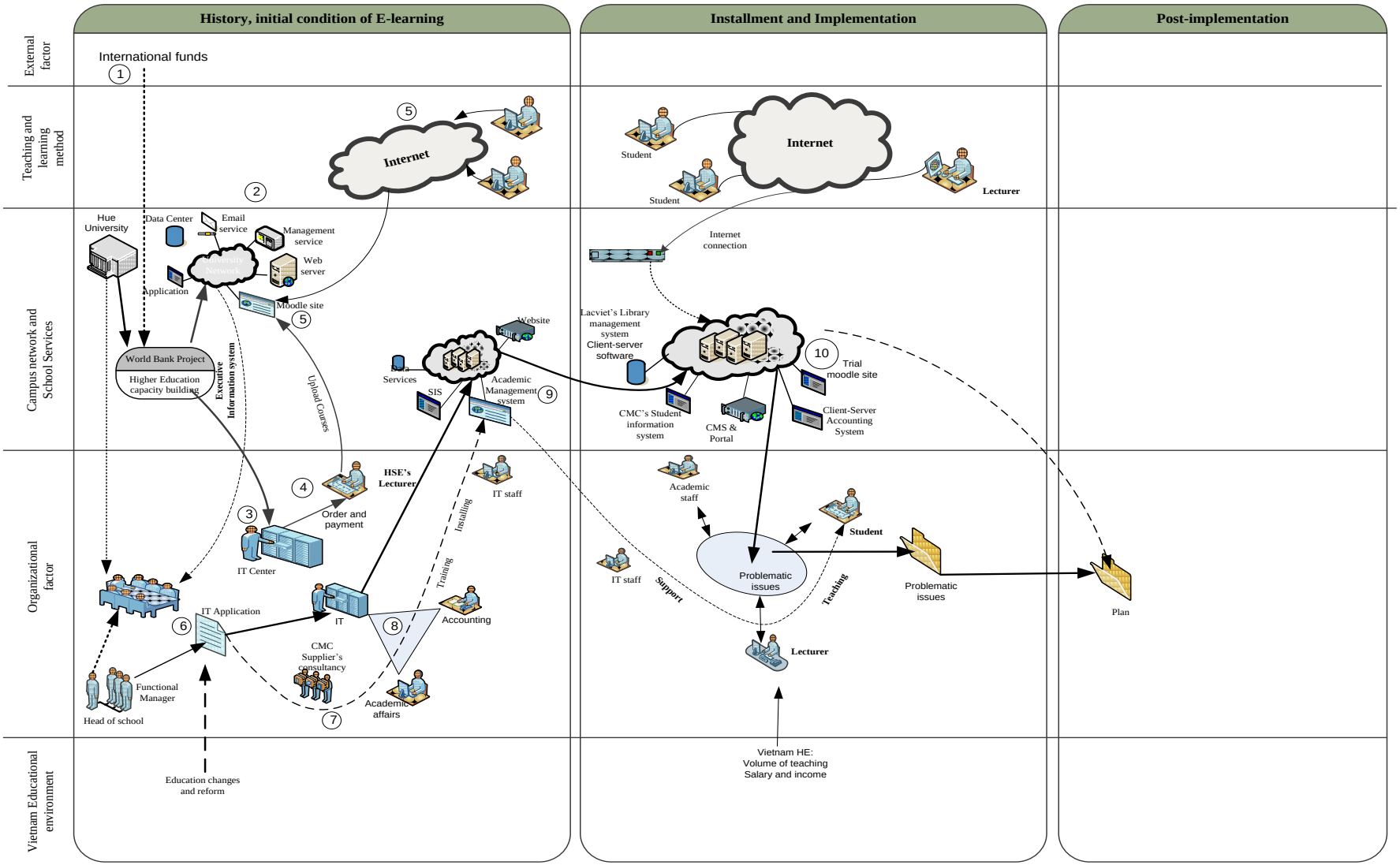

Figure 6-1: Factors and process of E-learning implementation at Hue University

6.3 Findings of the case: themes and features

6.3.1 Thematic analysis

Using the same method as in the previous chapter, the data of this case was distributed and coded into the conceptual framework identified. Therefore the results of data analysis were organized into temporal and contextual dimensions. From the thematic network analysis perspective, there were 198 basic themes identified from all transcripts of the case (Appendices E and H). The basic themes were arranged and grouped into 56 organized themes. These have been developed to become global themes and, where applicable, into, super-global themes, following contextual and temporal dimensions, as illustrated in Table 6-1 and Table 6-2. The theme of case context highlighted the main points of interaction and interrelation which were significantly shaped and impacted on by the process and outcome of E-leaning implementation. The theme of a temporal dimension described the main points and problematic issues in the process of E-learning implementation at Hue University.

6.3.1.1 Themes of context

Fifty five basic themes were identified regarding organizational aspects of HU, which have been grouped into twenty two organized themes developed to four global themes on the higher abstract layer. The four global themes were organizational setting, IT governance, ICT resources and capacity, and change. The *organizational setting* refers to aspects of how HU was founded and organized to achieve its mission and objectives. The *IT governance* illustrates generally how IT was organized and its capability in supporting the university and its member. The *ICT resource* refers to qualifications of ICT human resources and the ICT budget to developing ICT infrastructure. *Capacity and change* illustrate potential readiness for change.

From thirty seven basic themes identified from data related to aspects of information and communication technology, twelve organized themes were constructed. These organized themes have been grouped together to align with its meanings and strong relationships. As a result, technology data analysed built up into four global themes, namely isolation and separation, ICT capacity, ICT development orientation and ICT strategy. The *isolation and separation* commonly refers to the responsibility and governance of ICT at HU. *ICT capacity* refers to the ability of ICT to meet the needs of the university and its users. *ICT development orientation* is used in its broadest sense to refer to the administration and operation of ICT within COE campus. The *ICT strategy* describes the quality of network services and ICT

support for COE's student and staff. From twelve basic themes, five organized themes have been constructed to cluster into one global theme, namely academic conflict. *Academic conflict* indicates features of teaching and learning approaches at HU.

Table 6-1: Contextual factor of E-learning implementation, Hue University

Themes	Organized	Global	Super Global
Organization	• Across-function and relationship • Complex structure • Charter of University • Unstable structure and function • Profit-oriented function • IT Budget Controlled by University • IT Budget allocated by college • IT project management • IT investment and resources • Lack of staff and budget • Limited investment budget • Unqualified IT staff • International funding and support • External low expertise • Good support service from provider • Poor support services • Academic services offered • Academic changes • IT support to change • Administration improvement • IT-based improvement • IT awareness	• Organizational setting • IT Governance • ICT resources • Capacity and change	• Organizational configuration
Technology	• Divergent of development • Separated management • Proprietary platform • Network capacity • Poor qualified in-house development • Administration-focused development • Decision support system development • Multimedia investment • Independent governance • WAN-oriented investment • Data center investment • Ambiguity of ICT policy	• Isolation & separation • ICT capacity • ICT development orientation • ICT strategy	• ICT competency
Teaching and learning	• Student learning • Pedagogical conflict • Student assessment • Teaching method • Teaching content	• Academic conflict	• NA

6.3.1.2 Themes of process

From the conceptual framework with its three stage implementation process, E-learning at HU has been divided into pre-implementation, implementation and post-implementation stage. Major features of each stage will be highlighted in the next section.

In the initiation stage, data analysis has developed into two themes, special understanding and E-learning as a business, which have become the global concept approach. It is a very

different approach to conventional thinking, where a public university will use E-learning to do business rather than support and improve teaching and learning of its training.

In the implementation stage, there were nineteen organized themes developed from fifty basic themes during the process of data analysis. The organized themes were then clustered into seven global themes, namely positive conditions; negative conditions; challenges of adoption; inappropriate technology; E-learning policy; operation and management; and benefit and damage. *Positive conditions* can be defined as any stimulus which accelerates E-learning adoption at HU. *Negative conditions* were used to indicate any impacts causing resistance to E-learning adoption. The *challenges of adoption* describe features of the academic environment and the difficulties which students and teaching staff faced when adopting E-learning. *Inappropriate technology* has commonly been used as digital infrastructure, which has made E-learning problematic. The *E-learning policy* refers to strategic guidelines to develop E-learning application at HU. *Operation and management* refers the organization and promotion of E-learning applications at HU. *Benefit and damage* refers to the losses and gains to both individuals and organizations when adopting E-learning.

Table 6-2: Process of E-learning implementation, Hue University

Themes	Pre-implementation	Implementation	Post-implementation
Organized	• E-learning as business • Special understanding	• Facilitating factors • Love technology • Management involvement • Learning materials • Resisting factors • Difficulty of adoption • Voluntary adoption • Motivational adoption • Challenges of user • Challenges of pedagogy • Limited time resource • Limitations of software • Limitations of network • E-learning benefits • Damages • External support and funding • E-learning operation • E-learning needs • E-learning support	• Future development • College's E-learning planning • E-learning interest
Global	• Peculiar approach	• Positive conditions • Negative conditions • Challenges of adoption • Inappropriate technology • E-learning policy • Operation and management • Benefit and damage	• Intention without action

In the post-implementation stage, three organized themes identified from nine basic themes have been developed into one global theme, namely 'intention without action', referring to the proposal that future growth should promote E-learning on university communication channels, rather than practices.

6.3.2 Thematic network

The *academic conflicts, organizational configuration, and ICT competency networks* cooperate interactively as influential forces in the process of E-learning implementation. They are the contextual settings which can explain how the process of implementation has been carried out at HU. Nine thematic networks, including the *peculiar approach, positive conditions, negative conditions, challenges of adoption, inappropriate technology, E-learning policy, operation and management, benefit and damage,* and *intention without action* emerged through the data, which means the process of implementation can be presented as a weblike-network. As a result, an over-arching thematic network which describes the process of implementation under contextual settings at HU is illustrated in Figure 6-2.

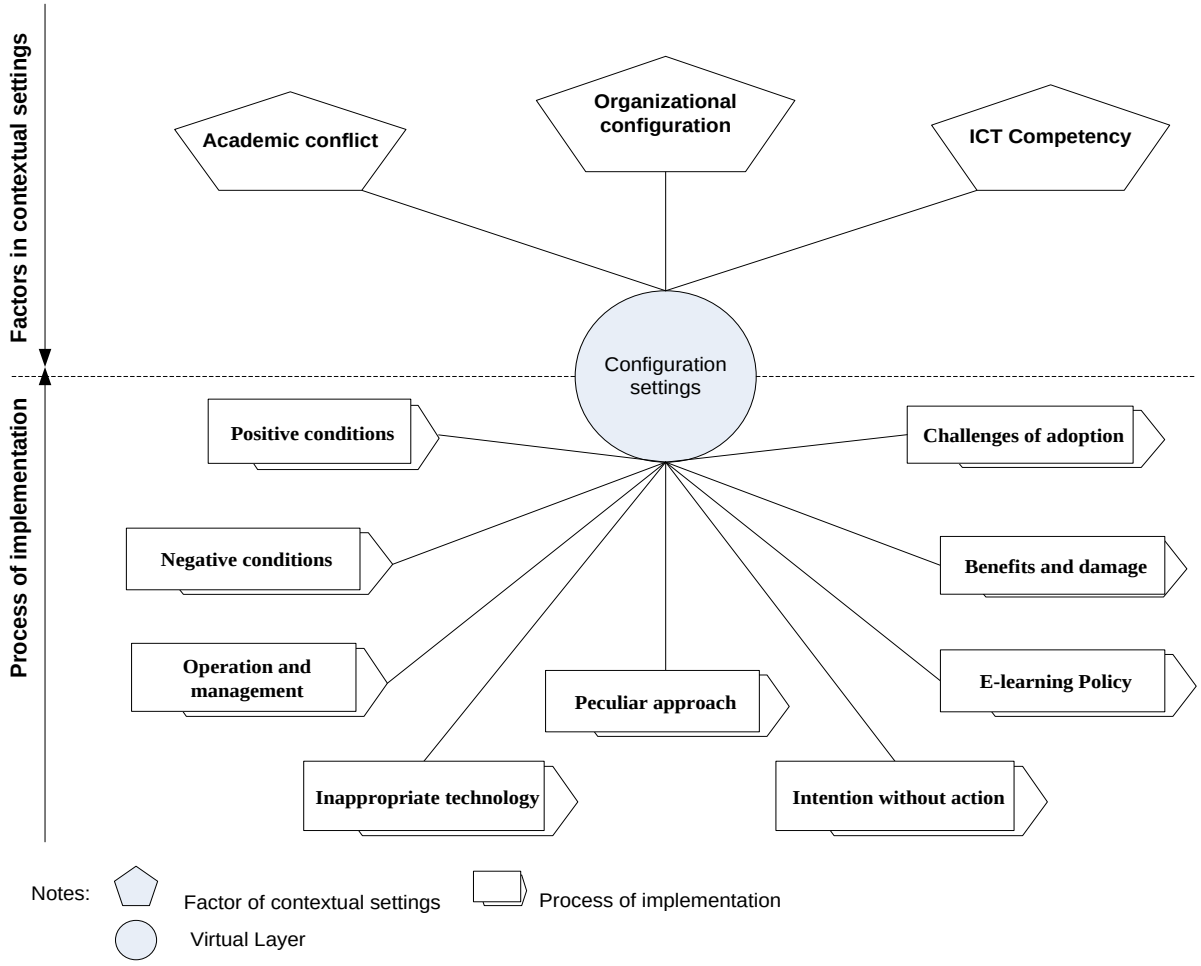

Figure 6-2: Thematic network of E-learning implementation, Hue University

6.4 Context of E-learning implementation

6.4.1 Organization

Historically, HU was founded by merging independent and outstanding colleges and universities in Hue City. Under the status of a regional institution regulated by government, HU is one of the top five Vietnamese multidisciplinary universities with regard to size and public investment, offering a wide range of academic areas in both undergraduate and postgraduate degree programs. There was no evidence that the independent universities and colleges were desirable because they would lose their status, name and academic reputation after merging. Grouping administratively individual colleges and universities in the same area was a political decision,, not one naturally motivated by individual members. In addition, after the merger, the organizational structure remained unchanged, where the functional departments were organized as the same that of HU. However, the status of a regional university like HU has not been clearly defined and recognized by governmental agencies and published yet. Therefore, duplicating and overlapping of functions among member colleges and universities to support academic work and administration exist. Therefore the complexity of organizational structures led to several issues related to operation and administration, power and duty, budget and resource allocation, and admission and recruitment. As a manager noted:

> *"...When combined into Hue University, they are already big, very big, too big, having them under one roof would be very uncomfortable. At the present time, because of the instability, everyone has got ideas of autonomy, independence.... So we need to define a model of the regional university. The Ministries or the Government needs to define the structure legally. It's very chaotic."*ADIT8

Because the structure and charter of HU have not been acknowledged, the university administration could not be efficient and effective in managing academic tasks and information technology. It is very difficult for functional departments, both at university level and college member level, to cooperate in academic and administrative work. In addition, with the weakness of functional relationships among departments, each functional department could operate independently. It could develop and follow an objective which could maximise departmental performance, but HU as a whole has never reached its potential. As an IT manager complained:

> *"Because the Department of Academic Affairs wants to finish their work quickly, they*

let students register via network for a short period of time so when they opened the system, lots of students came on, causing a bottleneck. It makes it less stressful but they couldn't finish the training plans on time. They could only announce the plans when they're checked, so the remaining time was short." ADIT8

It is likely that subjectively merging individual universities was caused by the weakness of the university charter and the complexity of its structure. The college and university members have not benefited from member status of a bigger institution. When the members suffered through the merger, it was understandable that they would want to be separated from HU. As a manager commented:

"The structures of Hue University and University of Danang are the same. As you know, they have a lot of problems such as the College of Arts wanting to leave" AMBM4

Along with the complex structure, function and duty designed for organizational structure have not been stable and optimal. For example, activity in the IT department at HU's headquarter was oriented to business rather than support for academic and administration within the university. The IT department used to be a business centre which could generate revenue or at least bear the cost and budget. As a result, this department focused only on activity that could make profit for them to survive, since resources were not allocated to them by the university. This led the department to go far away from its functions as a support service unit for academic and administration at HU. In the other words, how the university IT department supported college members was questionable. As a result, the functional departments of college members did not cooperate effectively with the IT department of HU. As a manger said:

"The Centre of ICT of HU and Departments of IT under each college member still has links, but not close ones. The headquarters of HU are connected to all college members via WAN, fibre optic cables that are connected to colleges, we work together to manage WAN. When a problem occurs, HU come and fix it. Colleges that have IT Departments are linked through the means of managing WAN together, using WAN. But that is hardly closely linked..." ADIT7

After changing from a profit-oriented approach, the IT department was focused only on managing networks and supporting administration for headquarters. Needs for ICT services

on campus were supplied by individual members. As a result, most of the university's ICT budget was used for investing and upgrading headquarters. As a university manager said:

> *"IT is one the goals HU has set for its strategic development plan. By improving administration, applying IT to bring administrative improvements, then we would be able to find the solution. HU invested in a comprehensive plan, a common path. Soon, by focusing on the objectives of the IT plan, we will reinvest, mainly at headquarter".* ADIT8

Meanwhile, the college member has used their own budget to invest in ICT to support learning and teaching on its campus. This might lead to obstacles and inefficiency. On the one side, an ICT project normally requires a large investment but one college member might not have a sufficient budget to allocate for this. If a project is needed, the small amount of budget may be allocated. Therefore, an ICT project requires more time to completely come in to operation. On the other side, a similar ICT project which has the same application and hardware platform might be invested in by other colleges. These projects could be invested in at one site to be shared, and distributed among all college members. When resources are limited, this approach to developing ICT services is not efficient or sufficient; even HU has wasted its scare resources. Moreover, the decentralized investment might bring costs for university as a whole because the overheads would be higher. When asked about ICT strategy, a manager noted:

> *College members that are strong have already invested but have not completed yet. HU's investment will come into operation in the future therefore our investment system will be thrown away…. What we should do to answer the demands is address the requirement of integration into the university system*. SSAC3

The HU has not defined clearly the long term vision and strategic orientation on ICT development as a whole. Most university members decided to go with their own system. By doing this, college members face several obstacles to providing ICT service to its users. They will have fragmented funding and a lack of qualified staff, as well as a bureaucratic procedure and unprofessional project management. An IT staff member said:

> *I wanted to buy a new server and it took a month for me to find out how to do this. It is our common situation. Even when it has been approved, we still work with other departments, budget department, State Treasury, and, for example, when you've finished the paperwork for State Treasury. It's really complicated. It's like we're*

fighting in Guerrilla style. Implementing such master plan has divided into small parts. AMBM4

It is likely that ICT decentralization of ICT at HU is not appropriate. The HU did not strategically take the role of developing ICT resources for the whole University. ICT development was delegated to each member to decide their own way. As a result, achievement and performance from ICT investment across the university was very low: ICT services offered on the individual college campuses were basic, low quality and poorly supported, as a manager complained:

We do not provide an email service for students; we provide a computer room with internet connection. The college websiteis hosted with a company. The most valuable thing is the support from providers. At HU, when help is needed, we can phone. For example, the College of Agriculture and Foresty, but they wouldn't reply, waiting for them until we die. AMAC6

At the time of writing, HU and college members recognized the needs for changes in the academic environment, which was driven by government. Academic activity requires more openness and transparency under public and government control. Managers at both university and college levels have an awareness that ICT will play a key role in facilitating change. However, ICT resources and approaches will probably not be sufficient to support them. Although emphasizing ICT as a facilitator of change, before changing their academic management and administration, HU need to change in their management approach and develop ICT resources for the whole system at once.

The thematic network of global themes which determined aspects of organization at HU is depicted in Figure 6-3.

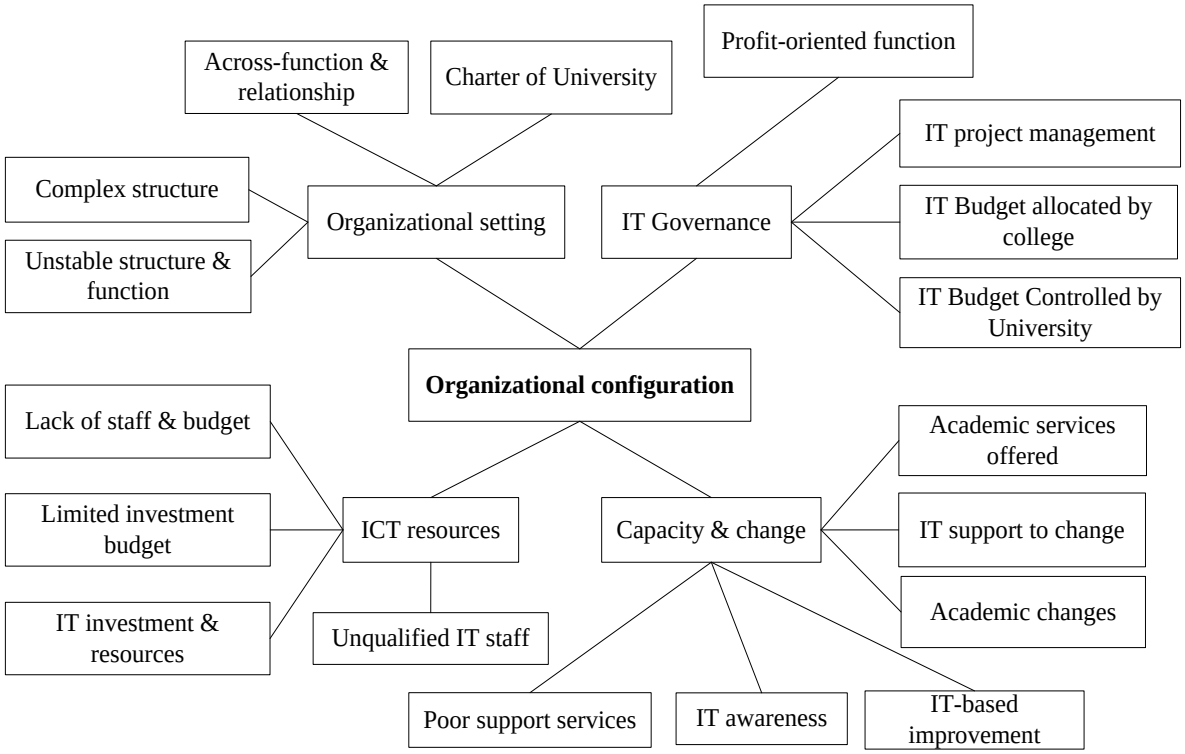

Figure 6-3: Thematic network: organizational configuration

The weak university charter and the institution's complex structure have dominated IT governance and resources at HU. This suggests that links may exist between organizational setting, IT governance and ICT resources. When information technology has an important role in higher education, as it does today, ITC investment must enable changes in the academic environment, as required by government. If this does not happen, the poor quality of academic services may be associated with ICT service and resources invested at HU. However, awareness of IT may be a positive driver of innovation and foster technology adoption at HU, both at university and college levels.

6.4.2 Information and communication technology

A principle for developing ICT resources at HU was that each member has to build ICT infrastructure within its campus, except a database. The common use of the university database required updating and reporting periodically, which allowed the HU to know what was going on with college members. The HU intended to monitor and improve its administration based on database application. Following such a strategy, HU intensively invested in data warehousing and network connections across campuses. A data centre was built from state funding, called the Phase C project, in 2002. The database centre was located at headquarters to host SQL servers for database applications which were distributed to all college members. As an IT manager remarked:

HU has said very clearly, about infrastructures, colleges can do it themselves, such as network infrastructures, but the database must be the one provided by HU. Therefore, the university doesn't interfere with colleges' resources. ADIT8

As a part of the Phase C project, a multimedia facility was built for teaching and learning. In addition, with grants donated by an international organization and managed by an EAST-WEST organization, a learning resource centre (LRC) was equipped with state of the art facilities in a multi-purpose building. Managed directly by the HU, the LRC offered services to all HU's students and staff. Therefore, the ICT infrastructure and multimedia facility enabled HU to offer a multimedia-enriched environment based on information technology. As an ICT manager said:

HU has got pretty good infrastructure. It has 1 video conference room and supports two-way E-learning. The data centre project from Phase C has also been invested in quite a lot. Not only that, the VINARENT Bandwidth network runs through node and HU also in that network with massive bandwidth. Therefore, E-learning, online lectures or teaching through Video Conference is very convenient. Regarding infrastructure, the Centre of It is also equipped with a Video Conference system, which sounds good. ADIT7

Following the centralized database-decentralized infrastructure strategy, the college members used their own budget for ICT infrastructure, such as networking, application, and servers to provide ICT services for academic work and administration. Therefore, each member organized an IT division to operate and maintain ICT resources on their campus. Delegation of ICT development without strategic orientation led to college member's ICT resources and management being relatively independent from HU. The college members entirely made their own decisions regarding technological platforms, applications and operations. On the one hand, this created divergence of ICT applications across university. It was very difficult for college members to share their IT resources. The differentiation of technology was a major obstacle for HU if it wants to integrate information technology in the future. In addition, it was very confusing for public relations and stakeholders to explore the university when each member maintained an independent online status, which was different from the HU. An IT manager complained:

IT departments of different colleges have got their own websites but they also need a management team. Only then, will they become independent. They don't want to use

'Hue University' as part of their title. They want their own name. Colleges have got the right to use a different domain name. ADIT8

The decentralized strategy for developing information technology without orientation was not appropriate to an institution with a limited budget. At HU, each member freely built or bought applications to meet their needs. Some database applications were either developed or bought by some college members for college administration and academic management. Meanwhile, the HU developed a software system which could provide the same functions. When the system was ready for operation, it will replace the existing system used at the individual colleges. An IT college manager commented:

You use this database, you can use the database if you integrate them, then you have at least to have a conversion tool, software, to convert the current database. That is the case if you want to keep both parties happy. If not, you have to throw one away to use the other. SSAC3

The thematic network of global themes of ICT at Hue University is indicated in Figure 6-4 below.

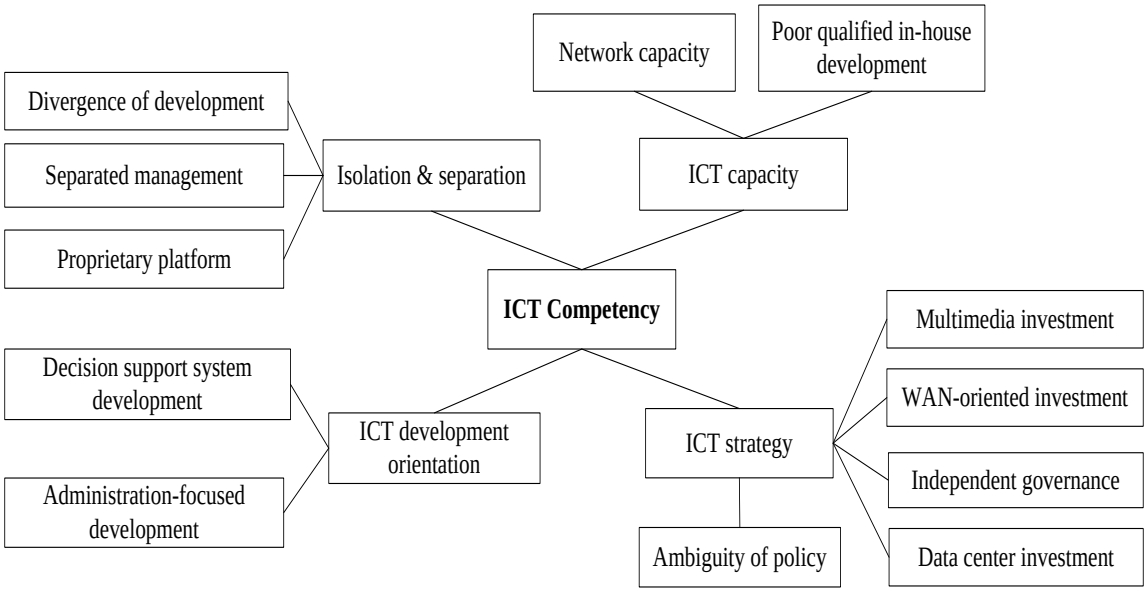

Figure 6-4: Thematic network- ICT competency

Delegating development of ICT allowed college members to quickly respond to their own needs, while the university was not able to provide a digital infrastructure for the whole system. It is apparent that the delegation in developing and operating ICT led to technological isolation and separation between college members and the university. The IT divisions in colleges were not closely link to the IT department at headquarters. Therefore, cooperation

and incorporation among them was impossible. As a result, the differentiation of technology and application implemented could grow. In addition, with a limited budget allocated for ICT, the performance of ICT project was poor. The fragmented ICT resources and the different technology prevented sharing among college members when the needs of ICT were at a peak. As a consequence of this influence, ICT capacity has not met the needs of students and staff in terms of the low speed networking, unreliable network services, and a low capacity server. In the case of HU, it may suggest strong links between ICT strategy, ICT development orientation and isolation and separation.

6.4.3 Teaching and learning

Data analysis indicates that teaching and learning at HU had three major features, including conflicts between different generations of lecturers; unified content of courses; and endeavour by lecturers versus laziness of students. Vietnam has opened its economy to the global since its renovation in 1986. With international and domestic scholarships and support, increasing numbers of young lecturers have graduated in developed countries and returned to work in Vietnam's higher education sector. This generation has contributed significantly to the academic environment in term of teaching methods, knowledge, academic work and skills. At the HU, the younger generation of lecturers has actively participated in changing and improving the academic environment, especially in relation to teaching methods. Their teaching approach is entirely different with the older generation. By using multimedia and presentational tools, teaching involves more visualization and challenges students more. They interact with and are open to students during classes. However, the new approach, though appreciated by some, has been rejected by some older staff members. The older generation consistently maintained that their traditional approach was more effective. Some lecturers read a book out loud in the classroom and students just took notes. A manager stated:

> *"Older teachers believe they have had a lot of experience in teaching, so they don't prepare for lessons in advance by using PowerPoint or PDF to upload online material, and sometimes ridicule it as well. Here, younger teachers would argue back with 'You don't know anything about technology.' That's the conflict between two generations. There might be some lecturers who teach in class by reading the book only. This teaching method still exists at HU. The goals of E-Learning are very good but there are teachers who still don't want to use E-Learning"*. LEBA1

With experiences and skills gained during study abroad young lecturers have developed

syllabi in which the student's learning performance accumulates through various study tasks, such as personal assignments, group projects, and presentations, rather than one final exam taking place at the end of the semester. This learning design requires students actively engage in learning by doing various academic activities and collaborative learning with other students in their group. In addition, they have tried to apply IT in lectures and are open to discussions with student in their lectures. In light of this point, it is likely that the teaching and learning approach from young instructors are conceived following modern learning theories of constructivism integrated with technology, where learning refers to a process in which learners have to engage in the learning process to build their knowledge and skills. This learning and teaching approach definitely requires more time, endeavour and qualified skills to carry out. It can be rejected by unqualified staff and unmotivated learner. For instance, this teaching and learning requires students to work more; however, the evidence is that students did not working hard. One academic manager discussed this, as follows:

> *"...Teachers can try anything but students don't want to study, are lazy, and only come to class for registration, dealing with attendance requirement which student have to achieve to meet minimum limitations of attendance in order to sit the final exam.. As you might know, stusdents play around for the whole semester and only study for their final exams, and that's it"*. AMBM4

Students who have not worked hard should be criticised, but attempts to change the academic environment at HU have not been synchronous. There are several answers to the questions of why learner's motivation was not high. It might be that subject content, curriculum and many other things did not meet with learner needs. Forming the learning theory perspective, learning design, such as curriculum development, course content and learning marterial should interest the learner. Another solution for HU is that enhancing and improving the quality of training has not fully been supported by relevant resources. Although students have been provided with free internet access, HU's library has not provided appropriate academic and digital resources for student learning. Without digital resource subscription from the library, going online to search for materials was a major challenge. Therefore, instead of using the internet to seek for academic references to do assignment and project work, students used it for news and personal communication. Moreover, library resources provided were not updated. As a student complained:

> *"Teachers give us course work, saying we have to do research for our essays. However, sources on the internet are very diverse. We usually find sources in*

Vietnamese from online newspapers; and websites from different businesses and organizations. Academic resources are not found in newspapers, so if we wanted to, we could find them from printed magazines. To be honest, we mostly only go online to read newspapers, chat and facebook". STBM1

Other major issues in the academic environment at HU were demographic. The issue could be an obstacle to preventing improvements in the quality of training and learning in the case of HU in general, and the application of information technology in particular. It is likely that quality assurance of training was chaotic. When the content of a course had not been agreed among lecturers, public access could not exist. Lecturers had to protect themselves by keeping close to the others. In other words, the principles of learning were barely respected at HU's academic environment. Aiming for a learner-centered instead of a lecture-based approach, teaching and learning at HU remained unsuitable for learner's context and reality. In addition, copyright could be another issue because it is commonly violated in Vietnam. Although HU recognized these issues it will need time to change and improve quality assurance. When discussing the quality of training, an academic manager admitted:

"Uploading a lecture online requires high unification among teaching staff. According to the principles, you have to be clear, you have to be unified. To achieve that unified level you need time. You have to sit together and agree on the same thing then you upload. Otherwise, students would be confused. When publicizing education, everything will be available, not only to students but to the general public. Therefore, it is clear that standardization must be gained". AMAF5

The thematic network of the academic environment that has emerged over data is illustrated in Figure 6-5 below.

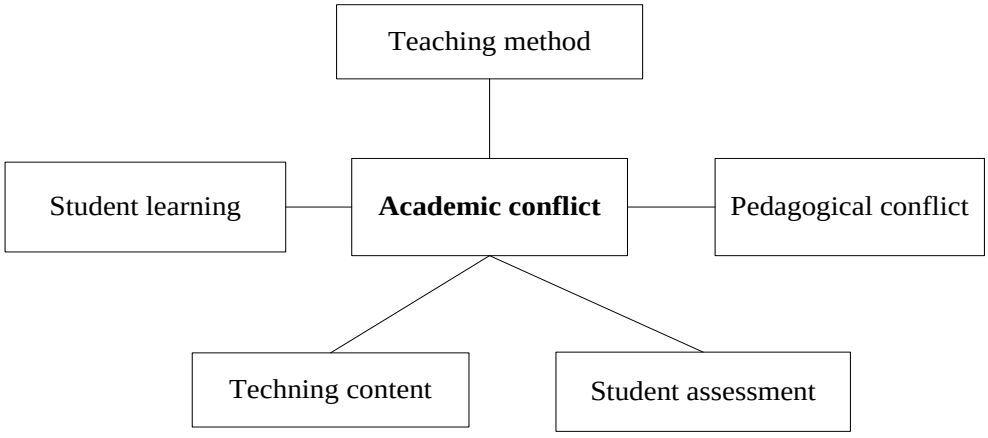

Figure 6-5: Thematic network: cademic conflict

At HU, the endeavours of teaching staff to improve quality have not been returned in the form of student's improved learning performance. The student's learning motivation did not reach as high a level as expected. However, this cannot be blamed entirely on students, when the academic resources provided have been limited and outdated. The academic conflicts between the younger and older generations were slowly resolved. These issues may exist in a closed environment but do not become external. Therefore, differentiating academic content of subjects and the choice of pedagogical methods has not been resolved. Due to recent calls for the improvement and renovation of higher education, Vietnamese education institutions were opened by regulation.

6.5 Process of E-learning implementation

The data analysis of the implementation process has been divided into a three stage sequence process: pre-implementation, implementation and post-implementation. The following sections present the detailed features of each stage of the E-learning implementation process.

6.5.1 Pre-implementation stage

E-learning was initially approached in a special way. The concept of E-learning has been understood differently to conventional thinking on education and has been oriented to a profit approach. At college level, E-learning has been referred to as an academic management system in which having a module could provide teaching and learning activities. For example, at the College of economics, implementing an academic information system that had a functional module called E-learning provides some basic tasks for teaching. As a result, the process of implementation of the academic information system was viewed as the same E-learning implementation. This thinking created confusion amongst stakeholders and communication related to the application of ICT within college campus. When a software provider implemented the system in college, it is clear that this process was like the ERP implementation process, rather than E-learning implementation. A manager referred to the academic management system as follows:

> *"... The CMC Company has built a system quite successful for the National Economics University. The college of Economics thought this system was very suitable for E-learning, so they decided to build it. It took CMC 6 months to modify their software because the College of Economics had a different demand. CMC invited all key managers to a workshop then presented the demo. At that point, they actually changed the software according to the college's demands."* AMAC6

However, the concept of E-learning was understood differently among college managers. Although this project was viewed as E-learning by general managers, the college's IT manager thought that the college would implement an academic information system only. As the college IT manager corrected:

> *"What objective have I targeted? Right now, I'm doing phase 1, phase 2 will be E-learning and the information system has not been implemented yet".* SSAC3

Moreover, the HU manager thought of E-learning as a way in which E-learning is generally applied to teaching activities. Therefore HU claims that it had a long history of E-learning applications, since lecturers had used multimedia hardware to deliver teaching content in the classroom. From this aspect, HU had created favorable conditions for E-learning development. As a manager proud of the history of HU's E-learning said:

> *"Applying information and technology as E-learning at the HU has happened for quite a long time, since around the 90s. In general, we can see the advantages; we can recognize them very clearly. Teachers and students have already realized it. Having a good infrastructure and sufficient budget, E-learning will be easily developed".* ADIT8

However, as the centre for ICT at HU was required to provide an E-learning environment for students and lecturers in 2007, a MOODLE system was set up at a central location. Due to the fact that this centre at that time was a functionally business-oriented unit, the E-learning system was seen as an opportunity to generate revenue and make profit. If E-learning business is lost, it is understandable that E-learning will naturally cease. A manager of the center for ICT said:

> *"The centre for ICT is operated as an enterprise, seeking profit, meaning they act like businessmen. Teachers have to prepare for lessons, they supply me with their lesson plans, I upload them, but they think that they gain nothing. Therefore, they are not very interested in it. When implementing E-learning we saw that it was not very useful, and did not generate revenue, so we stopped it".* ADIT7

The reasons why E-learning could not survive was a lack of digital resources published on the system and because students did not want to pay for E-learning services. As a business, E-learning was advertised to attract students. When the budget for E-learning was limited the center for IT discontinued this service. A manager explained this change thus:

"The first reason is financial problems. Secondly, there were no lectures, meaning the teachers didn't cooperate. To be honest, we did advertise it but students weren't very interested in it; they were curious but not interested, after registering an account on the system they did not access and eventually forgot about it". ADIT7

6.5.2 Implementation stage

6.5.2.1 E-learning policy and management

In the case of HU, E-learning implementation has been significantly affected by how the E-learning concept was defined. Different views of the concept of E-learning have divided E-learning practices and implementation at HU. With partial independence in ICT governance, the different departments, schools and centres carried out E-learning systems of their own. E-learning implementation has been deployed on two levels, university and school member. Therefore, E-learning has been provided in three places at HU, including the Centre for ICT, the Learning resources centre (LRC) and the college of Economics.

At university level, when the E-learning service at the Center for ICT was stopped, the LRC tried technically to provide an initial E-learning system through cooperation and support from a foreign partner. Depending on the availability of digital infrastructure at LRC, the Medical school collaborated with LRC to offer a distance learning course that was funded by a foreign partner in order to enhance skills and practices for medical doctors in other provinces. This vocational training program used the E-learning system operated by LRC to deliver the subjects, mostly providing supplementary references to learners. This system, using the MOODLE platform, set up an E-learning environment. The LRC's technical staff had technically assisted medical lecturers to design and publish the teaching content on the system. They also provided technical support during the process of teaching, when the students and lecturers needed it. An E-learning manager at LRC said:

"The trial use of E-learning for the distance learning program in which the students living at PhuYen Province learnt with the system for one year and graduated gave us good lessons on how to operate distance learning programs online. In addition, we learnt that teachers should be trained to design their courses themselves. Regarding technology, we think that we are capable of providing an E-learning system; course content will be supported by teaching staff, following the functions of E-learning software". ADTL9

The participants on this project benefited from international funds. To provide E-learning for this program, teaching and support staff were paid from the project budget. In contrast to the E-learning system operated by the Centre for ICT, the distance learning students could access learning resources more conveniently than in a traditional format. It is likely that financial incentives and benefits from E-learning were the important factors motivating participants. A manager explained the reason why this program was successful in comparison with E-learning at the Center for ICT thus:

> *"People [lecturers and support staff] who followed the project were chosen. They had to study, they had to work, and there were lots of requirements they must commit to so that the marketing for the project was promoted highly "*. ADIT8

At the college level, an E-learning system applied to distance training was gained as well, apart from the project budget and tuition fees. It is likely that generating revenue from E-learning allowed it to survive when the university and college did not allocate a budget for E-learning activities. Unlike the Medical School, E-learning implementation at the Center for ICT could not be continued.

At college level, E-learning included an academic management system in which a module of software provided functions for teachers and students to access content and syllabus. Therefore, the College of Economics encouraged and motivated lecturers using the system to provide resources for student learning and communication. This system only provided some basic functions for users, and therefore it did not attract lecturers. This system was actually the same as before, with a static webpage rather than a dynamic web application for teaching and learning. The system had insufficient functions to benefit users. The basic functions of software could not be used to deliver courses as real functions of a conventional E-learning environment. More exactly, this function was only used to provide information of subjects in the curriculum for references to support registration. As one lecturer mentioned:

> *"Generally, the College of Economics encourages lecturers. If they can, they might upload to the system by designing PowerPoint files and other materials for courses, such as case studies, scanning or making a soft copy".* AMAF5

Support for those using the E-learning system was provided, depending on objectives, technology and program offered. For the distance learning program using an E-learning system to support student learning, IT staff supported students accessing the system and solving technical issues during the process of learning on the system.

"It depends on what kind of problem it is. For problems about technology, you have us; for problems about knowledge, you have teachers' help through forums" ADTL9.

Meanwhile, as the college of economics focused on encouraging the use by academics of the information system, the IT office provided a range of services by developing the website to help students and staff. However, it was not real E-learning; it offered a complete system which management and academic administration could use for their work.

"Right now, I'm developing the website which follows the trend of universities around the world, such as an integrated portal. Based on applications, I export information onto the website... A database of Electronic book will be built to encourage students and lecturers using plenty of resources from across the world". ADIT7

Managing and administrating the E-learning system, in the case of the Centre for ICT, focused on technical and technological aspects rather than online learning management. Because of the way E-learning was used in supporting the program, E-learning was viewed as where distance learning students could get learning resources for their own references, rather than it being a learning process which accumulated data on their performance. E-learning management was handed completely to IT staff. The E-learning system became a server used for downloading resources. A manager mentioned:

"Managing (here) isn't systematic, like when you talk about training a specialist for E-learning, how to manage it, how to devise classes, even about how to grade a class. When they recognize the advantages of E-learning, they will have a strategy for it". ADTL1

From a managerial perspective, E-learning is viewed as a part of the academic information system carried out on campus. The College of Economics established an IT Unit on campus. It also built a website to complement this system and administrate the college website. This website aimed at providing an information hub for everyone, as the college portal.

The University of Economics started a project called 'Project for the development of Information Technology for E-Learning use'. They gave it to the Department of Academic Affairs... Each week, when there's anything you want to upload onto the Internet, you can. LEBA1

Meanwhile, IT staff thought the College of Economics had not implemented E-learning at all. For them, E-learning was a conventional software system such as MOODLE. An IT manager

of college claimed that he implemented the college portal and a dynamic website for E-library in the first phase. An E-learning system was planned in the second phase, using the MOODLE system. As he stated:

> *Right now, I'm doing phase 1, the phase 2 includes information and E-learning still has not been done yet. Right now, reporting about E-learning from HU is wrong. Up there, they say that the College of Economics are using Moodle. In practice there is no E-learning". SSAC3*

6.5.2.2 E-learning technology and problems

At the College of Economics, the system implemented did not meet the needs of users and the college. Functions and user interface did not provide convenience for users. The system was separated with other applications that were in use on campus. For example, this system could not exchange information and authentication of user rights with the library system. As mentioned before, the main function of the module, called E-learning, only provided information regarding subject areas on the curriculum for student reference. As a manager who said:

> *"The online library still can't connect to E-learning. What is the problem of this system? One of the restrictions on E-learning is that the infrastructure has not met with the needs of development, the size of classrooms. E-learning is like giving people space, with little disk space for teachers to post their lessons on"*. LEBA1

At the time of writing, when students registered, the college and the students wasted much time due to sysem failures, either of the network or server or both. Network capacity might not be able to meet the needs of connections to the system s user. Students and the college suffered technical issues and needed a systematic solution, rather than specific improvements on a small scale. As a manager said:

> *"Until now, according to my knowledge, it has now taken two years to finish off the software for E-learning and this is the 3rd year and the amount of users, the number of programs, and the number of courses have all increased, but the accessible capacity is a problem. There were times when students' registrations for classes were announced, and the number of concurrent connections increased dramatically, causing bottlenecks"*. LEBA2

6.5.3 Post-implementation stage

At the College of Economics, the academic information system implemented had the potential to manage subjects and courses of training programs, which could provide further information to students. Although the system was not a conventional environment for teaching and learning via networks and the internet, nevertheless the university claimed that E-learning implementation across the university has been achieved to a certain degree. Evaluating the outcome of ICT application, a manager stated that:

> *"About 90% of teachers now teach with E-learning to help them, except in philology methodology, where the lecturer uses a very simple approach. Now, in HU, the application of E-learning means that multimedia applications are needed for lectures mostly. There hasn't been anything about studying online except some subjects on projects funded by foreigners. Clearly, online learning has not yet been implemented". ADIT8*

Recently, the HU refocused on E-learning following the president's decision, which required further ICT applications for teaching and learning. A new E-learning server based on the Moodle platform was introduced on the university website. However, there were no resources on it. As a manager noted:

> *"Using Moodle to implement E-learning, it has been installed, and is online, but in reality, it's not active. E-learning implementation currently on the network only has some lessons designed simply by IT lecturers. There isn pretty much nothing else. It isn't used very much at HU"*. ADIT7

Although the HU's interests in E-learning implementation were officially issued across the institution, a specific action plan still only existed on paper at the time of writing. A new approach to E-learning was suggested for further development in which E-learning would be integrated into the academic information system that was developing. This aimed to encourage students to use the system during their study, as they could use the E-learning system as well. As a manager said about the future plan of development:

> *"Every notice, all discussions between teachers and students, registrations for subjects, exams calendars, even tuition fee payments, are all in that system, therefore students would have to use it. We think that using this system to implement other services will be more successful than before. When implementing software on an*

academic system, students must use it frequently. Put E-learning in there, they'll get used to seeing it: then we'll be able to develop it better". ADIT7

Another way to develop E-learning is to offer online distance learning programs. The Medical School will expand the size of the existing distant learning programs in cooperating with the LRC. The LRC will be responsible for all aspects of technology to deliver distance learning programs for remote areas. Instead of using a combination of E-learning and in-classroom study as before, students will completely study on the E-learning system and get support from lecturers. However, examinations to assess students' learning performances will be conducted in classrooms to meet with requirements of government regulation. As a manager mentioned:

"On the technology side, we're trying very hard to develop the current E-learning for different projects, such as training for remote places where transportation isn't available. We are developing a proposal which is bigger, like video conferencing to implement online learning". ADTL9

Meanwhile, at the College of Economics, an E-learning system, not an academic information system, will be implemented in the second phase. The College will use the Moodle platform to build up its learning environment and customize it, following its needs. This plan aims at intensively using the E-learning in the process of teaching and learning at the college. A manager shared their ideal about the future plan for E-learning:

"I'll implement an E-learning system at Phase 2. I will apply web 2.0, similar to the interactive web. We're opening the gates for teachers and students to interact with each other in a free, comfortable environment. In the future, I'm going to use Moodle. I will hire a software engineer who will develop the web 2.0.". SSAC3

6.5.4 Thematic network: process of implementation

HU handed down E-learning implementation to a business-oriented unit in the initial stage. As a result, a profit-seeking approach to implementing E-learning became its approach. Meanwhile, at college member level, different understandings of and ways of conceptualizing E-learning significantly impacted on E-learning implementation. As a part of the school management system, E-learning was treated the same as other functions, maybe as it was less important than the administrative module of the system. When E-learning is a more technology-oriented concept, E-learning implementation has been carried out by focusing on

technological aspects of the system. For all cases, it is likely that E-learning has been taken for granted to be for technological people rather than organizations. In addition, a peculiar approach to E-learning fundamentally determined other stages of implementation. The process of E-learning implementation at HU is depicted in Figure 6-6, below.

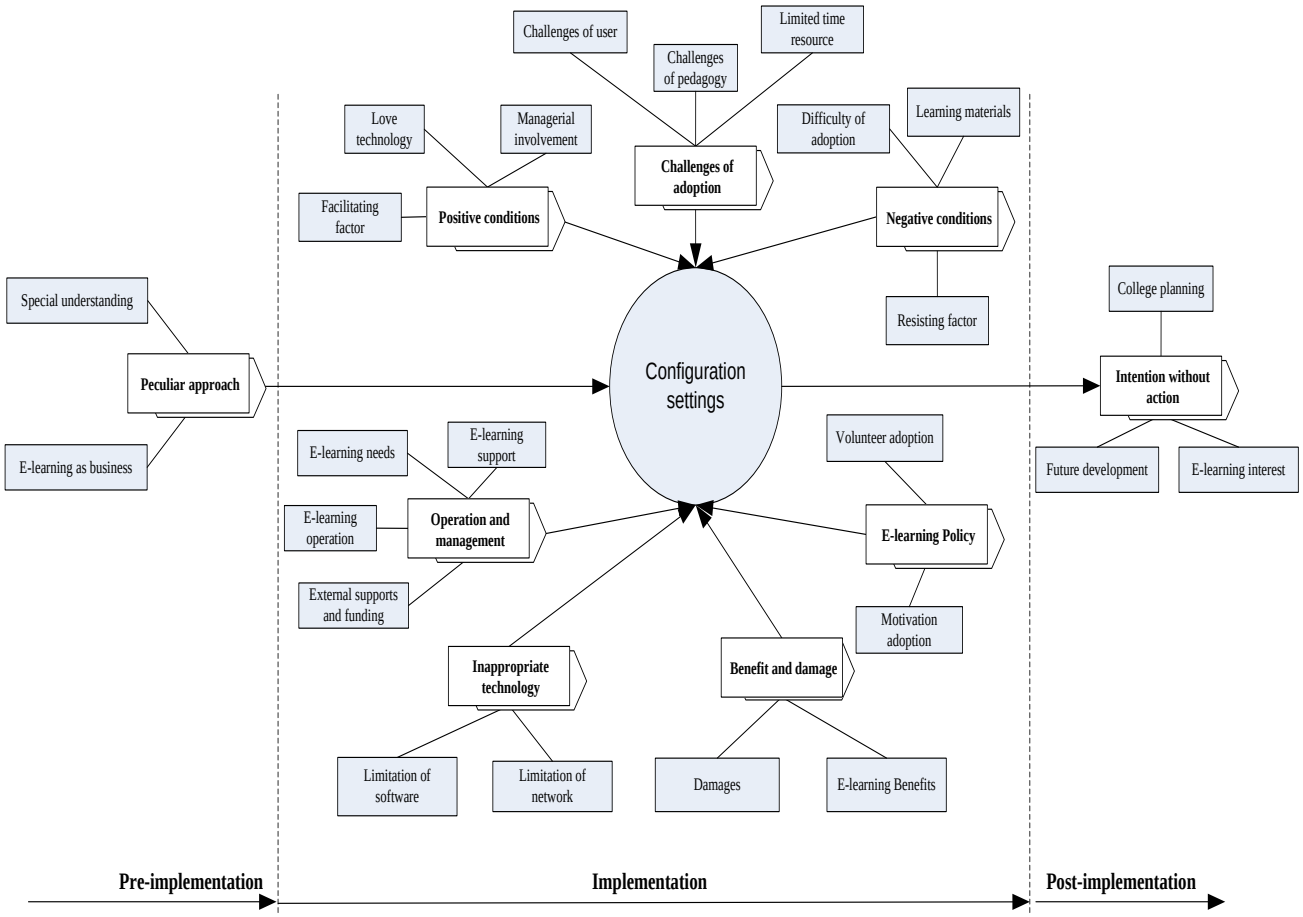

Figure 6-6: Thematic network - Process of E-learning Implementation

6.6 Configuration-based Interpretation

The individual thematic networks will configure via a virtual layer. The general thematic network underlines the main themes that indicate the nature of E-learning implementation at HU and draws the structure of our interpretation of findings in the next section. When incorporating the contextual settings with sequenced stages of the implementation process, the result will illustrate an integrated view of E-learning implementation, in both process and contextual settings. The contextual settings will impact on the process of implementation, either individually or resonantly. It is likely that the nature of E-learning implementation will result from (i) configuration interaction among contextual settings as a bounded system of the

implementation process; (ii) the sequential effects configurationally leading from one stage to another, and, (iii) the configuration interaction between contextual settings and stages of the process. The following sections address these relationships in more detail.

6.6.1 Factor-configured implementation

The historical status of college members and the government-enforced charter led to a complex organizational structure. A consequence of the complex organizational structure is weakness in cooperation and collaboration among college members and universities in academic and administrative work. For example, ICT developments created by college member lacked reference to university strategy, as they followed their own IT strategy with available resources. In other words, the accountability for decision-making was relatively independent among university members. This may suggest strong links between managerial settings, IT governance and IT strategy at HU. IT governance is not setting a transparent accountability of strategic and operative decision. Therefore, the long term consequence of IT governance at HU has directly influenced IT capacity.

Managerial settings and IT governance led to isolation and separation in managing ICT at HU. An independent decision and budget led to divergent investment and diversified technology being adopted by college members. The mechanism of IT governance allows college members to build their own ICT resource, which is suitable for its business process and procedure. As a result, most applications and technological platforms were closed within their campus, not able to exchange data and information with other systems. This approach to ICT governance indicates that the college members did not need to share common resources.

The collision between old and young generations of lecturers in teaching methods and content has encouraged HU at all levels to reform and change. In addition, in responding to challenges of academic enhancement, change depends on several issues in management. This change suggested that there were the relationships among academic conflict, capacity and change with managerial settings at the HU.

6.6.2 Process-configured implementation

E-learning development was handed to the Centre for ICT, where an ICT capacity building project funded by MOET was managed. However, as a profit-oriented unit, it was inevitable that E-learning was implemented to seek profit. Therefore, the process of implementation entirely depended on how E-learning could generate revenue for recovering the cost of the

operation and the investment budget. Because the Centre for ICT failed to attract students and lecturers to participate in this learning system, E-learning was built to operate without any adopters. In other words, after deploying technically the E-learning system at the Centre of ICT, it was neglected and boycotted by users because of the fees attached. The process of E-learning implementation almost failed at this stage at the university level. On the other hand, E-learning was understood to be a part of the school management system at university member level, as was the case for the College of Economics, where E-learning implementation was actually the process of ERP implementation rather than actual online learning at the next stage.

In the implementation stage, after installing the MOODLE system on IT facilities equipped by the funding project, the Centre of ICT provided a very good performance of its E-learning system on a large scale. However, the centre failed to convince the lecturers across the university to participate and use the new environment. The driving factor of available technology and facilities did not completely lead to E-learning adoption at HU.

In terms of college implementation, the younger generation's love of technology led many to apply information technology in their lectures in the classroom rather than online. The involvement of top management was not enough to encourage staff to participate actively in the E-learning process of implementation. When voluntary motivation for adoption was the main policy to persuade staff to be involved in the process, inappropriate technology defeated their endeavours. Due to limitations of the software system and the network, the college's ICT did not provide appropriate services to meet user needs. It is likely that adopters did not gain from participating in new environments.

6.6.3 Configuration of factors and process

Data analysis indicates that the university charter has impacted significantly on organizational structures and IT governance. E-learning was implemented by orders from the management and based on the availability of resources. E-learning development initially was assigned to a business-oriented centre to deploy a system for all university members to adopt. As a part of the school management system, E-learning was implemented through a process of administrative improvement. This approach is peculiar to E-learning, compared to conventional implementation in a public university (1 in Figure 6-7).

One weakness of the university structure was its complexity, which made it hard to achieve effective and efficient management in general, and in the governance of ICT in particular.

HU did improve the administration by applying information technology for monitoring and administrating college members (2 in Figure 6-7). To do so, HU intensively invested and focused on the development of the network and the data management facility. This portfolio of investment created an ICT facility for the development of the information system and data connection, which facilitated data and information reported from members. However, taking full advantage of these facilities to implement an E-learning system is not seriously strategic. Utilizing available resources without allocating budgets to develop E-learning may indicate that HU was not really interested in E-learning development.

E-learning technology requires a set of specifications which might be different with other requirements of database applications. For example, the performance of an E-learning system for a large number of users at a university requires a very strong server farm to handle many concurrent connections and interactions with the system. As a result, the complaints from users at HU might have been foreseen, given the improper technology used (3 in Figure 6-7). In addition, unsuitable E-learning technology may have been caused by separation and isolation in ICT development and investment at HU. College members developed their own IT infrastructure to meet specific needs. Lacking consultation with a higher level and with university strategy, ICT development by college members was independent of other members, even with university applications. The limitation of resources did not permit members to have enough facilities to support and meet user demand (4 in Figure 6-7). Meanwhile, other resources were available for use, but a technological platform is different. Sharing and use of common resources at peak demand was impossible for college members. The technical problems faced were not solved.

It was always likely that, when HU assigned E-learning development to a business-oriented unit, it wanted to make money from E-learning activities. Introducing new technology requires strong support for users to adopt, and offering pay-per-use technology to regular students on academic degree program was very challenging. As a result, HU's students were not interested in learning with the system. More importantly, lecturers who had the power to lead their students to adopt the system also had not participated in the new teaching environment, except for lecturers who paid for developing and uploading materials on the system (5 in Figure 6-7). Without revenue being generated, bankruptcy is understandable. By this way, the E-learning implementation of HU completely stopped at the university.

HU followed voluntary adoption of E-learning. Even with lecturing staff, a financial incentive was applied for "buying adoption". It is likely that teaching staff had no obligation

to adopt E-learning for their teaching activity. In this, it is very clear that E-learning application is an external part of teaching work within academic policy. Unlike other universities around the world, E-learning is a part which cannot be separated from the academic accountability of teaching staff. Therefore, lecturers were not affected, whether they adopted E-learning or not. In the other words, it is clear that E-learning actually was not wanted at HU (6 in Figure 6-7).

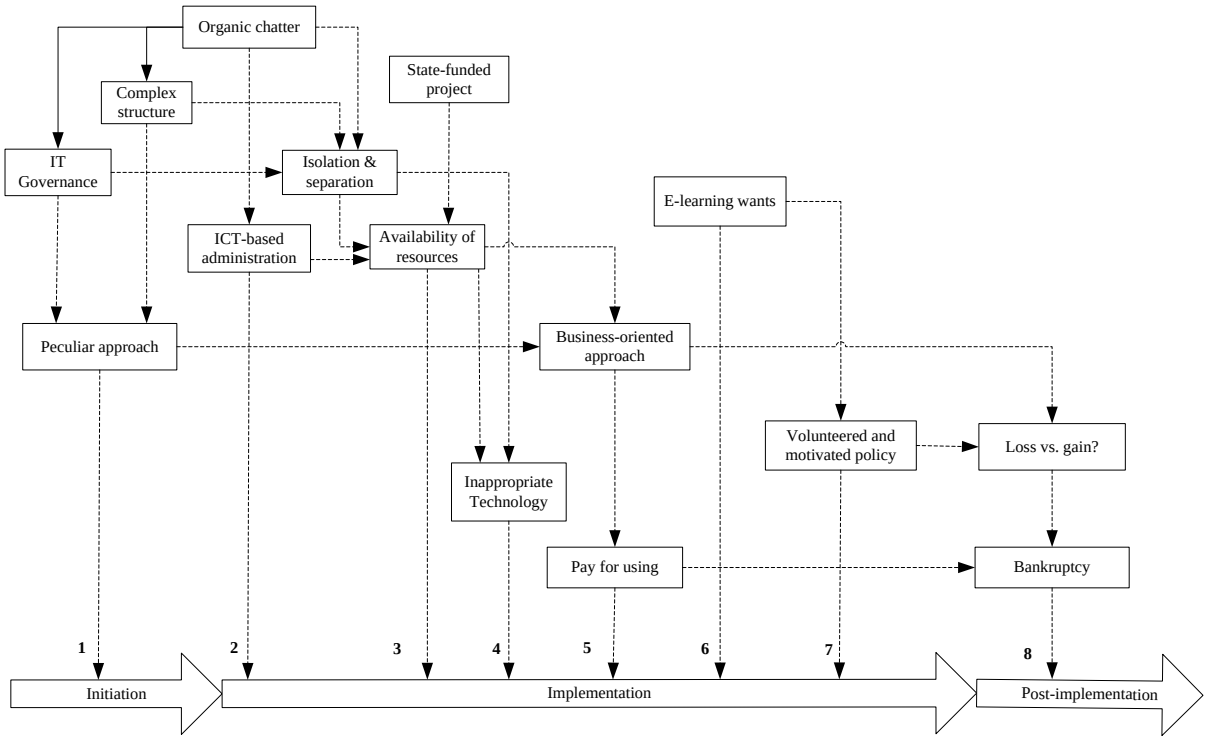

Figure 6-7: Configuration of factors and process of E-learning implementation

6.7 Pattern of E-learning implementation

Incorporating themes of contextual settings and the process of implementation, the relationship and interaction among the elements will indicate how E-learning has been implemented at HU. In other words, the bounded system in which the super-global themes of technology, organization, and teaching and learning have configured with global themes of process to shape the nature of E-learning implementation at HU has converged on E-learning needs, funding-based supply and derivative demand, as illustrated in Figure 6-8.

6.7.1 Funding-based capacity

E-learning implementation was completely assigned to the Centre of ICT because of the availability of IT facilities there invested in by the government and supported by international donors. The focus of E-learning implementation was on the technological aspect rather than

other aspects of pedagogy and organization at HU. Because of decentralization in managing and governing ICT, complex structures and a weak charter, HU's administration could not manage ICT resources effectively and investment across the university. As a result, isolation and separation of ICT across the university was a major problem in relation to applications. A lack of strategic orchestrating at university level meant E-learning implementation at HU did not involve users in the project. Setting an E-learning system up is one thing, using an E-learning environment for teaching and learning is another. The E-learning system at the HU was not adopted by lecturers and students because of the separation across technology, management and organization of E-learning. With an emphasis on the technical side of E-learning, E-learning services provided at HU were completely based on the availability of ICT facilities and assigned to technical staff to implement.

6.7.2 E-learning need

As part of state-funded as well as international-supported projects, E-learning must be implemented at HU. Therefore the peculiar approach to E-learning implementation at HU could be explained by managerial settings and IT governance. For such reasons, it is clearly that E-learning needs at HU were derived from top management decisions and by the availability of technological infrastructure was determined by managerial settings, ICT governance, and resources funded by state. While a real demand for E-learning from other stakeholders was not mentioned, HU applied unavoidably a voluntary policy to encourage staff and students adopting E-learning. Compared to a mandatory policy, such as the responsibility and duty of teaching staff, the motivation and encouragement policy had a large degree of flexibility in terms of potential action. As a result, whether or not they adopted an E-learning environment in their teaching roles, staff were not convinced to use E-learning in their work. In the other words, E-learning at HU only reached at a desirable level from the management and/or the younger generation, who love technology. If E-learning were demanded at HU, then it would have invested resources on both organizational and institutional levels. However, there is no confirmation that HU were willing to invest and commit to develop this technology for teaching and learning environments at the time of the study or in the near future.

In the centre of the pattern, the virtual layer indicates the results of interplay and interactions among contextual factors and processes of E-learning implementation at HU. Based on the capacity which was provided by external sources, E-learning was implemented, rather than through internal demand. In other words, findings from the case indicate that the presence of

E-learning at HU originated in and was motivated by outside sources. Therefore, HU showed a lack of commitment to E-learning and was challenged when faced with difficulties during the process of implementation.

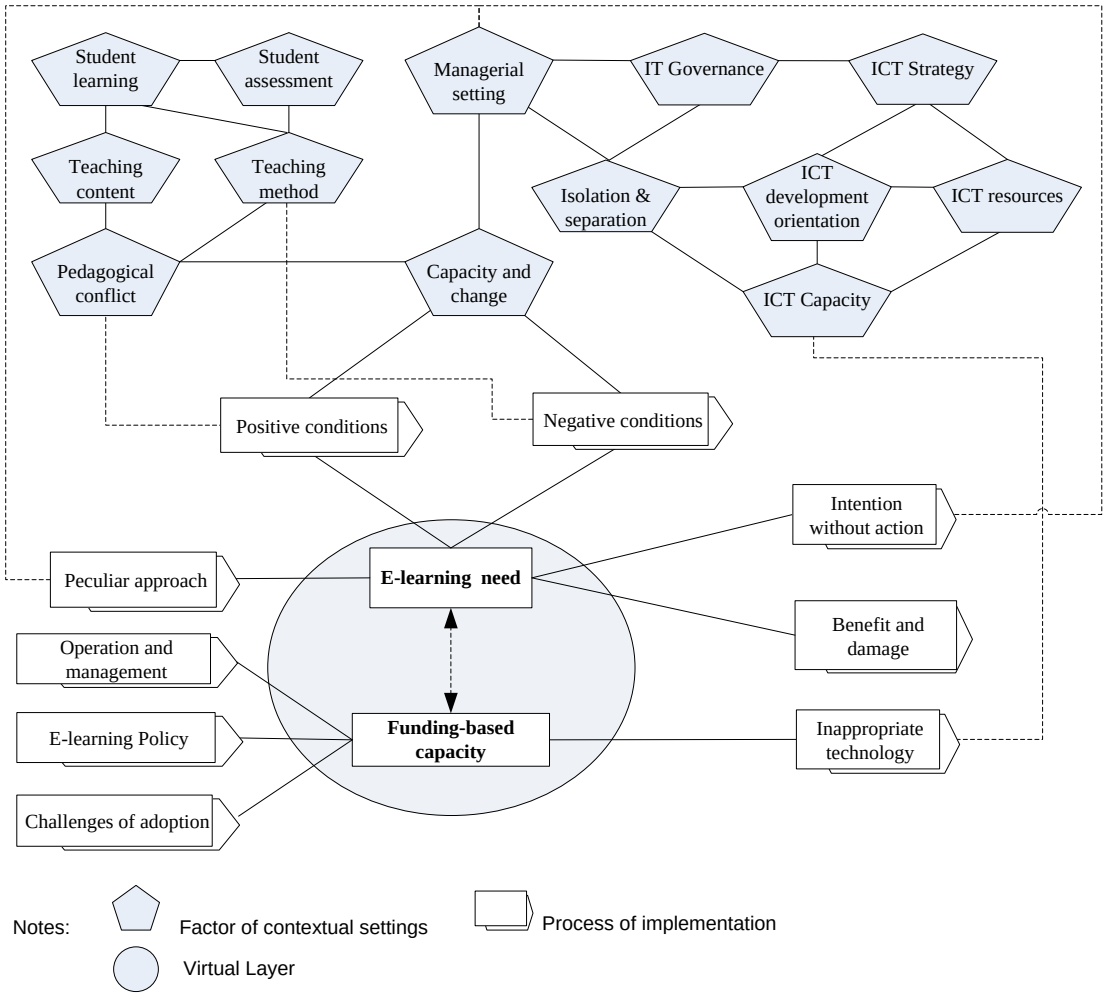

Figure 6-8: Configuration-based pattern of E-learning implementation

6.8 Chapter conclusion

From a thematic network analysis, E-learning implementation at Hue University has been presented from a factor and process perspective, and is graphically depicted in the comprehensive network. In this network, the individual networks have been integrated via a virtual layer. As a result, the configuration method allows the E-learning pattern shaped by interacting themes. It has been acknowledged that E-learning implementation at Hue University has been entirely dependent on the need for E-learning and funding-based capacity.

Chapter 7 – Cross-case analysis

7.1 Introduction

The purpose of this study was to ascertain how E-learning has been implemented in Vietnamese universities. More specifically, this study sought to advance the understanding of factors affecting E-learning implementation and the process of its implementation. This chapter presents the merger of a multiple case study of E-learning implementation. The cross case analysis has been carried out to illustrate the main themes which indicate the similarity and differences across the cases from the factor and process perspective. The chapter has been divided into five parts. After the introduction, the following two sections present cross-case analysis for contextual settings and the process of E-learning implementation. The following section will highlight significant drivers and constraints to E-learning implementation. The next section proposes a configuration framework of E-learning implementation emerging from the cross-case analysis. Finally, conclusions have been drawn for the findings of this study.

7.2 The context of E-learning implementation

This section presents the cross case analysis of E-learning implementation. From the factor perspective, the cross-case analysis has emerge as seven themes, including managerial settings, capacity and the working environment; ICT strategy and capacity; ICT policy and management; teaching and learning; and academic changes and challenges (Table 7-1). The detailed identification of these themes is summarised as follows:

Table 7-1: Contextual factors of E-learning implementation

Contextual settings		University of Danang	University of Hue	University of Cantho
Organizational context	Managerial settings	• Bureaucratic procedure • Lost control and large span • Administrative-bias	• Autonomous and independence • Overlap and duplication of functions • Weakness of relationship • Unstable and complex structure	• Close and strong relationship • Solid structure • Respected & controlled
	Capacity	• Tension of enrolment and resource • Overload work & low salary • Negative attitudes	• Delegation and decision-making • IT-based improvement • Low salary	• Low capacity • IT-based change • Low income and salary
	IT governance	• Decentralized-decentralization	• Decentralized-decentralization	• Decentralization and separation
	Academic changes & challenge	• Yearly to credit system, • Transparency, freedom & democracy • Lack of academic resources • Resource and time, • Unfavorable academic environment	• Chaos & disagreement • Closed	• Yearly to credit system • Registration procedure • Poor academic services • Overload of teaching and large class
Technological Context	ICT strategy & capacity	• IT infrastructure • WAN and internet connection • Hardware-emphasized investment • Limitation of operational budget • Fragmented investment	• Hardware Investment • Networking connection • Low capacity of network • Poor quality of application developed • Centralized database • Decentralized infrastructure	• Neutral vendor & open architecture • Integration of system & application • ITC-applied improvement
	ICT policy & management	• Physically-controlled mindset • Isolated and separated management	• Separated management • Weakness relationship	• Software application vs. hardware mindset
Teaching and learning context	Teaching & learning	• One way and abusing technology • Laziness	• ICT-applied vs. traditional method • Young vs. old teaching staff • Laziness and irrelevant resources	• Students not working hard

7.2.1 Organizational context

7.2.1.1 Managerial settings

The managerial settings, as studied in the three sites, were analysed to address an overview of institutional mechanisms for managing E-learning implementation and other services related

to E-learning. Analysing these managerial settings revealed that the three universities have contrasting organizational structures, administration, and interrelationships.

Similarities: Driven by government regulation in merging several individual universities and schools at the same location and city to physically establish a regional university, the structure of UD and HU has been organized into two levels, college and university. Meanwhile, the structure of CTU has been organized straightforwardly, from university to college, in which a board of university management directly controls almost all activities of college members. With the two-level structure, the college member likely has more autonomy, with a certain degree of freedom in making their own decisions in administration. In addition, while the status of a regional university has not been recognized and clearly defined by governmental regulation and institutions, the sharing and achieving university strategy and mission are questionable. Both UD and HU have been operating in a complex structure where managerial functions have overlapped and been duplicated by the university and its members (see Sections 4.4.1 and 6.4.1). Therefore, the regional university's charter has divided college members from the university's control and administration. In this context, the interrelationships among the functional departments, as well as between university and its members, are significantly weaker in providing services and supporting decision-making. It is inevitable that this structure has applied a bureaucratic procedure for operation and administration.

Differences: At CTU, the institutional settings are different from the charter of the regional university. Based on a solid structure, which is built on a development history and culture for the long term, the internal relationships are very strong for supporting the university administration as a whole, in which individual members share the same values and mission to achieve its strategic vision (see Section 5.4.1).

7.2.1.2 Capacity and working environment

Similarities: Exploring three universities shows that the size of student enrolment has been too high so that the allocation of resources for academic activities and support services creates tension at institutional and individual level. The ratio between student and staff is too high, higher than recommended by MOET, and has led to teaching and support staff suffering from academic and institutional overload. Because of strict regulation by law, all these universities have been prevented from increasing tuition fees. Therefore, the only way to increase the budget for the operation is to increase student enrolment. Even running at over-

capacity, the operational budget probably would not compensate for the endeavours of staff. Almost all staff interviewed complained about how low their income was when working for colleges and universities, especially IT staff. These institutions have run out of resources to sustain the huge size of student enrolment. This solution has put these institutions under pressure in terms of quality control and resources. Individually, support and teaching staff have to face an increase in either the number of teaching sessions, class size, or both. Therefore, finding time resources for other activities out of teaching and administrating will be difficult for teaching staff.

7.2.1.3 IT governance

Charter and structure are specified in terms of how IT has been governed and developed within an organization. Although IT management and governance has been either decentralized or centralized across the three sites studied, the scope, activity and degree in governing IT were significantly different among these institutions. In the case of CTU, managing the IT platform has been centralized by the university administration, where the strategic decision on IT investment and development was made by university managers, while content development and digital resources have been decentralized across functional and academic departments. In contrast, decentralizing in development and investment on IT has been applied in the case of UD and HU. At university level, IT development has focused on serving the university administration at headquarters only. At college level, each college member has been responsible for investing and developing ICT resources to meet their own needs.

7.2.1.4 Academic changes and challenges

Similarities: Although Vietnamese education reform began two decades ago, in the early 1990s, the academic environment still needed to be changed further and opened up. At the time of data collection, not all universities in the Vietnamese higher education system had changed from a yearly to a credit system in academic management. The academic management of the three universities studied had not completed this change, so ambiguity in the academic environment led to several negative impacts on teaching and learning. Data analysis reveals that the common issues of the academic environment at these universities were that the academic resources were out-of-date, and associated with very poor academic services. In particular, academic assessment and feedback were closed to students. For instance, after exam grading, the results were reported directly to the Department of

Academic Affairs, without any feedback to students. The students' exam papers were kept by lecturers. No one had a right to access it. Transparency and open access is required by stakeholders, so the government has recently made available to the public the three most important things on the university website, namely tuition fees, budgets and resources for academic activities.

7.2.2 Technological context

7.2.2.1 ICT strategy and capacity

Similarities: Although there was some inconsistency in the ICT strategy implemented across the three cases, the physical infrastructure and network connection were the most common targets for developing ICT at these universities (see Section 4.4.2; 5.4.2 and 6.4.2). Two of three cases examined in the study were found to decentralize the development of ICT infrastructure to its members where they were invested through their own efforts. In addition to physical infrastructure, all of these cases studied faced budget limitations for ICT development and operations. With decentralized development and limited financial resources, the technological platform was separated and isolated, hindering the sharing and coordination of resources and information. In the cases of UD and HU, ICT resources were fragmented and inadequate, not only within individual campuses but across the entire university.

Differences: In the case of CTU, the external support and donation significantly created a strategic foundation to support the long term development of ICT. The ICT infrastructure was opened and completed so that CTU could apply, develop and deploy new ICT applications which were smoothly integrated into the existing infrastructure. For each case analysed, there was evidence that the complaints about technical problems of E-learning and registration related to infrastructure capacity, especially the reliability and stability of network connection. The slow speed of registration was mentioned in all cases, while disconnection from the E-learning system seriously hindered endeavours to adopt E-learning.

7.2.2.2 ICT policy and management

Similarities: In ICT management, a common point among three cases studied was the physical-oriented mind-set in ICT management (see Section 4.4.2; 5.4.2 and 6.4.2). For senior manager, the concept of ICT management includes two aspects: space and physical control. As a result, managers wanted to directly control and own the ICT resources which were located within their workplaces and under their observation. There was no room for

synthesising the power of information technology in this thinking. This approach prevents the sharing and utilization of ICT resources for administration and academic activities within the whole institution. Furthermore, a weakness across functions in organizational structures is limited coordination and collaboration. In the case of UD and HU, where the organizational structure was based on the same regional university charter, they faced the same problems in managing ICT. The weakness of cross-functional management led to isolation and separation in ICT management. Each university member managed their own ICT infrastructure associated with its policy and strategy, which were independent of the others.

Differences: In contrast, with an organic structure, the CTU has eliminated and changed from a physically-oriented to an application-dominated mind-set. It allows CTU to centralize its physical resources in one location at headquarters to leverage and utilize ICT resources, while ICT services and various applications have been widely developed across the institution.

7.2.3 Teaching and learning context

Similarities: Across three cases studied, the student's learning motivation was reported to be low, as students remarked in the interviews, they limited themselves to achieving better academic performance (see Section 4.4.3; 5.4.3 and 6.4.3). It also impacted negatively on endeavours of teaching staff in applying ICT to improving academic work. In addition, the different background of education and training resulted in differences in applying information technology for teaching. In the cases of HU and CTU, the younger generation of teaching staff had more advanced skills, knowledge and experience than the older ones, as most had graduated from abroad. As a result, adopting new information technology in academic work was easier for them than for the older generation. Data analysis indicates that pioneer and enthusiast adopters of E-learning were young lecturers. In contrast, older lecturers were more passive in relation to using ICT for delivering lectures, in the case of HU. For them, the traditional teaching method, using blackboard with chalk, was the best and most effective form of higher education. Therefore, the tension in academic environments between the younger and older generations of teaching staff with regard to ICT applications in teaching and learning increased. More specifically, the attitudes and behaviours to information technology in higher education can become barriers to E-learning adoption, not only for the younger generation but also for educational institutions as a whole. Except in the case of CTU, where an E-learning training program was held for lecturers, the old teaching staff gained knowledge, achieved appropriate skills and were ready to implement E-learning. In

the case of UD and HU, there was no training or professional development provided in order to solve the problem of resistance to using ICT.

7.2.4 Conclusion

There are seven influential factors of organizational context across three cases have been summarised in Table 7-2 below. In this table, the letters H and L indicate the power of each single factor influencing E-learning implementation, ranked by researcher. High power (H) and low power (L) in E-learning implementation are defined as the degree of important power stemming from the influential level of a particular factor to E-learning implementation.

Across three cases, data analysis indicates that the organizational context in which E-learning was taking placed at UD and HU was similar in almost all factors; meanwhile E-learning implementation at CTU was placed in different managerial settings and IT governance. From CTU's history development, an organic solid structure allowed CTU to centralize ICT management and development, while IT governance at UD and HU was decentralized to college members. In these cases, these universities were faced with overcapacity, overload of work and an in-transitional status to adopting an open and transparent academic environment to improve the quality of academic services and training.

In the technological context, although management of ICT recourses was decentralized to each member at UD and HU, while CTU centralized its resources under the management of the university, nevertheless, they had similar strategic development plans, oriented toward developing hard infrastructure and networking. Because of decentralization in ICT development, the common features of ICT were fragmented, isolated and inadequate in the case of UD and HU. In contrast, with support in strategic planning, the open and integrated technological infrastructure, which was planned in developing and investing in ICT resources, allowed CTU to integrate smoothly ICT applications within the existing infrastructure. In addition, limitations in financial sources also caused low network capacity and servers which did not meet with needs of the school management system, as was reported in the three cases.

In studying, it was remarkable that the student's low motivation of learning was reported by lecturers and confirmed by students in all cases, which in turn negatively impacted on the lecturer's endeavours to use E-learning. In all cases, the young instructor generation had E-learning experience and ICT skills and so were ready to adopt and use E-learning. In addition, where professional training and development was not provided, conflicts between young and old instructors in integrating ICT in teaching became more serious.

Table 7-2: Contextual factors of E-learning implementation

No	Influential factors	Feature	UD	HU	CTU	Remarks
1	Managerial settings	Regulated charter	H	H		Structure of CTU is solid and organic, based on long historical development, with centralization of administration.
		Two levels of structure	L	L		
		Weakness Interrelation	H	H		
		Delegated administration	L	L		
2	Capacity & working environment	Capacity	H	H	H	
		Working environment	L	L	L	
3	IT governance	Decentralized	H	H		Centralization of IT governance at UD, HU vs. Decentralization at CTU.
		Centralized			H	
4	Academic changes & challenge	Academic transition	L	L	L	
		Transparency & open access	L	L	L	
5	ICT strategy and capacity	Infrastructure and connection focus	L	L	L	Digital infrastructure was open and integrated vs. the fragmented and inadequate infrastructure at UD and HU
		Low speed and weak servers	H	H	H	
		Open and integrated			H	
		Fragmented and inadequate	H	H		
6	ICT policy and management	Physical-oriented mind-set	L	L	L	ICT resources were managed by college members, preventing sharing and exchanging at HU and UD
		Isolation and separation	H	H		
7	Teaching and learning	Learning motivation	L	L	L	
		Young vs. Old generation	L	L	L	

L: Low power; H: High power

7.3 Process of E-learning Implementation

From a process perspective, the nature of E-learning implementation has been divided into pre-implementation, implementation and post-implementation phases. Nine themes have emerged from cross-case analysis, namely resource and scope; software systems; management commitment & support; motivation of adoption; operation; limitation of resources; technological problems; attitudes and behaviour; and challenges & future directions (Table 7-3). The following section illustrates similarities and differences across the three cases studied in more detail.

Table 7-3: Process of E-learning implementation

No	Themes | Case	University of Danang	Hue University	Cantho University
Pre-implementation	Resources and scope	• Cultural and departmental innovation	• Profit-oriented approach • Function software system	• Supported by internationality • Distance learning support & incentives
	Learning management system	• Open source-Moodle	• Open source-Moodle	• Open source-Claroline & Dokeos
Implementation	Commitment & involvement	• Management involvement • Policy Commitment	• School members own system • Financial incentive policy	• Management involvement • Sceptical mind-set
	Motivation of adoption	• Lack of motivation & recognition • Collective culture	• Encourage volunteer adoption • Marketing campaigns	• Volunteer policy & self-motivation • Peer support and sharing
	Operation	• Lack of information & communication	• Technical-bias operation and management • Administrative-based implementation	• Training and professional development
	Budget allocation and investment	• Limitation of time resource • Lack of training and professional development	• Weakness of network and server	• Limitation of time for adoption & outdated materials
	Technological problems	• Unreliable network technology • Unreliable function of the system • Poor IT support service & unqualified staff • Low internet connection	• Stand-alone E-learning system • Basic E-learning function provided	• Integrated & modern system & technology • Mistake in selection of software system • Well-supported services for adopter • Unreliable internet connection
Post-implementation	Attitude and behavior	• Positive attitude & excited participation • Huge volume of teaching delivered • Intensively used functions of system	• No full-time student and staff E-learning system • Distance learning student-adopted system	• Passive learning and teaching on system • Main functions used
	Challenges & future direction	• Unsatisfied with existing system & services • Risk and damage for adopter • Distance learning-oriented development	• Planning but no activity • Possibly developed for distance learning	• Unclear further development • Trying to maintain level of adoption • Can be applied to distance learning

7.3.1 Pre-implementation stage

7.3.1.1 Resource and scope

Funding for E-learning played a critical role in implementing an E-learning system at two studied sites, the HU and CTU. The presence or absence of funding serves as an important enabling or constraining factor to E-learning implementation at these universities. Data analysis indicates that, without funding, E-learning would not have occurred at CTU and HU (see Sections 5.5.1 and 6.5.1). In the case of HU, E-learning implementation almost stopped after the introductory stage. In all cases, the E-learning infrastructure already existed when a learning management system, for example MOODLE or Claroline, was deployed on an available server by technical staff. However, E-learning environments were not introduced until these universities received funding for projects.

The presence of external funding was a facilitator for introducing and establishing a new teaching and learning environment. For example, in the case of HU, it already had the IT expertise and digital infrastructure to develop an E-learning system but it needed more funding to be allocated in order to market the E-learning program and reach the target users. At CTU and HU, external funds were paid to teaching staff for their involvement in and support for student learning on the existing system. It is remarkable that external funding was aimed at mainly building institutional capacity, in which the development of more digital resources was a part of funding a project, rather than E-learning development only. In this case, external funding, as the catalyst, solidified further E-learning implementation. Therefore, funding for developing resources for the E-learning environment was the most important thing in implementing an E-learning system within these institutions. Although funding helped to start the E-learning project, these universities looked forward to receiving more funding to maintain and further develop the system. In contrast, in the case of UD, the innovative ideas and sharing culture paved the way for E-learning implementation without the presence of external financial resources. E-learning implementation was spread from one department to another and completely adopted by the whole college. Without external resources and support, technological innovation and culture played an important role in facilitating E-learning implementation (see section 4.5.1).

In the pre-implementation stage, data analysis identified that the starting point for E-learning implementation in all cases stemmed from the availability of resources, technical innovation and culture. The innovation idea and local culture were the driving factors for E-learning

adoption and implementation at a departmental level where the needs for improving academic practices was needed. In other words, the technological innovation and culture driving E-learning implementation was bottom-up. The available of resources provided by external support could make the implementation process easy and risk-free in regards to cost-benefit analysis. In this case, a top level manager is normally involved in the project as a conventional approach to project management. Therefore, top-down implementation would connect to the available resources as a driving force. Generally speaking, bottom-up or top-down E-learning implementation probably depends on cultural and technological innovation and availability of resources.

From the top-down approach, initiative implementation primarily focused on distance learning rather than blended learning, as in the case of CTU. This approach could support the institution to generate revenue with regards to making decisions on cost-benefit by senior managers. However, technological, economic and social conditions did not create favourable conditions for distance learning at this time. In addition, a profit-oriented scheme to E-learning implementation failed through lack of involvement, participation and cooperation from users, as in the case of HU. The approach selected depended on the resources for E-learning development. With external resources provided, E-learning was planned and managed directly by the university administration. Users and college members followed the plan coordinated by the university administration. Both the top-down and bottom-up approaches to E-learning implementation have been applied in all cases studied. However, bottom-up implementation was mainly involved and was mainly facilitated directly by users who had actual needs for applying ICT to changing and improving their work, with or without direction and support from upper levels of the administration.

7.3.1.2 Learning management system

Due to limitations of financial resources, open source software of LMS was generally considered a viable technology for initiatives of technological implementation. An open source software (OSS) learning management system was used to build the E-learning system in all cases studied. The Moodle system, which is very popular in Vietnam, was adopted in the case of UD and HU while the Claroline system, and Dokeos later, were applied to the E-learning system at CTU. The selection of LMS for an E-learning system was based on recommendations by technical staff, derived from their familiarity and experience. Although open source software is free of charge, switching costs in the case of CTU were significant. Changing the old platform to the new one meant many resources designed and developed on

previous systems could not be retrieved. As a result, existing adopters did not use the new system, as it meant their time and work on developing and designing content resources would be lost.

7.3.2 Implementation stage

7.3.2.1 Involvement and commitment

Data analysis revealed that having the support of organizational management was critical to the success or failure of E-learning implementation. As an either enabling or hindering factor across the cases, management support included the commitment of staff who could develop and provide support services for end-users; commitment of resources invested and allocated; and organizational commitment to addressing and solving problems associated with the operation and management of E-learning. In the case of CTU, the involvement and commitment to projects by top management at three levels, including department, school and university, was appreciated and recognized by project stakeholders. Administrative interventions were given on time to solve problems during the project's life. In contrast, in the case of UD and HU the lack of commitment to an E-learning policy and involvement in E-learning activities from senior managers were claimed to be factors preventing and damaging participation in E-learning as well as diffusion of E-learning technology across these institutions (see Sections 4.5.2.1; 5.5.2.1; and 6.5.2.1). Respondents from these cases indicated that feelings of frustration and abandonment were experienced by teaching staff when faced with too many technical difficulties and complaints from students that could not be resolved. It is really dangerous for technological adoption in general and E-learning in particular within any organization when a policy related to adoption is informed but not being performed. When the organizational belief and psychology about innovation and technological adoption are negative, the process of implementation will be risky and challenging.

7.3.2.2 Motivation for adoption

Although occurring at different locations and times, E-learning implementation at three sites primarily motivated users rather than forcing them to adopt the new teaching and learning environment. Moreover, financial tools, such as financial incentives, were applied, though voluntarily E-learning was emphasised in the implementation policy. Across three cases, participating in and adopting the new teaching and learning environment was based entirely on voluntary choice and self-motivation in the pre-implementation stage. Institutionally, data

analysis indicates that this was the situation in all cases studied. Voluntary adoption and motivated policy were commonly used rather than regulatory policy because of current government regulation, a sceptical mind and E-learning recognition. Senior managers at these institutions admitted that they actually did not believe in the quality of training delivering via online formats at all.

However, the motivation for active participation, both for individuals and academic departments, needs to be mentioned. Official public recognition to enhance motivation by top management should be carried out. In the case of UD, many E-learning users claimed that their endeavours and E-learning achievements were not recognized within the organization. Only saying rather than doing, along with a lack of motivation in practice and in public by top management, can be explained with regards to organizational politics. This issue would be harmful to an organization if it continued during further development of E-learning. In contradiction, sharing cultures and peer support had a crucial role in appealing to teaching staff for continuous adoption. Except for the case of HU, E-learning implementation stopped after these initiatives; the sharing culture and peer support were the main drivers to E-learning adoption during the process of implementation at all stages in the cases of UD and CTU.

7.3.2.3 E-learning operation and management

The difference between ICT knowledge and recognition with a conservative mind-set significantly shaped the manner of operation and implementation. At HU, an E-learning system was considered to be a subcomponent of the academic management system. In the case of UD, E-learning implementation was carried out by the IT unit which was responsible for all aspects of implementation. There was no change to the operational model or administration at the university and of college members. As a result, technical and administrative-biased implementation and operation were largely dominated by decision-making and intervention during the process of implementation. The lack of involvement of academic and pedagogical aspects meant the E-leaning environment was built as a body without a spirit. The result was that no staff training and professional development was provided to support users in adopting the system.

Data analysis indicates that open and regular communication was critical to implementation and intervention. At the CTU, the main form of communication reported was informal, while the meetings of the E-learning project team were the only method of formal communication.

These types of communication occurred frequently between members of the E-learning team responsible for day-to-day operations related to user adoption. Informal communications were used to support and share knowledge, guide skills, provide guidance, and train users. In addition, CTU provided a primary point of contact to troubleshoot issues for users to respond thoughtfully in a timely manner related to pedagogical and technical aspects. The effective communication channel at CTU was also helpful for senior management when they knew what was happening during the process of implementation and what or how an intervention could be given to protect the project.

Contrary to CTU, during the implementation stage UD and HU did not establish an official communications channel for formal or informal interaction and exchange among stakeholders directly involved in E-learning implementation. Data analysis shows that communication was not exhibited in both cases. In the case of UD, interviewees reported that official information relating to E-learning implementation did not update to them, either in formal and informal channels, so that most teaching and support staff had difficulty in knowing why the E-learning technology was adopted and how it was going to help them. In the case of HU, "bottom level" staff did not clearly identify the direction which the "top level" management wanted to move towards with E-learning. A large part of this resistance to adopting E-learning clearly stemmed from a fear of the unknown. In order to overcome these uncertainties, a communication strategy should be specially formulated for an E-learning project.

7.3.2.4 Budget allocation and investment

In all cases, E-learning had inadequate resources for implementation at different levels. At UD and HU, the E-learning system was simply an additional web application built on the existing ICT infrastructure for supporting teaching and learning; a low level server was used to install an LCM. It was evident that UD, particularly COE, cost nothing for the E-learning project. Similarly, HU and CTU did not invest in E-learning activities, even though they benefited from state funded projects in which E-learning was a sub-component of a building capacity project. However, the back end of the E-learning environment at these institutions did not exist at this point; the initial stage of E-learning implementation required merely fundamental foundations in which digital resources, content development, course design and staff training could be presented, in order to facilitate user adoption.

As a result, learners were not satisfied with learning content and materials, course design and delivery on the system. One of the most common complaints across the three cases was the outdated material and subjects taught by teaching staff who adopted E-learning for their teaching. The previous courses reused outdated content, probably because lecturers did not have enough time to develop and change. In this circumstance, although E-learning was still used, it was abused as a show-case for ICT applications in this institution, rather than leading to reform and improvement in the quality of training.

7.3.2.5 Technological problems

Data analysis indicates that users were impacted on radically by technology, either facilitating or hindering participation and adoption, related to the existing ICT infrastructure on which E-learning system was built, in each case studied in the ongoing implementation stage. The E-learning system was not able to integrate with the existing IT infrastructure, which led to technical complaints when using E-learning in the cases of UD and HU (see Sections 4.5.2.2 and 6.5.2.2). Meanwhile, the smooth integration of an E-learning system with the current digital infrastructure made E-learning available to users if they wanted to adopt the system in the case of CTU (see Sections 5.5.2.2). Despite the enormous efforts made by IT staff to achieve a high degree of integration, the E-learning system at the UD and HU was faced with technical problems in communicating with infrastructure and other applications which were in use at the sites. The major features connected with technological challenges and technical problems related directly to user login and support services to retrieve the user account. The E-learning systems in the case of UD and HU were standalone, with other digital resources and applications on its campus. However, the CTU's technology meant that the E-learning system was completely integrated with other computer-based applications and network resources. Most ICT applications were planned to integrate with the existing infrastructure during the development process, as technological integration is one of the requirements. The CTU's technology is capable of providing a single sign-on application so that it is easier for new ICT applications to integrate with the entire current infrastructure. As a result, the complaint from users who adopted and used E-learning at CTU were different in UD and HU.

Across these three cases, data analysis identified that all these institutions tolerated limitations in network traffic and lack of powerful servers which were supported for heavy applications, such as E-learning and academic management systems, especially at peak demand. The bottleneck of networks was recognized as a major weakness of the current

infrastructure, which was not able to support the needs of ICT at these institutions. In addition, when users had a technical issue that they needed support in, poor IT support services did not provide them with a response in a timely manner. From these three cases, it can be seen that technology can promote users' adoption of E-learning or encourage resistance to it..

7.3.3 Post-implementation stage

7.3.3.1 Attitude and behaviour

In all cases, the users' attitudes to E-learning were very positive. Especially at the pre-implementation stage, teaching staff and students were very enthusiastic about the initial activities carried out for adoption. The automatic functions of the system were highly appreciated by users. Teaching staff who adopted E-learning found that its functions were very useful, convenient and saved time. By letting students study on the system, teaching staff could reduce teaching in the classroom. However, conflicts and tensions between adopters and resisters arose when the institutional academic policies and educational regulations did not define clearly how quality and student performance had been assessed. An endorsement for quality and performance was not released, so the use of E-learning still was not official within academic principles and disciplines in all cases.

7.3.3.2 Challenges & future direction

All three studied cases conducted interviews to examine the key outcomes of interest, the current status and future development of E-learning. At the time of data collection, the E-learning systems at the UD and CTU were still alive and ongoing adoption by their users was still occurring, but it had different results. The E-learning system of HU entirely stopped after the introductory stage. The result of E-learning implementation and future developments in the cases studied were different from each other and depended on resources supplied, the E-learning concepts applied, and strategic developments planned. Data analysis from each case indicates that most of the challenges to E-learning were to maintain the level of user interest and adoption after introducing and implementing the E-learning system. In fact, E-learning diminished in interest and adoption in all cases, both individual and institutional. Even in the case of HU, E-learning almost died out in the ongoing pre-implementation stage because no one was interested it. For the other two cases, technical problems, poor support services, and incompetent E-learning policy and operation decreased E-learning interest and adoption. Damage and risk rather than benefit was gained through using the system. E-learning

implementation needed to be approached in a different way. Distance learning oriented planning must dominate in all cases for the future development of E-learning at the institutions.

However, it is surprising that the senior managers in all cases mentioned the distance learning approach as a strategic development in the next stage of implementation. The main reason for changing from blended learning to distance learning was not clearly indicated but the possible link could be limitations in financial resources. The HU and CTU were unable to identify funding and allocate budgets to continue E-learning implementation, as originally designed and implemented. However, the international partner of CTU was able to support a new E-learning project, which could be a sub-component of another capacity building project. Despite a confirmation from the top senior managers of E-learning development at HU, it was unable to identify funding for its E-learning program and could not absorb the costs of E-learning. In the case of UD, an E-learning environment was continued by the College of Economics, where teaching staff and students contributed to E-learning implementation by individual efforts and volunteering.

At the time that the data were collected, the status of E-learning implementation at each site was different. Only the E-learning system at UD still existed, with many active users. The second system, CTU's E-learning project, was partly worked on by some active subjects; and HU had virtually completely died. However, it was surprising that the more successful the implementation of E-learning was recognized to be for an institution, the more risk and damage was placed on adopters.

7.3.4 Conclusion

Cross-case analysis of the implementation process was structured in three sequenced stages, including pre-implementation, implementation and post-implementation. From the similarities and differences among three cases studied, nine influential factors were identified during the process of implementation, showed in Table 7-4 below. It was noticed that some features might appear only in one stage, while others existed and continued into subsequent stages. In the pre-implementation stage, for instance, top-down and bottom-up implementation was almost unchanged during the whole process of implementation. However, the funding source for E-learning implementation ceased at the end of the implementation stage in the case of CTU, as illustrated in Figure 7-1.

Table 7-4: Influential factors of process of implementation

No	Factor	Features	UD	HU	CTU	Remarks
1	Resource and scope	External funding		H	H	External funding was important source for launching the E-learning at CTU and HU.
		Innovative culture	H			
		Top-down implementation		L	L	
		Bottom-up implementation	L			
2	Learning management system	Open source platform	L	L	L	Open source platform was dominated in use.
3	Involvement and commitment	Management involvement			H	Except CTU, lack of involvement and commitment from management were the same at UD and HU.
		Management commitment			H	
4	Motivation of adoption	Volunteer adoption	L	L	L	Volunteer adoption was applied and financial reward was used for further motivation of the use of E-learning at all cases.
		Financial reward	L	H	H	
5	Operation and management	Communication and contact			H	E-learning implementation was handed over to technical staff and IT unit at UD and HU. There was no training for supporting E-learning users at UD and HU.
		Staff training and development			H	
		Tech-administration-based	L	L		
6	Budget allocation & investment	No operation budget	H	H	H	There was no budget for E-learning implementation.
		Non-additional investment	H	H	H	
7	Technological problems	Stand-alone environment	H	H		Low network speed and weak servers were the common issues in all case. Only CTU's E-learning system was integrated into the existing infrastructure.
		Integrated environment			H	
		Login service and user account	L	L		
		Network traffic	L	L	L	
		Weak servers	H	H	H	
8	Attitudes and behaviour	Negative attitude in post-implementation	H	H	H	
9	Challenges and future direction	Decreasing in interest & adoption	H	H	H	E-learning implementation in the case of HU was completely stopped.
		Distance learning	L	L	L	
		Active environment	L		L	

L: Low power; H: High power

In the pre-implementation stage, the funding for E-learning implementation was identified as a motivator for administrators at CTU and HU to carry out E-learning, while an innovative culture fuelled instructors to implement E-learning in the case of UD. The local culture was an important factor to facilitate E-learning implementation, not only in the pre-implementation stage at UD but also in the next implementation stage process, in all cases. However, the cultural factor was very complex in relation to implementing and adopting E-learning in these cases. For example, where E-learning was accepted, local culture helped to overcome the difficult challenges faced during teaching and learning, while it also helped to protect instructors where E-learning was rejected.

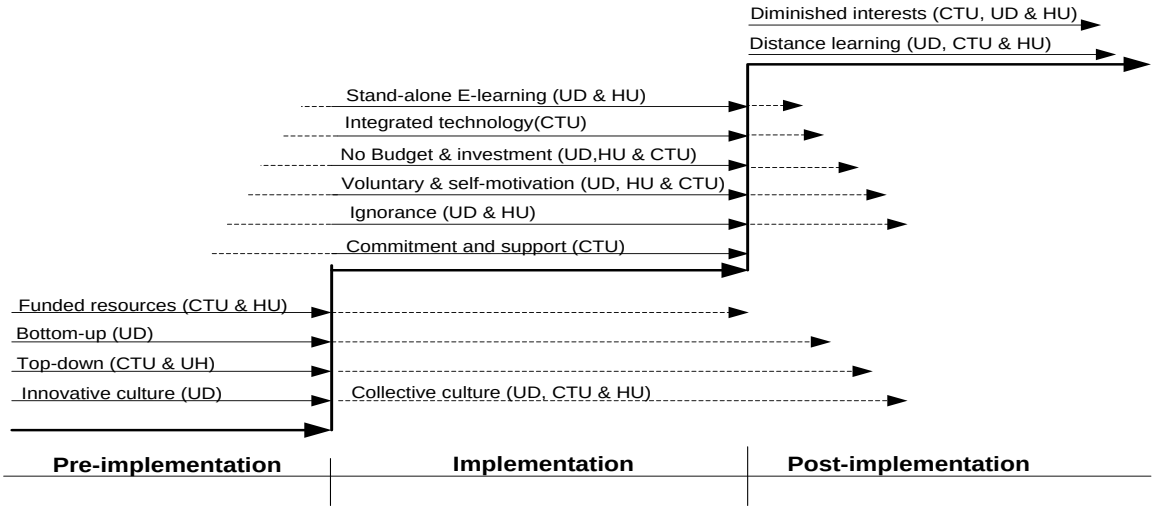

Figure 7-1: Features of implementation process

In the implementation stage, all three institutions did not invest and allocate the budget for E-learning operations. Instead, they applied the same policy, in which faculty were encouraged to volunteer to adopt the system. However, management and operation of E-learning were different. In the case of CTU, E-learning implementation was reported regularly and monitored by top management. This allowed them to intervene and give direction in order to solve the problems. In contrast, E-learning in the case of UD and HU was handed completely to the IT unit to control. Administrators did not maintain E-learning practices and status within their institution. Even the policy of E-learning reward was not carried out without any notice. The opposition to E-learning technology was identified between CTU's E-learning and other cases. E-learning at CTU was built on an open and integrated technology which allowed E-learning to integrate with the existing infrastructure. However, the E-learning system in the case of UD and HU was stand alone, with other applications in use on the current digital resources. This was an obstacle which could not be overcome without radical

changes in ICT resources and technology. It was noticed that the problems in the implementation stage were never solved, and continuously impacted on the next stage as a result.

In the post-implementation stage, cross-case analysis revealed that the future development of E-learning and the users' attitudes are similar at all cases. Negative thinking existed regarding E-learning appeared in almost all faculties and students, both in terms of adopting and resisting E-learning. For E-learning users, the more exciting and enthusiastic they were in the pre-implementation stage, the more frustrated and exasperated they became in the post-implementation stage. At any given stage of implementation, whatever was happing in E-learning environment, it was taken for granted that E-learning was still alive within these universities, as all university managers at these cases stated that their institutions were implementing and using E-learning. In addition, distance learning via E-learning was the next form for their institutions further development of E-learning use and integration into education.

7.4 Drivers and constraints of E-learning implementation

A review of the literature revealed that, from different perspectives, factors influencing E-learning implementation and adoption, both negative and positive, used different concepts to identify and illustrate how these factors impacted on E-learning implementation and adoption. On the negative side, for example, the concept of barriers, challenges, inhibitions and constraints were used interchangeably in expressing, identifying and referring to influential factors of external and internal environments to E-learning implementation and adoption (Nagunwa and Lwoga, 2010; Ali and Magalhaes, 2007; Peansupap and Walker, 2006). Similarly, on the positive side, concepts of drivers, facilitators, opportunities, and critical factors are used to present favourable attributes, aspects, conditions and factors which facilitate successful implementation and adoption of E-learning (Goi and Yen Ng, 2009; Lee, 2006; McPherson and Nunes, 2006). However, it is likely that there is an overlap of influential factors impacting on E-learning implementation and adoption in literature.

So far the analysis has identified separately influential factors from contextual settings and implementation processes, which affected E-learning implementation. Findings from cross-case analysis provide some insight into the similarities and differences between the sets of influential factors of the contexts and processes which affect E-learning implementation among these cases. Because an individual influential factor, either positive or negative, could

not stand alone with others in the context of implementation, an aggregated effect made by the individual factors should be examined in the final result of E-learning implementation. A lack of integrated theoretical perspectives made it difficult to synthetically understand the final results so that an approach which can possibly provide a systematic analysis of the influential factors affecting E-learning implementation is necessary for this study.

Force field analysis (Lewin, 1951), which examines the relationships between driving and restraining forces for changes at the organizational level, is very useful to an analysis of E-learning implementation for this study. Originally applied to organizational change, Lewin's model considered that both driving and constraining forces would simultaneously affect the organization. Although this model did not refer to E-learning implementation, nevertheless Lewin's approach to examining driving and restraining forces can be used to make predictions about the kinds of problems which educational institutions may have with technological innovation, adoption and implementation, such as E-learning. Findings from cross-case analysis indicate that the driving and restraining forces are different from source, type, power and manageability. First of all, an individual driving or constraining force will be developed by incorporating the influential factors from the contextual settings (Section 7.2) and the implementation process (Section 7.3) whenever alignments between them are appropriate, illustrated in Figure 7-2.

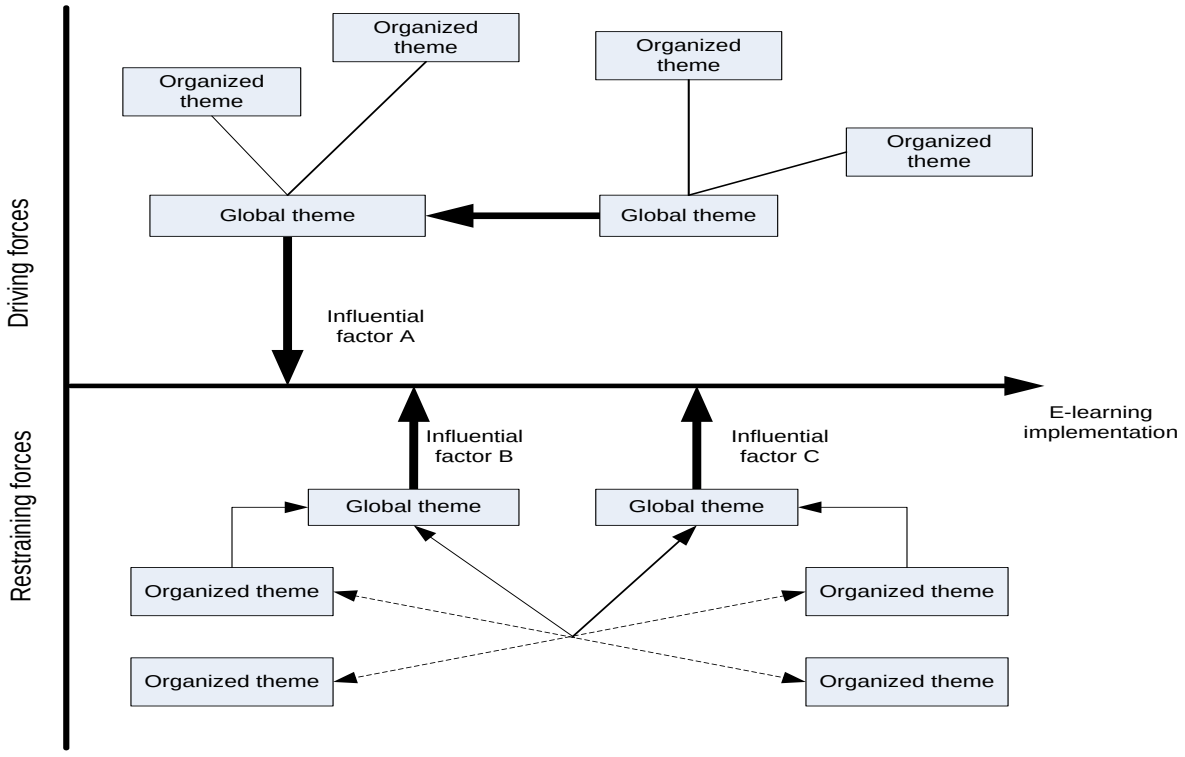

Figure 7-2: Development of driving and constraining forces in E-learning implementation

In the figure above, the characteristics of driving and constraining forces will be identified and defined from across the influential factors of the implementation context and process. Then the results of driving and constraint to the E-learning implementation will be summarised using the Lewin model of E-learning implementation, depicted in Figure 7-10. The following section presents drivers and constraints E-learning implementation in its contexts in more detail.

7.4.1 Availability and limitation of resources

The availability of resources appeared as the most significant driver of E-learning implementation in the pre-implementation stage. In study cases, an E-learning initiative was started from funds which were supported and donated by external bodies. Findings revealed that E-learning had been bolted on to the digital infrastructure which already existed through external funding. Thus E-learning had favourable conditions for launch. Another interesting factor was that the budget for E-learning allocated from funded projects was also available, so users were motivated to adopt E-learning. The more activities were undertaken, the more financial rewards could be received. However, the time, human and financial resources required appeared as constraints to E-learning implementation in all cases studied during the implementation stage. Limitations of financial resources inhibited an adequate investment allocation for investing in IT infrastructure. It was also not allocated appropriately to the operational budget for managing IT tasks and providing IT support services for end-users. In addition, the absence of technical and managerial IT skills did not allow the organisation to envision strategically ICT application and E-learning implementation within higher education. Running over-capacity caused overload and administration work did not allow teaching staff and senior managers to dedicate their time and energy to E-learning adoption and intervention on time, when problematic issues and conflicts appeared in the process of implementation. After implementing the system, the continuance of the E-learning environment was questioned. Further development and adoption required that financial resources and budgets should be allocated before any action would be considered. In addition, the future direction of E-learning implementation was oriented to distance learning, which would potentially generate revenue, and so stemmed from the limitation of resources and budgets for E-learning implementation too. The driving and inhibiting forces on resources is illustrated in Figure 7-3 below.

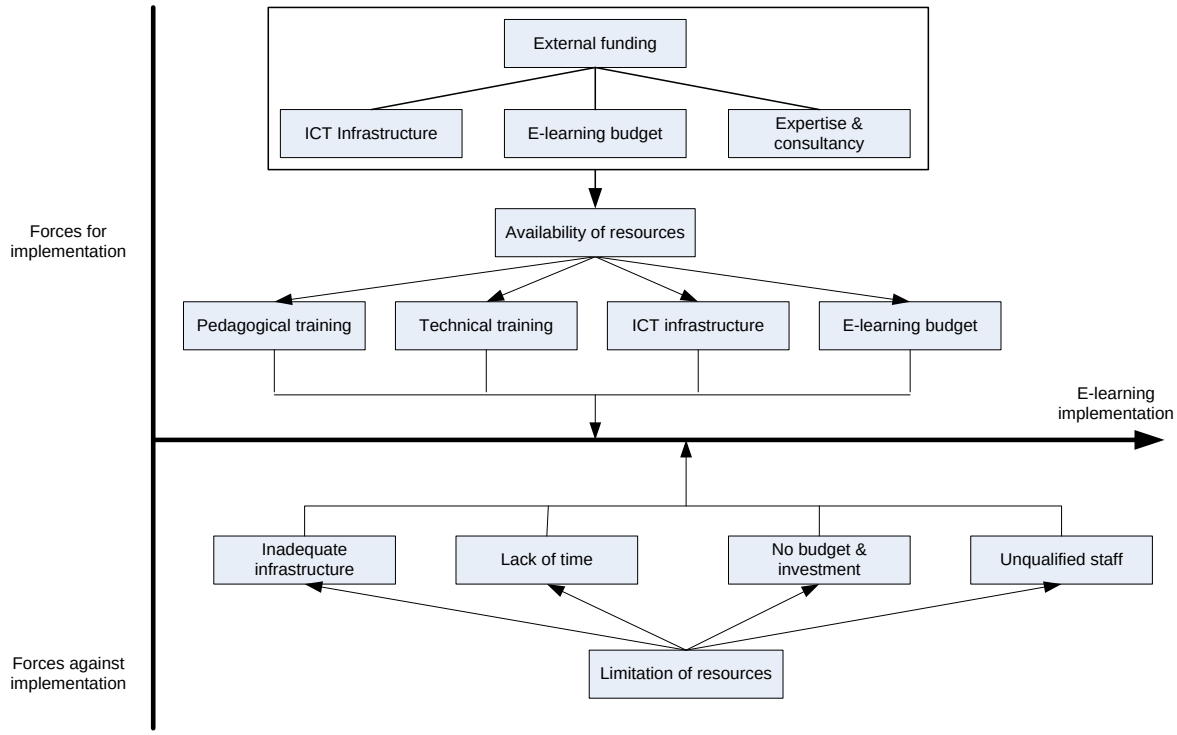

Figure 7-3: Forces for and against E-learning implementation - availability and limitation of resources

7.4.2 Local culture

Findings from the study show that local culture played a key role in E-learning implementation at all study sites, either as facilitating or inhibiting factors. Where the resources for E-learning and support services for users were absent, the innovative culture helped to start up E-learning implementation. Throughout the process of implementation, the sharing culture, especially peer support, assisted people to overcome technical and pedagogical problems and cope with challenges in bureaucratic procedures, alongside organizational conflicts. The local culture, where most teaching staff adopted E-learning working together and sharing the same values and beliefs in ICT, found that only peer support was a way to help them learn how to use new technology without professional training and development provided by the institution. In the meanwhile, collective culture was also an inhibiting factor in some places, where E-learning was rejected. Resisting adopters to E-learning found that collective culture could offer an umbrella which protected them from not using advanced technology in teaching. Sharing the same sceptical mind-set about the quality of E-learning and believing that E-learning could by no means improve teaching and learning, resisters could argue and endorse rejecting and avoiding E-learning adoption. The drivers and constraints of cultural factors are illustrated in Figure 7-4 below.

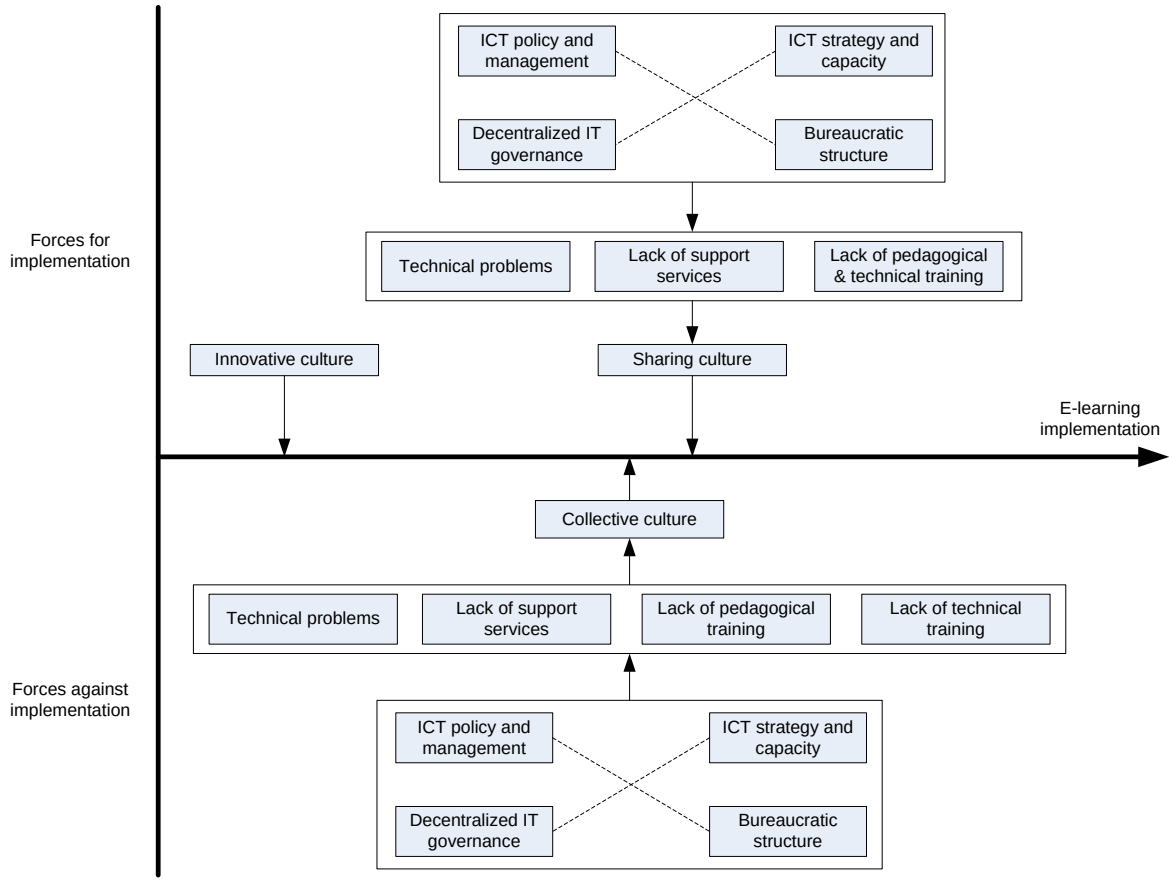

Figure 7-4: Forces for and against E-learning implementation - local culture

7.4.3 E-learning recognition and policy

Nationally, at the time the data was collected, the Vietnamese Ministry of Education and Training (MOET) has not recognized the quality of training in E-learning technology. Nationally, although MOET encouraged educational institutions to apply E-learning to improve the quality of training, it did not allow the institution to replace in-class teaching by using E-learning formats. In addition, student assessment and academic performance cannot be achieved from studying through an E-learning system on any academic degree program, only paper exams conducted with human supervision are accepted. In other words, the Vietnamese regulations and education policies have not created favourable conditions for E-learning development and adoption. Although there are many arguments associated with advanced roles of ICT in Vietnamese education reform, the strategic development and confirmation within Vietnamese education in applying ICT has not been released to the public. The Vietnamese education institution is in a grey area, where the bright future of ICT-embedded integrated education is overlapped with the darkness of regulation and policy left behind from previous eras. In this circumstance, public education institutions have taken it

for granted that nobody rejects the role of ICT in education but people are still awaiting changes in policy and regulation.

Institutionally, the cost-benefit analysis oriented on strategic planning for E-learning development is a barrier to current investment and to promoting the development of E-learning within these institutions. Only by generating revenue will E-learning have the opportunity to develop, otherwise these institutions will not invest in E-learning. This strategy will lead to implementing E-learning on distance degree programs only, where revenue generated from the distance programs will be managed completely by educational institutions, according to current regulations. As a result, a blend of E-learning will not be of interest to the institutions. Partly impacted on by regulations, this mind-set clearly inhibits E-learning development and adoption within educational institutions.

Personally, adopters recognized several benefits which E-learning could bring to teaching. The functional tool of an E-learning system could be used for automatic teaching, providing quizzes and saving time. In addition, alongside quality improvement of E-learning in teaching and learning, the use of E-learning to support student learning could gain financial rewards from the institution. Therefore, E-learning awareness was voluntarily motivated in the adoption, and used by the users. The driving and inhibiting forces of E-learning recognition and policy are depicted in Figure 7-5 below.

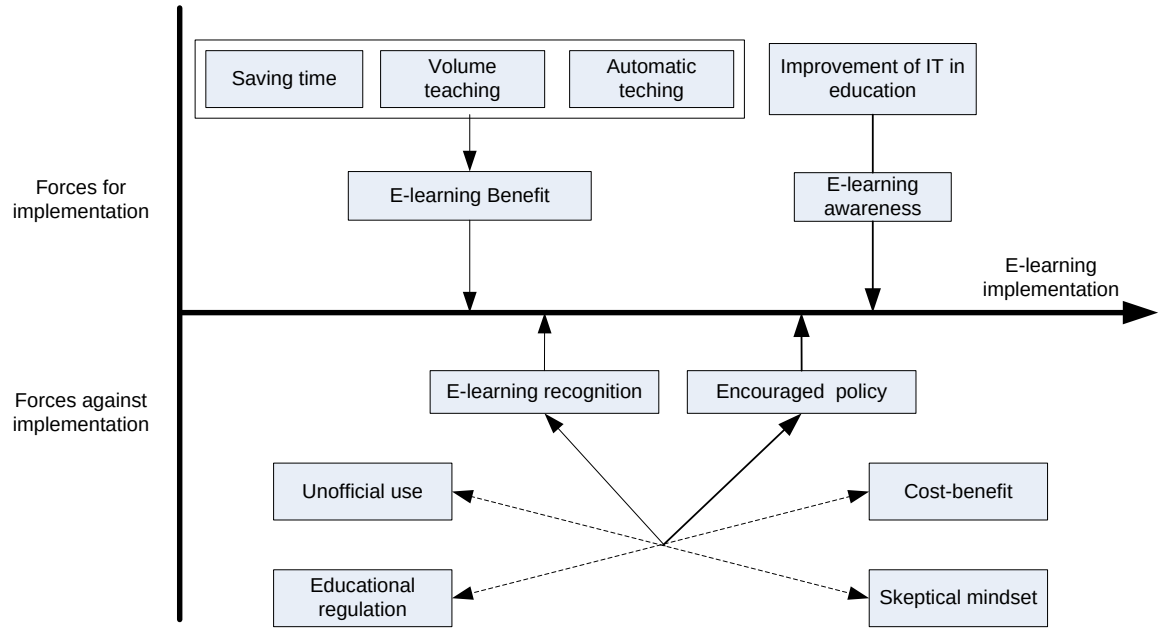

Figure 7-5: Forces for and against E-learning implementation: recognition and policy

7.4.4 Organizational charter and structure

Findings in all cases indicate that the organizational structure that was largely shaped by the regulated university charter was strongly influenced by IT governance within each institution. The charter led to decentralized and delegated governance to each member in the deployment of IT investment and principles of IT strategy. In contrast, the organic-based charter fostered a centralized mechanism of IT governance which allowed her to carry out appropriate IT investment and strategy and achieve the desired results. The different mechanisms of IT governance led to different standards, policies and operations created to define university IT infrastructure. In the centralized mechanism, IT infrastructure allows focus on the university's IT capacity rather than needs of specific business units or university members. Under decentralized mechanisms, IT infrastructure is driven by a specific business model, and each member was therefore unable to consider sharing and cooperating requirements across the organization as a whole. As a result, decentralized or centralized mechanisms of IT governance formed by characteristics of the charter could impact strongly on the cost of IT infrastructure and investment; efficiency and reliability; and the future of IT capacity at the university.

A common factor emerged from the two study sites which significantly impact on integration of IT infrastructure, namely management across functions within the organizational structure. The integration infrastructure created allows academic and support services; and functional support services. Also, data and information across borders within institutions could be accessed, shared, related and exchanged via a standard of technological interfaces. However, with a regulation-based charter, the collaboration and cooperation across borders, both university and college members, are limited to their boundaries. Thus the pre-defined standard of technological interface would not exist in advance when individual business units are concerned only about the specific requirement of its business processes and tasks. Meanwhile, the absence of higher levels of management which could manage the specific requirements of each business unit, created a barrier to integrating an application system and data, which tends to be more specific to individual units. In contrast, a structure based on an organic charter applied to centralized IT governance, involving human and financial resources, physics and software, and data and intellectual property, in which application system and data could communicate together via a predefined standard of technological interfaces, is better. In light of this sense, E-learning implementation could be easily carried

out on the foundation of integrated infrastructure. The driving and inhibiting forces of the organizational charter and structure are illustrated in Figure 7-6 below.

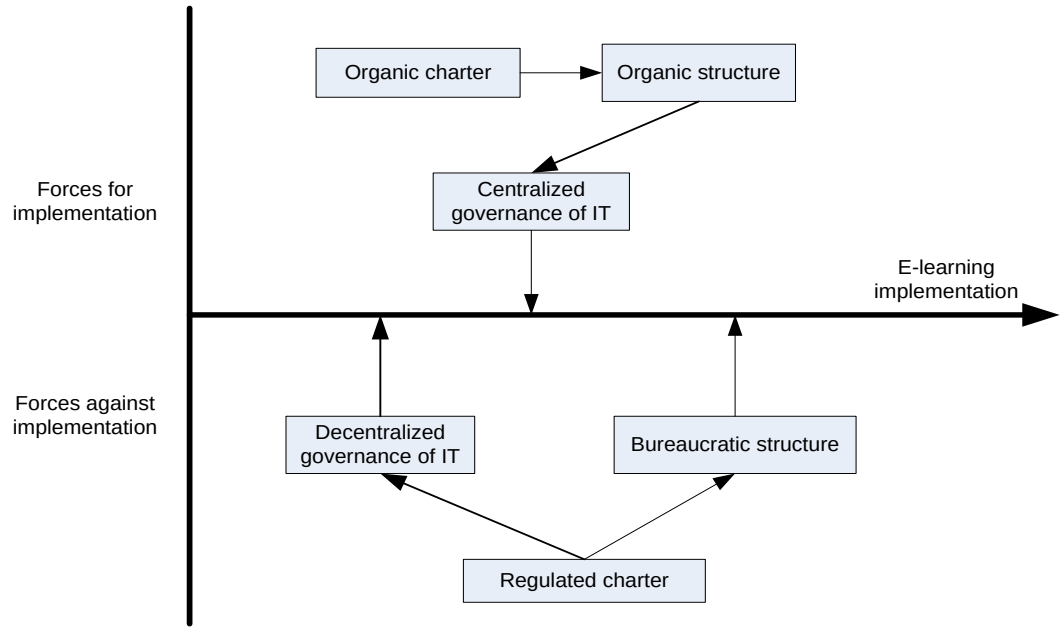

Figure 7-6: Forces for and against E-learning implementation - organizational charter and structure

7.4.5 Management support

The findings show that support and involvement from the top management of all three organizations was stronger in cases of top-down implementation than that of bottom-up implementation. Organically, such support and involvement were indicated by several signals in verbal and written formats in organizational communication. However, the commitment to bottom-up implementation only appears in internal communication rather than specific actions, such as allocating appropriate resources, resolving conflicts and solving problems. For top-down implementation, commitment to implementing a successful project was carried out by allocating and mobilizing resources and control, as agreed by donators. However, the universities in these cases maintained continuity throughout the implementation project. In other words, organizational commitment was present at all studied sites but their commitment to E-learning implementation did not reach a sufficient level.

The findings showed that the key senior managers at these universities lacked attention to progressive adoption of E-learning within the organization. In addition, dedicating time to making E-learning-related decisions from top managers was not positive within these organizations. Actually, in the Vietnamese public sector context, a position of chief of information did not exist in almost any organizational structure. Thus, the lack of personal

involvement in E-learning implementation could negatively impact on E-learning implementation. The driving and inhibiting force of management support is demonstrated in Figure 7-7 below.

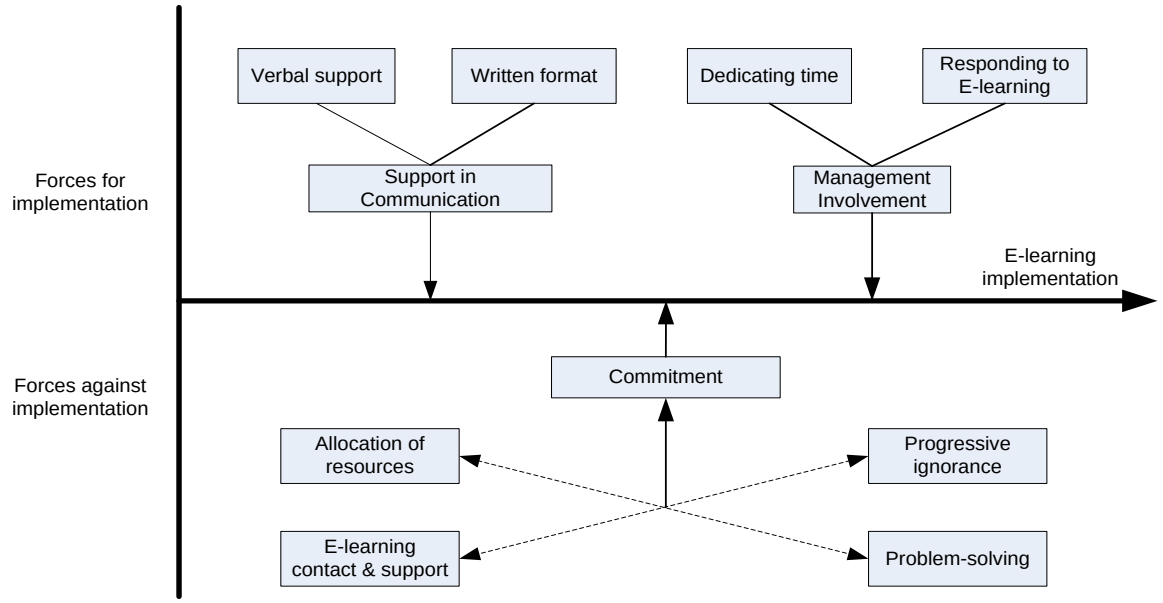

Figure 7-7: Forces for and against E-learning implementation - management support

7.4.6 Professional development and training

Except for one-off training at a small scale provided by external support, lack of formal training and professional development in general, online pedagogy and E-learning technology training in particular negatively impacted on E-learning implementation. Disregard for pedagogical training and development meant teaching staff were not ready to use appropriate E-learning technology and teach with it. Even later adoption has not provided adequate documents and manuals to enable people to use the system. Although early adopters had some training on technology and pedagogy, far fewer received training on how to design an online content subject and how to teach on the system during the implementation stage. Learning to use technology requires practicing lifelong learning by constantly enhancing knowledge and skills. The use of E-learning in teaching may require teaching staff to reconceptualise the ways in which they have completed their tasks for many years. Irrelevant training and development has led to technological abuse and inappropriate E-learning methods, which resists E-learning adoption. In addition, IT staff need further training to improve their skills and knowledge to support E-learning users, in order to maximize the potential of technology and provide better support services for users. Besides the non-completion of technology and infrastructure, low skills and a lack of IT expertise were also major obstacles to implementing successful E-learning at the cases studied. The forces for

and against E-learning implementation of professional development and training are illustrated in Figure 7-8 below.

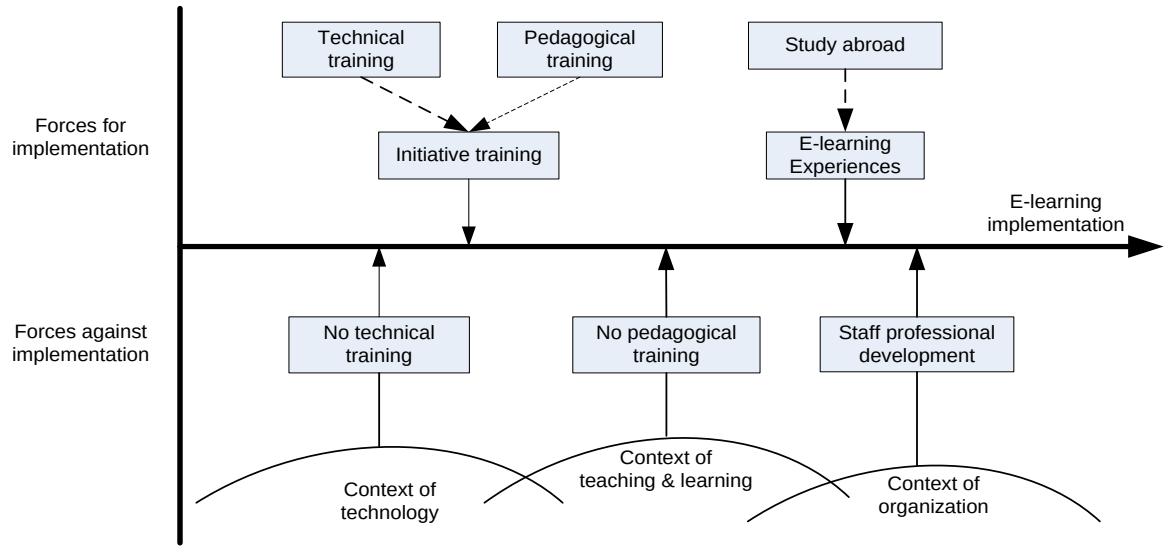

Figure 7-8: Forces for and against E-learning implementation: professional development & training

7.4.7 Technological integration and isolation

Findings from the cases indicate that the integration or isolation of technology originates in technological readiness or technical complaints and challenges to E-learning adoption. In the case of technological integration, most E-learning is capable of adoption whenever users want to use it. Ease of access and system logins have proved that convincing users to adopt E-learning is a simple task at this institution but it is very hard to retain users on the system when they face technical issues with login and connection. In contrast, the isolation of technology normally separates the E-learning system from the ICT infrastructure. In other words, the decentralized governance of IT and ineffective cross-functional management within institutions is caused by isolated infrastructure and closed technology by the fragmented investment and separated management. Furthermore, these institutions were wrong in setting up an institutional ICT strategy which converged with the university members' efforts in investing, developing and applying ICT in academic administration. As a result, technical problems in using E-learning become bigger challenges to users during the process of implementation. In conclusion, integration and isolation in E-learning implementation play an important role in technological readiness for E-learning implementation and adoption. The driving and inhibiting forces of technology are illustrated in Figure 7-9 below.

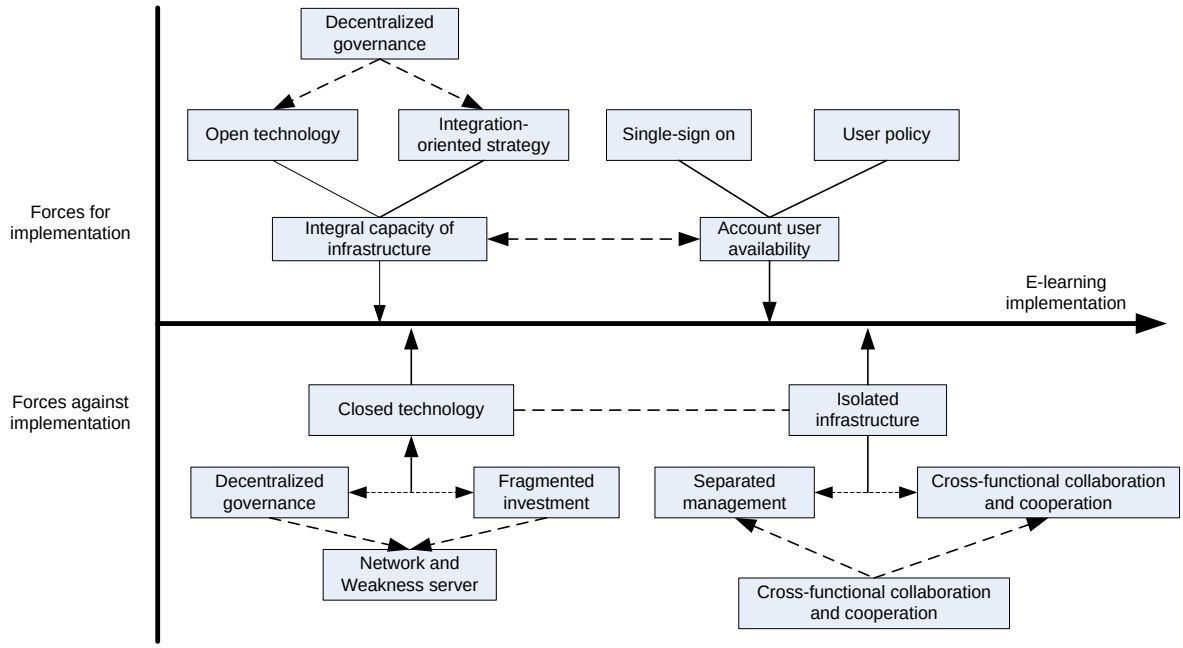

Figure 7-9: Forces for and against E-learning implementation: technological integration and isolation

7.4.8 Conclusion

After analysing the driving and constraining forces which shaped E-learning implementation in the three cases studied, these forces were scored to produce the following visual illustration in Figure 7-10.

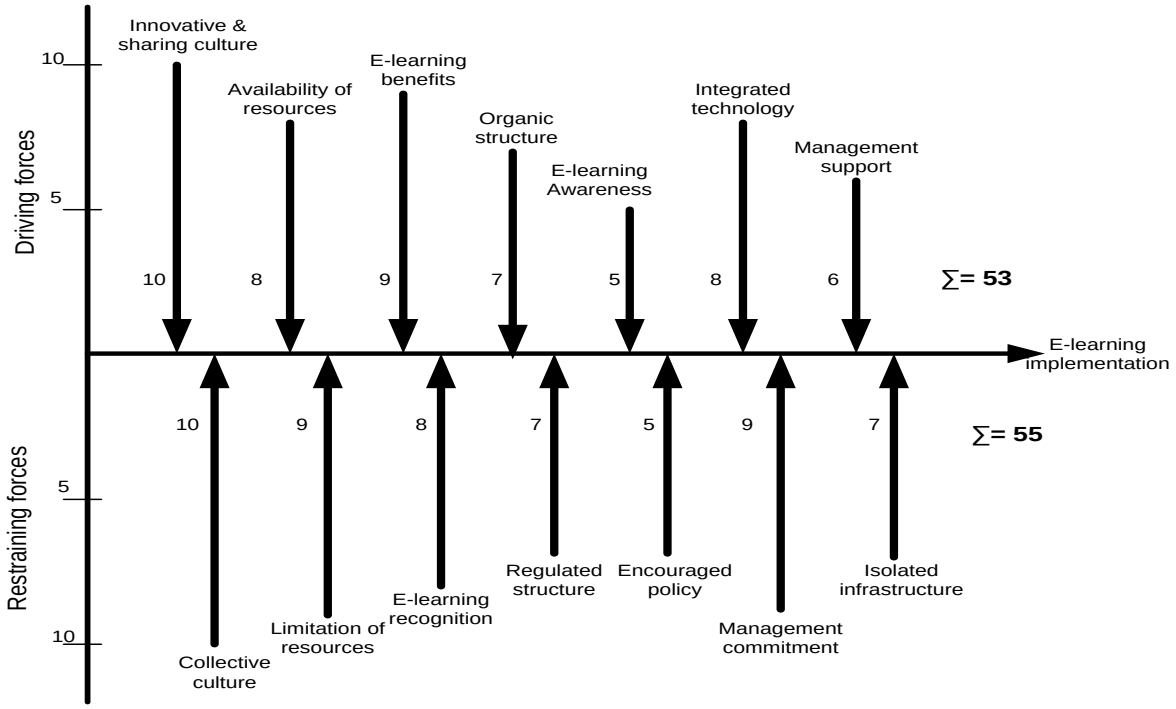

Figure 7-10: Drivers of, and constraints to, E-learning implementation

The study found that the context of organization and technology significantly impacted on E-learning implementation, especially in the implementation stage process. Although available resources and external support were essential factors which booted E-learning in some cases, nevertheless, the values of the local culture, namely an innovative and sharing culture, essentially played a more important role in simulating and fostering the E-learning implementation and adoption in all cases where E-learning were accepted and used. The personal awareness of E-learning was a stronger influence on E-learning implementation compared to public and institutional recognition. Although E-learning benefits as a driving force for adoption and use of E-learning, it was noticed that the abuse of E-learning should be notified and corrected throughout pedagogical training and development. In addition, the volunteer policy and financial rewards for adopting and using may have motivated E-learning users at this time but it will damage the integration of E-learning into education and training over the long term. Where management was involvement and supported E-learning, the organizational challenges and technical difficulties were quickly overcome, otherwise, when this was lacking, the problematic issues for E-learning remained unchanged. Findings in this study also showed that integration of technology and isolation of infrastructure were two sides of one issue, either successful or failed E-learning implementation within an educational institution, respectively.

This study found that positively facilitating E-learning implementation from all driving forces was not stronger than negatively hindering E-learning implementation in the contexts of study. As shown in practice, E-learning implementation in two cases, CTU and HU, almost ended completely, while E-learning at UD was mainly still active where it was started. This outcome suggests that continuous implementation within given contextual settings should be taken into account by all stakeholders involved in E-learning implementation.

7.5 Configuration of E-learning implementation

This section presents the cross-case analysis of configured patterns of E-learning implementation emerging from individual case analysis. In the previous chapters, the study identified factors from the context and process of E-learning implementation which interplayed to shape the nature of E-learning implementation from each case. The findings of cross-case analysis indicate similar understandings from managers, lecturers, technical support staff and students from the top-ten universities in Vietnam involved in the study of how E-learning has been implemented in a university setting. Based on their ideals and opinions of E-learning practices, the similarities and differences from contextual settings and

the process of implementation have been identified, and categorized into a broad range of influential factors. The cross-case analysis also identified the drivers and constraints influencing E-learning implementation. On the basis of these findings, a configured framework of E-learning implementation, from the influential factors and the nature of the process, has been proposed. The following section describes, constructs and explains the components of the framework and its nature.

7.5.1 Conceptual framework of E-learning implementation

The interaction and interplay between the context configuration and process configuration from each case has brought out four components, namely E-learning need; E-learning demand; E-learning capacity; and E-learning competency, which constitute the pattern of sustainable E-learning implementation across three sites studied. For our purpose, the study defines the sustainability of E-learning implementation as the long term continuity of all aspects. This implies that E-learning implementation, once started, will continuously be carried out, adopted, and adapted by end-users. Findings of the study indicated that the E-learning implementation will be sustainable, depending on four components: E-learning need, E-learning demand, E-learning capacity and E-learning competency. The lack of any one of these will cause E-learning implementation to be discontinued. The sustainability achieved allows an educational institution to overcome any difficulties to meet with long term development of E-learning.

The study by Zmud (1984) on "technology-push" (TP) and "need-pull" (NP) is applicable to explaining behaviours in the adoption of E-learning technology. E-learning technology-push and E-learning need-pull are underlying motivations and driving forces for implementing and adopting E-learning. In E-learning technology-push thought, recognition of the potential of advent technology for improving performance and changing academic activities means an educational institution will be prompted to implement an E-learning system associated with appropriate structure and strategy. An educational institution may yield to E-learning technology-push even if E-learning benefits are not clear (Chau and Tam, 2000). The E-learning need-pull means recognizing a need for change, which is triggered by an existing performance gap (Zmud, 1984). The E-learning need-pull, divided into internal and external need, is derived from the major stakeholders of an educational institution. The external need-pull might be a response to calls for change from state agencies or donors, while the internal need-pull forces might occur due to institutional, political, and innovative influences (Drury

and Farhoodmand, 1999). The conceptual framework of E-learning implementation containing these impetuses is presented in Figure 7-11.

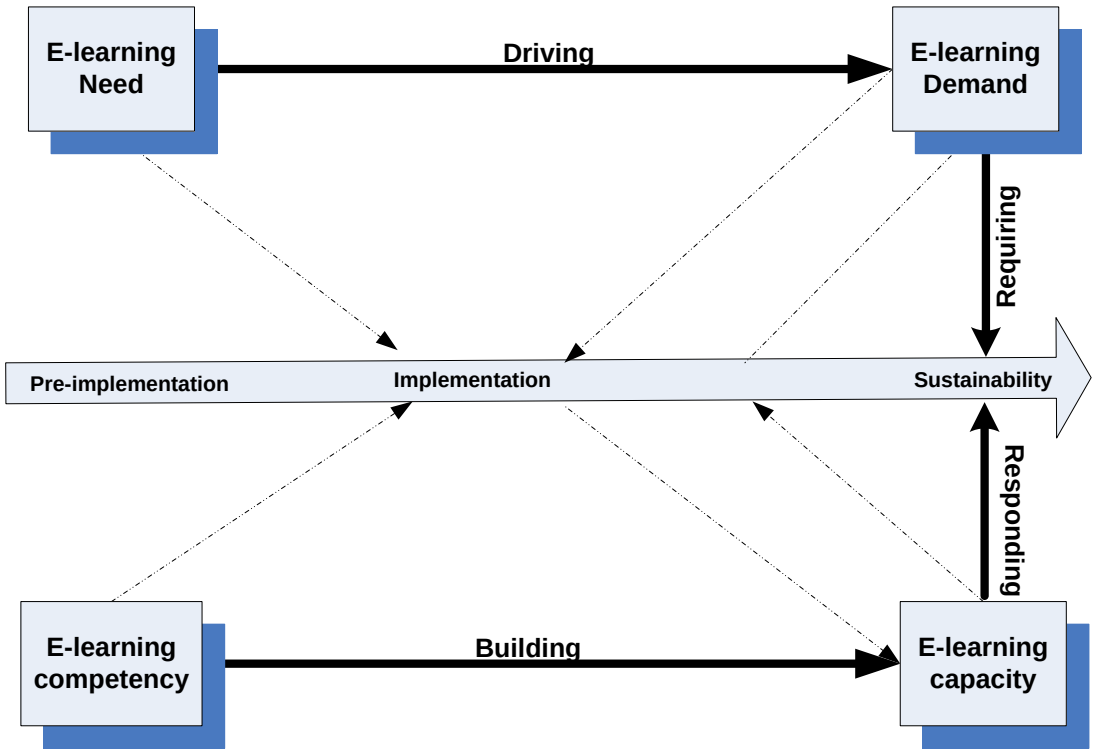

Figure 7-11: Sustainable framework of E-learning implementation

7.5.1.1 E-learning Needs

The first component of the framework proposed in this study, namely E-learning needs, indicates a deficient state that initiates a motive for E-learning by individuals and institutions (Monette, 1997). The challenges and pressures from contextual settings and the implementation process impacted on academic environments and required improvements and changes in teaching and learning. In this context, information technology could be a suitable way to change and improve academic activities and working environments.

Findings from the cross-case analysis indicate that pressure from the environment motivates individuals and institutions to reform teaching and learning, which is accomplished via information technology. E-learning needs to be derived from interactions among institutional managers, lecturers under positive and negative conditions, and organizational culture. Lecturers, students and managers had a "felt need" to use the available technology, E-learning, to improve their work. Local culture has a key role in feeling that E-learning should be applied to their work. In addition, the innovation culture has fostered the need for E-learning improvement and has helped to overcome challenges during the process of

implementation. In other words, the innovation culture can serve as a powerful motivator for E-learning (Section 4.7.1; 5.7.1; and 6.7.2). Institutional managers might feel that the institution wants E-learning for future development. They might wish to apply E-learning for improving and supporting teaching methods and learning performance. However, the intention and practice were not synchronised. From the current status of E-learning implementation, there is a need for further development, rather than an actual plan with investment and a detailed scheme. E-learning needs cannot be expressed in terms of demand for E-learning (Monette, 1997). In this study, E-learning needs have been constructed from innovative culture and influential factors of external and internal contexts.

7.5.1.2 E-learning demand

From an economic perspective, demand is defined as the amount of goods and services that individuals or organizations are willing to buy at a certain price. The need might exist but the demand might not. Without buying power, which is affected by income, demand could not be met (Barrantes, 2007). Demand in the information technology context is a modification of traditional economics. Regarding this study, E-learning demand will be defined in term of a set of attributes associated with E-learning demand and how buying power is accumulated to meet that demand.

Moving from E-learning need to E-learning demand requires satisfaction-seeking behaviours by applying E-learning technological services for teaching and learning. Different user's satisfaction or complaints about E-learning services offered could illustrate what E-leaning demand is. The findings from this study show that E-learning demand is satisfied by the ability to implement an E-learning system. In the light of this point, the demand for E-learning is partly dependent on current and future expectations of E-learning, which depends on mobilizing existing provision of resources. Findings from the study reveal the university's expectations of E-learning benefits, risk and damage, as well as future needs of E-learning. It is remarkable that external support and resources play a key role in deriving needs for E-learning, called derivative demand, rather than being internally driven. In conclusion, E-learning demand is primarily determined by future need, benefit and risk, and external support (Sections 4.7.2; 5.7.2; and 6.7.1). Findings from the study indicate that university management expect future development of E-learning will be delivered in a distance learning format. From the voices of students and lecturers, demand for more sophisticated functions is acknowledged and integrated in E-learning technology. Given specific contextual settings, E-learning technically demands more media functions and more support. In addition, the buying

power of the organization could be expressed in terms of being willing and able to invest in E-learning.

7.5.1.3 E-learning competency

A study by Tippins and Sohi (2003) suggested that IT competency is knowledge and utilization of IT to manage information, which can be expressed in three dimensions: understand, utilize and process the IT resources to manage information within a firm. Extending and adopting the concept of IT competency for this study, E-learning competence here refers to knowledge and utilizing IT resources to providing E-learning services within an institution. The concept of IT competency proposed by Tippins and Sohi (2003) is applicable to this study because the findings show that E-learning has been implemented by utilizing the available IT resources without extra investment or E-learning purposed investment. The available capacity of IT resources might be very large but this does not imply that the institution will provide effective qualified E-learning services for its users. Given the specific context, the successful implementation of E-learning will be determined by E-learning competency, which in turn provides E-learning knowledge, technology and operations for E-learning services. Findings from the study indicated that E-learning competency is determined by administrative and managerial skills and appropriate technologies (Section 4.7.4). Generally, an institutional competency of E-learning significantly relies on and is constructed from managerial competency, which enables an institution to develop an effective administration and operation, and appropriate technology.

7.5.1.4 E-learning capacity

The last component of the proposed framework is E-learning capacity. From a resource-based perspective, Bharadwaj (2000) suggested that IT capacity is an "ability to mobilize and deploy IT-based resources in combination or co-present with other resources and capabilities." Extending Bharadwaj's concept of IT capacity, an institutional E-learning capability refers to the ability to mobilize and deploy E-learning-based resources in combination or incorporated with other resources and capabilities to meet with E-learning demand. Adopting the three classifications of IT capacity suggested by Bharadwaj (2000) for this study, E-learning-based resources of an educational institution will include E-learning technology, pedagogical and technical skills, and intangible E-learning-enabled resources, such as E-learning policy, operation and management (Section 4.7.3; 5.7.3; and 6.7.1).

7.5.2 Demand configuration

Under pressure from academic work and environment, teaching staff have been motivated either by the need for change or new technology to solve problems related to academic workload and performance (Zmud, 1984). Therefore, it is apparent that, in the context of education, technological desire leads to E-learning-seeking behaviour to meet needs. Given contextual settings, the study found out that technological innovation might come out at this place but not at another, relying on local culture, which was identified in the context of this study as the driving force for E-learning implementation. Driving forces of awareness and benefits of E-learning will level up the desire for E-learning within these contextual settings. Desire for E-learning may exist at any educational institution and for many individuals, but they should be capable of creating E-learning environments to respond to their needs. In other words, the E-learning need should be transformed into demand for E-learning by the availability of resources which are identified as driving forces for E-learning implementation. Therefore, demand for E-learning should be indirectly driven by technological innovation and academic changes.

E-learning demand might affect the way in which demand is met. When derivative demand for E-learning is built on the external stakeholder's resources, E-learning will be approached by top-down academic practices. The internal demand for E-learning, which comes directly from the desire of users, will be approached from the bottom-up. E-learning demand might go up or down during the process of E-learning implementation, as determined by institutional management, E-learning policy, individual risk and damage and integrative technology performance. Therefore, when institutional management supports and commits to the right E-learning policy, the technical challenges for E-learning users will be eliminated; the technical problems will be solved quickly with appropriate E-learning technology. In case of insufficient support from institutions and management, a sharing culture, as the driving force for E-learning implementation, can overcome institutional challenges and technical difficulties. E-learning is likely to become accepted and to attract more participants when their adoption is safe and recognized.

In this framework, the desire for E-learning paved the way for the implementation of an E-learning environment to offer services to users; as illustrated in Figure 7-12. The appearance of E-learning need was originated by the desire for E-leaning, which in turn emerged from the pressures and conditions of its context. In this situation, desire for E-learning will be the foundation for the actual need for E-learning, demanding improved teaching and learning

performance, called E-learning demand. E-learning demand will be driven by external sources or internal resources. In this study, the internal source is the local culture, while the external resource is provided by partners. If the E-learning demand of users has not been satisfied and the system has many technical difficulties and organizational challenges, users will keep choosing adoption, driven by the sharing culture. The derivative E-learning demand built on availability of resources, which stems from external stakeholders, is driven by external sources. When the funded projects come to an end this E-learning demand will disappear, then the ongoing implementation slows down or stops entirely. Findings from the cases suggest that, if E-learning demand is driven by internal need, then it will be sustainably implemented.

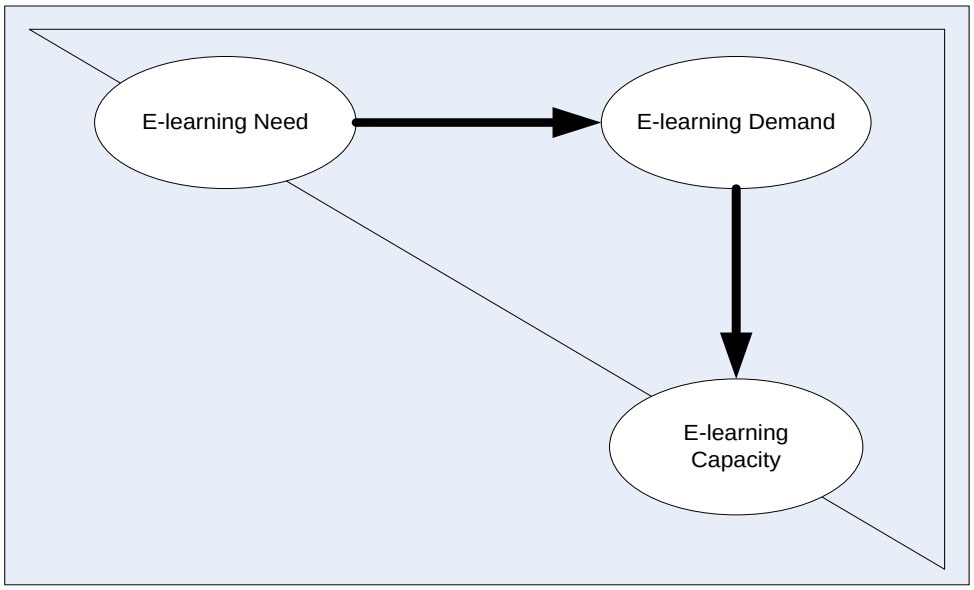

Figure 7-12: Demand-driven impetus

7.5.3 Supply configuration

In responding to educational technology innovation and change, technological competency is identified as the most successful factor for innovation success (Ritter and Gemünden, 2004). Managerial competency, particularly leadership, is identified as a significant motivation, as is support innovation in several ways, including vision, autonomy, encouragement, recognition, and challenge (Gumusluoglu and Ilsev, 2009; Jung et al. 2003). In the context of information technology, managerial competency enables an educational institution to understand and appreciate the needs of users; to work effectively across functions; to coordinate IT activities in ways that support users; to anticipate future IT needs of users; and to manage risks associated with IT investment (Mata et al., 1995). Managerial competency of IT facilitates in an institution builds and invests in information technology in the pursuit of a business

strategy (Bassellier et al. 2001). On the other hand, IT competency is a crucial enabler for E-learning capacity in responding to the needs for an E-learning service. Driving E-learning competency allows E-learning capacity to meet with E-learning in providing quality and performance of the E-learning platform, and an effective E-learning policy which protects adopters. For example, E-learning competency allows an institution to design and set up an effective procedure for operating and streamlining all academic and daily work. A bureaucratized procedure normally leads to poor management and less effectiveness in all operations and performance. Successful E-learning implementation relies on participation and adoption by students and lecturers. These groups are sensitively affected by operating procedures and policies associated with their work and adoption.

To meet E-learning demands, E-learning capacity is built by institutional competency. To do this, an institution must be able to understand, deploy and implement an E-learning system aimed at improving academic performance. Therefore, E-learning demand will be met by E-learning capacity, depending on how the institutional resources, skills and knowledge are mobilized in the process of implementation. Building E-learning capacity for an institution requires coordinating and collaborating across the institution in the transformation process; developing services and improving operational responses to challenges; dealing with difficulties from new teaching and learning environments; as well as identifying drivers and constraints from the environment and context. In other words, E-learning competency will be a foundation for building capacity to meet E-learning demand within an institution, as depicted in Figure 7-13.

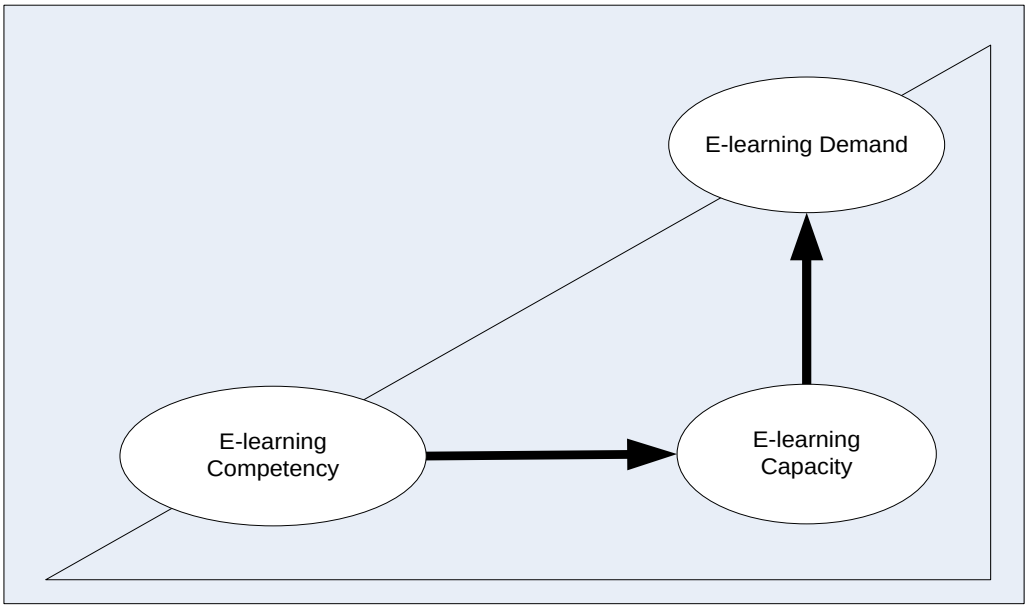

Figure 7-13: Supply- driven impetus

7.5.4 Equilibrium configuration: sustainability of E-learning implementation

From an economic perspective, market equilibrium is a situation where the market price has reached a specific level at which quantity supplied equals quantity demanded. A surplus or shortage is a situation where, at the current price, quantity supplied exceeds quantity demanded or quantity demand exceeds quantity supplied, respectively (Mankiw, 2011). In light of this point, the framework addresses how the equilibrium of E-learning implementation is reached when E-learning demand is met by the E-learning capacity of an institution. E-learning calls for reform and change in teaching and learning will be responded to by E-learning capacity. The long term continuity of implementation will be achieved by satisfying E-learning through institutional policy, technical platforms, operation and management, staff training and pedagogical approaches. It is noticed that the framework will act in its context, where the influential factors can facilitate and inhibit the process of E-learning implementation. Therefore, this framework is not generalized for the overall context of E-learning implementation but is derived from specific contexts bounded by this study only.

During the process of implementation, the technical problems of an E-learning system were the most noticeable concern of users. Findings from the cases indicate that the degree of technical difficulty depended on how far the E-learning system was integrated into the existing technological infrastructure. Depending on the E-learning approach, risk and damage, as well as future needs of E-learning, influenced the success or failure of E-learning implementation at these institutions. In other words, the issues which appeared during the implementation phase in turn determined whether the demands for E-learning had been satisfied or not. Findings from the cases suggest that the coordination and collaboration across functions within the organizational structure had the most important role in solving the problems of separated and isolated technology, service and operation. For teaching and learning in new technology environments, users need improved support services, or even new ones for educational needs. For example, training and professional development in the case of CTU really helps to maintain the use of the system after funding for the project has ended. The system, in the case of UD, would have had more adopters if pedagogical and technical training had been provided. Findings from the study suggest that the organizational and managerial competencies and technological solutions, when convergent, could enable E-learning capacity to respond to E-learning demand. This allows an institution to carry out the transformational process to match demand for E-learning during the implementation phase.

The status of E-learning at post-implementation phase illustrates that E-learning adoption and acceptance might completely stop, partly continue or be continuously used in different contextual settings. These different statuses are relevant to the concepts of market surplus, shortage and equilibrium, respectively. Therefore, the law of demand and supply might be applied to understanding the outcome of E-learning implementation in this context. On one side, without an actual need for E-learning, which aims at changing and reforming academic activity, E-learning services might be provided as an extra academic service available for use. However, the available E-learning system might not be interested in investing the user's resources, such as time, skill and knowledge, into use of technology. Even when regulatory policies of institutions are used to force adoption, it cannot survive in sophisticated environments, where new pedagogy is integrated with technology. As a result, like the market surplus, there are plenty of services and products supplied to the market but users do not want to consume them. On the other side, E-learning capacity driven by poor E-learning competency will fail to provide an adequate E-learning service for adoption of complex organizational technology. In this circumstance, E-learning might be adopted but the power of technological innovation and institutional performance would not be optimal. This situation is relevant to market shortage where the users want to consume more qualified services and products but suppliers are not able to provide the required goods and services to meet customer needs.

The framework of sustainability of E-learning implementation suggests that the continuity of E-learning implementation within an institution will exist, depending on two impetuses: (1) The desire for E-learning, driven by individual and institutional needs, the innovation culture and the need for improvement; and (2) That E-learning competency is based on the willingness to satisfy E-learning demand. Although the findings of this study support Zmud's (1984) conclusion that the E-learning need-pull approach had higher probabilities of success than technology-push ones, nevertheless, the framework of sustainable E-learning implementation posited by Drury and Farhoodmand (1998) is also important. They concluded that, whereas technological-push requires the adopter to fit the technology to the organization, demand-pull requires the technology to fit the adopter.

7.6 Chapter conclusion

This chapter presented findings from cross-case analysis of three studied cases. The similarities and differences across the cases were highlighted by comparing major themes that emerged from each case analysis. From a factor perspective, factors from contextual settings

that impacted on E-learning implementation were identified in three areas: organization, technology, and teaching and learning. From a process perspective, how influential factors and implementation contexts interplayed to shape the process of E-learning implementation has been presented. The overall findings show that there are many similarities in the drivers and constraints of E-learning implementation in Vietnamese universities. It appears that E-learning is a means of organizational politics and is connected with the institutional responsibilities to governmental agencies and donors rather than the real mission and strategic development of these universities. The commitment and responsibility to governmental funds and donors appears to be one of the main factors driving E-learning implementation in the universities.

E-learning implementation has been strongly influenced by local culture. In all three universities, the local culture either enabled or hindered the implementation of E-learning. The local culture may shelter an innovative idea and protect adoption or resistance, depending on the organizational context and condition. E-learning requires an integration to the existing infrastructure, both hardware and software. However, cross-functional management and IT governance are likely to prevent this capacity. In addition, the integration of E-learning also needs cooperation and collaboration from academic units not only to the technical unit, but also from other support departments within the whole system. The findings of this study suggest that this condition was absent from the contextual settings at the three Vietnamese universities, and will therefore be a barrier to implementing an IT project in general, and E-learning particularly.

The framework of E-learning implementation indicates that sustainable implementation of E-learning emphasises the actual needs for E-learning which come from internal demand for changes and improvement in the era of information technology in education, rather than from external demand for E-learning. In other words, the continuance of E-learning implementation entirely depends on an institutional capacity to respond to the need for integrating ICT into education. In light of this point, E-learning capacity has an important role in building the E-leaning capacity to meet the needs of users.

Chapter 8 – Discussion

8.1 Introduction

This chapter will discuss the integrated view of E-learning implementation from different perspectives, namely factor and process, outlined in this study, relating to E-learning implementation at three universities in the Vietnamese higher education sector. After reviewing the research questions and objectives, a summary of the findings will be presented to illustrate how they have satisfied the research aims and objectives. Secondly, the influential factors identified were discussed and the process of E-learning implementation highlighted at each stage of the process. Fourthly, the following section discusses the findings of the drivers and constraints to E-learning implementation. Fifthly, the sustainable implementation framework will be discussed in relating to relevant literature. Finally, a conclusion is provided.

8.2 Summary of findings

As mentioned in the introduction, this research is designed to answer the research question regarding how E-learning has been implemented at Vietnamese universities, aiming to understand E-learning implementation within the Vietnamese higher education context in depth. In order to answer the research questions, this study addressed the following research objectives:

- To identify factors impacting on E-learning implementation in the context of Vietnamese universities.
- To investigate the nature of E-learning implementation processes at those universities.
- To identify what the drivers and constraints of E-learning implementation at these Vietnamese universities were.
- To develop a conceptual framework of implementation to describe and explain how E-learning took place through the interplay and interaction among factors, incorporated into a sequenced stage process of implementation based on a configuration approach.

The research process was also supported by conducting a pilot study in an early stage of the research and reviewing the literature related to information system/information technology

implementation in general and E-learning implementation in particular. By reviewing a considerable number of previous studies, it has become obvious that previous research has not given enough attention to investigating E-learning implementation in depth, particularly on the post-implementation stage of sequenced stage process. In addition, a review of literature revealed that research on E-learning was conducted and taken into account in individual contextual settings. From a managerial perspective, this study was designed to focus on these issues of E-learning implementation by adopting qualitative case study research, applying thematic analysis network to analysis and using the configuration to interpret the data.

From a factor perspective of implementation, the study found that managerial settings; capacity and working environment; IT governance; academic changes and challenges; ICT strategy and capacity; ICT policy and management; and teaching and learning methods (See Section 7.2) were factors of the organizational, technological and pedagogical context that impacted on E-learning implementation and adoption at these universities studied. From an implementation process perspective, the E-learning implementation process impacted by these contextual settings achieved different levels of success. There were nine problematic issues associated with the sequential stage process of implementation, including resource and scope; the learning management system; involvement and commitment; motivation of adoption; operation and management; budget allocation & investment; technological problems; attitudes and behaviour; and challenges and future directions (See Section 7.3). As a result, the E-learning implementation and adoption has been continuous in one case (Case of UD) while the E-learning adoption at the others seems to be neglected and completely stopped (Case of CTU and HU, respectively). By incorporating the contextual factors with problematic issues of the sequenced stage of E-learning implementation process, this study identified and indicated that there are seven drivers and constraints which facilitate and inhibit E-learning implementation and adoption for particular purposes in the context of Vietnamese higher education (See section 7.4). For instance, the study found that resources, technology and local culture played dual roles in the implementation and adoption of E-learning. Features of the integration of technology, management involvement and commitment, and professional training and development, were key factors for facilitating E-learning implementation at the implementation stage of the sequenced stage process. On the other hand, the isolation of technological platforms, the lack of management commitment and support, and complex organizational structures, were key factors against E-learning implementation and adoption in the universities. In addition, public attitude and awareness

towards E-learning creditability and the concept of E-learning strongly impacted on the policy of E-learning implementation and the use of E-learning for academic purposes. One of the surprising findings of the study was that the unconventional thinking of E-learning shaped the way in which E-learning was implemented to respond to the perceived concept. Therefore some considerations of the individual contextual settings were carefully made, although the universities have the same status, regulations and policies in the Vietnamese higher education sector. Thus, the conceptual framework of E-learning implementation in the context of Vietnam higher education is a result of the influence of a number of contextual factors configured to features of the implementation process which is linked to E-learning need, E-learning demand, E-learning capacity and E-learning competency (Section 7.5).

The discussion of the findings of the study is presented in the following sections in relation to the research objectives.

8.3 Influential factors of context on E-learning implementation

The first objective concerned the influential factors from the contextual settings that influenced E-learning implementation at Vietnamese universities. The contextual factors influencing E-learning implementation have many similarities across the three cases and three categories of influential factors were developed. These were factors related to organization, technology and teaching and learning contexts.

8.3.1 Organizational context

The findings revealed that the managerial settings, capacity and working environment, IT governance, academic changes and challenges impacted significantly on E-learning implementation, especially in the implementation stage in the sequenced process of implementation. Many studies concluded that institutional and organizational settings, such as structure, working conditions, culture and governance, are crucial to the way e-learning is implemented and adopted in universities (McPherson & Nunes, 2006; Romiszowski, 2004; Nathan, 2011 and Liu et al., 2012). For instance, McPherson & Nunes (2006) point out that the organizational structure and its settings strongly influence E-learning implementation and adoption within educational institutions by imposing administrative procedures and allocating resources. These propositions are consistent with the findings of this study, as it was clear that the existing complex organisational structures and the charter of the regional university limited E-learning implementation and adoption within these institutions. In this structure, academic and educational settings were imposed by bureaucratic procedures and

administrative relations, which in turn affected E-learning implementation. Unfortunately, the bureaucratic procedures and weak relations across functional departments bounded by rigid controls in this structure usually took time to respond to needs for implementation and there was poor communication across the organization. Therefore, this structure and its settings frustrated adopters and innovators.

The organizational structure determined a mechanism of governing, controlling and incorporating E-learning into the universities' strategic objectives and implementation policies to provide adequate institutional support and available resources to implement a successful E-learning environment. However, depending on the type of use of E-learning, size, location and culture, an educational institution will organize its support services and networks to address the needs for implementation. In light of this point, a centralized governance of IT allows straightforwardly to combine centrally administered and other functional departments offering appropriate technical infrastructure, training, curriculum, course development and support resources across the entire educational institution (Pirani, 2004). Findings of this study indicate that, where the centralized governance of IT within an institution was applied, the E-learning support services and network were formally in the charge of the IT department. E-learning implementation was facilitated when the needs of users for technical and pedagogical support services were quickly responded to and provided. In contrast with centralized governance of IT, it was also clear that, where IT governance was decentralized, the needs for support for E-learning implementation were not met. There were no formal units responsible for providing support services mentioned and existed while participants in the study complained about technical problems and said they were frustrated about the quality of the E-learning system and the network. Being either centralized or decentralized in IT governance results in reliability and scalability of the IT infrastructure, which the E-learning system is built on. The study found that technical and technological problems were the major complaints; end-users stopped using E-learning due to technical problems.

In addition, the number of students enrolled led to a competition over resources, and working environments which prevented E-learning adoption at both personal and institutional levels. Hayden and Thiep (2007) indicate that the student/staff ratio of 1:30 in the Vietnamese higher education system at this time was considered to be too high, leading to disputes over resources between institutions and teaching staff. The study by Tawar and Koko (1996) found that increasing student enrolments created serious problems in staffing, equipment,

infrastructure, finance and management. It was not surprising that the findings in this study indicated that E-learning was not noticed to allocate appropriate resources at the organizational and personal levels for implementation when its role is still questionable. In this situation, lack of monetary resources and lack of time were the main challenge to web-based teaching implementation (Löfström and Nevgi, 2007).

Moreover, implementing and adopting E-learning required a relevant change to the traditional pedagogical approach which was involved in changes of university management (McPherson & Nunes, 2006). However, the findings in this study indicated that university management, along with other organizational settings, were not created and aligned with necessary changes in the academic environment to support E-learning implementation and adoption. In the open space of the IT world, there are no limitations or boundary to preventing access and evaluating the quality of services which an institution provides to customers. E-learning creates opportunities and allows stakeholders to monitor the quality of training provided by not only educational institutions but also faculty members. Teaching and learning in E-learning environments nowadays relates to day-to-day interactions and collaborations among users. Therefore, a large amount of private information will be exchanged and transmitted that may reveal reputations, quality and personal identification (Anwar and Greer, 2006). Therefore, it is understandable that only low quality training and academic services will be at risk in this situation, and have reasons to worry about their concealed weakness. Therefore, in such unfavourable conditions E-learning implementation and adoption were actually not encouraged in practices. Findings in this study showed that there were many shortcomings in the academic environment in Vietnamese higher education in the transitional period, both in organizational and personal aspects. The result of this finding, as pointed out in previous research (Mihhailova, 2006), was anxiety about the quality of teaching in online environments in E-learning implementation and adoption in higher education.

8.3.2 Technological context

The study identified two factors influencing E-learning implementation: ICT strategy and capacity, and ICT policy and management. IT governance refers to the process and structure in which IT investment by the organization is deployed in appropriate activities to achieve desired results. IT governance defines the principles of IT strategy and its relationship to organisational strategy, IT architecture, IT infrastructure policy and applications (Sharma et al, 2009). Findings in this study indicate that, in the decentralized governance of IT, the fragmented and inadequate strategic development and investment on ICT led to the

infrastructure's lacks of connectivity, compatibility, and modularity (Byrd and Turner, 2000). Furthermore, it was clear that the physical-oriented mindset can cause narrowing, unimaginative and inflexible aspects of software applications for managing academic and administrative work within institutions. In this context of E-learning implementation, the E-learning system, built on this infrastructure, was difficult to integrate with existing ICT applications and IT resources on campus. It is not surprising that the operation of the E-learning system is unreliable. Khan (2005) pointed out that E-learning environments should be built on the institution's digital infrastructure that should have reliable and efficient networks and competent technical staff to support e-learning. Because it is inevitable that the user of E-learning may face unexpected problems associated with networks, the institutional technology requires strategically designed, planned, maintained and staffed facilities. When the system created more trouble for adopters, technological innovation and adoption failed and was postponed, as mentioned by participants, in the case of HU and UD. In contrast with the decentralized governance of IT as two regional universities, CTU's centralized governance of IT allowed it to build open technology and integrative ability. The user's complaints about technical issues and the technology network were eliminated when using the E-learning system at CTU, as compared with HU and UD. It was clear that these features of the digital infrastructure allowed E-learning to be consistently available, scalable and reliable. As noticed by Khan (2005), successful E-learning implementation requires an architecture that depends on open, published standards, reusability of components, serviceability, and maintainability.

8.3.3 Teaching and learning context

Consideration of the teaching and learning context identified that learning motivation, academic transition and one-way teaching methods were the most significant factors influencing how E-learning was adopted and used. To secure a place at a Vietnamese university, all students had to take a national entrance exam, in which about 10% of students are selected for a place in a higher educational institution (Hayden and Thiep, 2007). However, it is interesting to note that, in all three cases of this study, the students' motivation for learning was not as high as expected. From a self-regulation perspective on student learning motivation, Pintrich (2004) pointed out that students' motivation was influenced by not only cognitive, but also affective and social factors. In the Vietnamese context, the motivational and affective factors, as well as socio-economic contexts, entirely had not driven students to learn, at the time of the study. The under-developed labour market could not

satisfy the demand for, and supply of, highly qualified human resources for modern sectors of the Vietnamese economy, as well as for higher education itself. As a result, it does not create enough motivation for knowledge and skills acquisition in Vietnamese higher education institutions. A mainly one-way teaching method is used in higher education institutions, where lecturers give talks and students take notes to learn material by heart. Regardless of poor teaching facilities and deficits in staff knowledge and skills about new teaching methodologies, the traditional teaching and learning culture, dominated by Confucianism, in which passive learning and listening dominate, and still remains unchanged in colleges and universities (Nghi, 2010). In addition, McCormac (2007, 2012) pointed out that corruption and bribes have been common in the higher education system, so that cheating and plagiarism have entirely destroyed students' motivation for learning. These unfavourable conditions of the labour market, of learning and teaching styles, and the levels of corruption, do not encourage and motivate colleges and university students to work hard. Furthermore, the principles of modern learning theory, which has important role in motivating learning and teaching, were mainly neglected in academic environment. There was no room for promoting, encouraging and motivating student learners to engage actively in the learning process; build their own knowledge and skill; collaborate and co-operate with others; and interact with the instructor.

In conclusion, contextual settings have significantly influenced E-learning practices within Vietnamese universities. The organisational context was not aligned with changes required to support implementation when introducing E-learning as a new teaching and learning approach. The technological context did not provide the necessary conditions to build ICT infrastructure and management upon which the E-learning system was built. Finally, student assessment, teaching methods and transparency must be improved in order to motivate student learning at Vietnamese universities and colleges.

8.4 Nature of E-learning implementation process

The second objective concerned the nature of E-learning implementation processes among universities in Vietnamese higher education. The findings of the study highlighted features of E-learning implementation in the sequenced three stage process: pre-implementation, implementation and post-implementation. This process was carried out under the influence of the contextual settings, given that they could shape the nature of the process of E-learning implementation.

8.4.1 Pre-implementation

Findings from the study highlighted how initial activities of E-learning stemmed from the available resources, supported by external funding and local cultures associated with top-down and bottom-up implementation, respectively. At all institutions, E-learning implementation was undertaken without extra investment by utilizing the existing infrastructure. This implied that E-learning implementation at these institutions were not seriously considered at the top management level because of a lack of vision and strategy for E-learning and a lack of awareness of complex systems in which E-learning will take place (Alexander, 2001). In his study, Pham (2007) points out that the adoption of open source software (OSS) to build the E-learning system is a major trend in Vietnamese universities. This was an appropriate decision because it could save institutional budgets and avoid risks, compared to using standard commercial proprietary software (Erlich and Aviv, 2009). Actually, these institutions have utilized the experiences gained by IT staff from OSS to build the E-learning system, when there was no limitation of practice and learning. While E-learning software propriety is dominated by some vendors it is obviously that they are not affordable for Vietnamese universities (Lakhan and Jhunjhunwala, 2008). In the context of developing countries, such as Vietnam, where the limitations of budget, institutional tensions regarding resource allocation and already overburdened finance already existed, the OSS of E-learning platform emerged as a viable solution. In other words, regardless of the reason for the decision, the technological-emphasized and resource-utilized approach to E-learning initiatives could not achieve potential learning and teaching outcomes of E-learning or build on the promising results of E-learning initiatives.

8.4.2 Implementation stage

The findings from the study in the implementation stage points to several problematic issues arising during this stage. In all, five were identified in this study (see Section 7.3.2). They were grouped into commitment and management support; motivation for adoption; operation; limitation of resources; and technological problems, all of which significantly influenced E-learning practice in the implementation stage. The following sections will discuss this in more details.

8.4.2.1 Involvement and commitment

Many studies of IT implementation in the context of higher education point out that (Basu et al, 2002; Ismail et. al, 2007) participation and involvement from top management is crucial

for successful implementation through devoting more time, effort and resources to implementing successfully information technology within an organization. Findings of this study from this implementation stage clearly illustrate that strong participation and involvement from top management to implementation were critical points for attracting users to accept and adopt E-learning. In the cases where E-learning users faced technical problems, complex operations, and low motivation, top managers were not really interested in, and disregarded, E-learning practices. Management involvement and participation in E-learning can create a favourable environment in which E-learning can receive adequate resources, just-in-time interventions, appropriate incentives and inspiration (Sife et al, 2007). Unfortunately, although institutional communication always emphasizes the strategic role of ICT, E-learning was not the primary concern of top management. There is a large distance between speech and practice, E-learning is still not embedded in institutional strategy and policy. As a result, E-learning at these institutions was not appropriately invested in or allocated a budget for the operation. Although the limitation of institutional resources could be the reason that E-learning was not allocated an operational budget, it is certainly essential to ensure an adequate funding provision for infrastructure and support staff for any e-learning program if an institution wants to succeed in implementing E-learning (Bates, 2008).

8.4.2.2 Motivation of adoption

Reviewing the literature revealed that, in implementing and adopting E-learning, motivation could be categorized into extrinsic and intrinsic motivation (Bhuasiri et al, 2012). Intrinsic motivation refers to a personal "activity for its inherent satisfactions rather than for some separable consequence" while extrinsic motivation "refers to doing an activity simply for the enjoyment of the activity itself, rather than its instrumental value" (Ryan and Deci, 2000). In their study, Bhuasiri et al, (2012) argue that motivation to E-learning is influenced by individual attitude and expectations; setting challenging goals; perceived enjoyment; perceived usefulness; clear direction; reward and recognition; punishment/regulation; and social pressure and competition. In another study, Birch and Burnett (2009) suggested that driving or inhibiting E-learning implementation and adoption can be influenced by institutional, individual and pedagogical motivations.

Intrinsic and extrinsic motivation could be facilitated to E-learning adoption in the specific context of one case they could be inhibited to E-learning implementation and adoption in others. The result of this study, for example, indicates that E-learning adopters considered the benefits of E-learning to students and themselves as a motivation for using E-learning, while

resistors thought that E-learning did not bring any benefit to student, and even learning performance was not creditable. Moreover, non-adopters claimed that they lacked institutional support and other conditions, such as time, while adopters emphasised that, because their time was limited by an overload of teaching, they had to use E-learning in order to cover academic and institutional workload. The use and adoption of E-learning in this study also showed that the users were motivated and influenced by financial reward policy and recognition by institution. When the extrinsic motivation ended, their adoption and use of E-learning was postponed, even completely stopped. From a learner perspective, students were not equipped with sufficient computer skills, internet knowledge and learning skills from the lower grades because ICT had not been integrated into education. Therefore, Vietnamese students are unfamiliar with the functions of E-learning technology and not aware of benefits from E-learning activities. They were not actively involved in online learning because their intrinsic motivation for E-learning was low (Long et al, 2013)

8.4.2.3 E-learning operation and management

Findings in the study showed that the E-leaning concept and its approach to implementation were differently understood and applied. A profit-oriented approach to implementation and E-learning as a sub-system of school management software radically determined the way in which E-learning was operated and managed. E-learning had to be a self-funded project in the context of a public university, which is very rare where all academic and administrative activities were funded by state budget. When E-learning was treated as a sub-system of management software platforms, E-learning implementation almost neglected other aspects of instructional technology. Without an appropriate operative budget allocated independently by institutions, utilizing the existing infrastructure, staff skills and knowledge could enable the setting up of an E-learning system and introduce this service to lecturers and students. With such thinking, the management and operation of E-learning were understandably in charge of technological and technical people and departments at all cases. However, E-learning implementation involves a sophisticated system; it is much more than technology. Therefore, it is not surprising that E-learning initiatives in Vietnam were controlled by technically sophisticated staff and the IT department. Unfortunately, successfully installing and technically operating E-learning software is one thing, a successful implementation of E-learning is another matter. E-learning requires much more equivalent effort from senior managers, staff, lecturers, and students to be successful (Lytras and Pouloudi, 2001).

8.4.2.4 Budget allocation and investment

Moving beyond the initial stage of E-learning implementation to the implementation stage, an institution should strategically plan infrastructure, budget, staffing, and policy planning. Findings in this study indicate that budget and investment for E-learning implementation were very limited, which significantly influenced courses and content development, training and staffing for E-learning. It is noticed that it is also very difficult to locate literature which intensively focus on the issues of budget and investment in E-learning. Reviewing literature showed that research in this field has not paid much attention to financial aspects of E-learning, especially regarding how the E-learning budget is planned and allocated at an organizational level. Instead of budget and allocation, researchers were interested in aspects of cost, profit and funding of E-learning, both blended and distance learning (Ruth, 2006). Ruth (2006) stated that educational institutions "will have to weigh the trade-off and make E-learning decisions according to its own culture, finance and goals".

A few studies confirmed that the budget and funding for E-learning were essential factors to facilitating or hindering E-learning adoption and use, as well as the quality of E-learning within an organization (Holt et al, 2013; Koohan and Harman, 2005). For instance, Holt et al (2013) found there was a big gap between an E-learning vision/strategy and budgeting and between planning and budgeting. They pointed out that an insufficient budget for E-learning will cause quality problems in infrastructure, training, course development and support, which in turn impacts on the implementation and use of E-learning. In their study, Koohan and Harman (2005) indicate that the successful E-learning implementation depends on allocating and securing budget for E-learning open source platforms.

8.4.2.5 Technological problems

A review of literature revealed that technological issues associated with E-learning implementation were widely reported. Technological and technical problems in the implementation and use of E-learning can be categorized into institutional infrastructure, E-learning software and platform. In their study, Sun et al, (2008) pointed out that an improper technology with slow response time or frequent technical difficulties will significantly impact on the use of E-learning. Many studies in this field have found that technical and technological E-learning are among the most important factors impacting on the quality of the E-learning environment, which in turn influences implementation and user's satisfaction with E-learning (Lee and Lee, 2008; Song et al, 2004). More specifically, associated with the

E-learning software platform, Burgess (2003) also found that logging and submitting documents on the E-learning system were a major technical problem in implementation.

It is noticed that conflicting results regarding technical and technological aspects of E-learning implementation and adoption have been reported. Researchers in the 90s and before 2005 mostly concluded that technical and technological issues caused obstacles to E-learning adoption. However, in the current study, researchers found that technical and technological issues were not considered to be serious problems in E-learning (Mahdizadeh et al, 2008). It is apparent that, for a long time, the development of E-learning technology has involved mature and reliable infrastructure so that problems reported could be solved by technological advances in software engineering and networking. E-learning research in developed countries now should be far more advanced than developing countries. In the context of developing countries, many studies indicate that technical and technological issues, such as a lack of reliable networking, low bandwidth, internet access, unauthorized access and log on, have been the main obstacles to implementing E-learning (Vallis et al, 2012; Alkharang and Ghinea, 2013; Bakari et al, 2010). In other words, while the benefits of technological advances in educational technology have been exploited and achieved by institutions in the developed countries, most e-learning in developing countries is faced with technological and technical barriers in aiming for an improved quality of training. The findings in this study have been incorporated with the literature to confirm that technical and technological problems are critical factors influencing E-learning implementation in the context of developing countries like Vietnam.

8.4.3 Post-implementation

At the current status of E-learning implementation, user's attitudes toward E-learning implementation and adoption have radically deteriorated. This has led to the use of E-learning to support student learning within these institutions ceasing. Regarding users' attitudes to and behaviours around E-learning, previous studies have found that there was a strong relationship between both instructors' and learners' attitudes towards E-learning and their behaviours around adoption and use (Liaw et al, 2007; Panda and Mishra, 2007). In their study, Liaw et al. (2007) point out that an effective E-learning implementation "depends upon users having a positive attitude toward it". The more positive the attitude they have, the greater the behavioural intention to use it they will have.

The existing problem in E-learning is still unresolved, though the future of E-learning was oriented to distance learning as a solution for further development. Although this strategy implies generating revenue and potentially saving costs in providing training services compared to the traditional approach, the answer to cost effectiveness in research and teaching is still not clear (Bell and Federman, 2013; and Lam et al., 2011). Even though this strategy of E-learning leads learners to self-study, the actual cost of compensation and operation might not be lower than with a traditional approach to distance learning. In addition, in order to retain a student on the program, a shift from static learning to interactive learning is needed, which might involve the same cost as the current approach on this kind of program. Even though, in practice, universities have successfully applied mass production to online distance learning programs to generate revenue, this does not mean that the E-learning used to support teaching and learning on campus can achieve the same objective (Njenga and Fourie, 2010). In other words, both cost-effectiveness and a revenue-generated approach for further development mean that the future of E-learning is not clear. Therefore, although confirmation and determination of E-learning development existed for academic leaders, specific actions and a detailed agenda for E-learning implementation have not yet been put forward.

8.5 Drivers of and constraints to E-learning implementation

The third objective concerned the factors which drive and hinder E-learning implementation in Vietnamese universities. Despite favourable conditions for facilitating E-learning application, there are various challenges which put pressure on E-learning practices in education and training. The drivers and constraints on E-learning implementation identified in this study include the availability and limitation of resources; the local culture; E-learning recognition and policy; the organizational charter and structure; management commitment and support; professional development and training; and technological integration and isolation. A review of the literature indicated that there are various studies on E-learning related to drivers and constraints to implementation and adoption which sometimes conflict and overlap. Much of the literature supports the identification of these drivers and constraints to E-learning implementation. Table 8-1 below illustrates which previous selected studies support the findings of this study. In the case of drivers and constraints of E-learning implementation, the discussion must begin with the premise of problematic issues related to negative and positive impacts on E-learning implementation. Then the discussion focuses on E-learning practices in the education sector as a whole and in the higher education sector in

Vietnam specifically. The findings of this study regarding the drivers and constraints on E-learning implementation are outlined in detail in the following sections.

Table 8-1: Drivers of and constraints on E-learning in the literature

Relevant findings	Citation	Drivers & constraints	Independent variable	Dependent variable
Study found that E-learning infrastructure needs to be reliable, Ease of use, system functionality, system interactivity and system response is necessary to implement E-learning successfully. These requirements will be achieved as institutional technology is integrated and converges as pointed out in this study.	Bhuasiri et al. (2012)	Technological integration and isolation	User characteristics, institution and service quality, infrastructure and system quality, course quality and motivation	Success of E-learning implementation and acceptance
The study found that E-learning implementation had not reached its full potential due to lack of trust in E-learning; and that professional development and training was suggested as ways of facilitating E-learning implementation.	Elgort (2005)	Professional development and training	E-learning recognition	Potential of E-learning
The study revealed that barriers to the adoption of e-learning relate to fraud and cheating, uncertainties about the cost of e-learning, low-income and disadvantaged students which are supported to the findings of this study.	Bell & Federman (2013)	E-learning recognition and policy	learning outcomes; effective conditions and barriers to adoption	effectiveness of e-learning adoption
The study highlighted challenges in implementing ICT in which the new technologically-based pedagogy will conflict with the traditional eastern culture that needs time to change.	Zhang (2007);	Culture	Technological use and pedagogical changes	Pedagogical culture
Interactions of E-learning benefit and difficulties in implementing E-learning led to challenges in adapting the educational paradigm of constructivism in the context of the Confucian-dominated culture as Vietnam.	Wang (2010)		Benefits and difficulties of E-learning	Transformation of pedagogical paradigm in the context of traditional eastern culture
It was found that trust in people or technology along with collaboration across organizational boundaries, significantly enables or inhibits E-learning development and organizational transformation.	Mason & Lefrere (2003)	Organizational structure	Trust and collaboration	Organisational transformation and development of E-learning
The study confirmed that senior management involvement have achieved the implementation of strategic information systems planning.	Basu et al. (2002)	Management support	Strategic information systems planning.	Organizational commitment, management involvement, and team involvement

8.5.1.1 Availability and limitation of resources

Jones and O'Shea (2004) point out that E-learning implementation and adoption need significant investment in digital infrastructure and resources, and staff training and development.

The specific investment required includes "developments costs to design and build a learning environment and actual courses as well as hardware and software costs to allow users to access the learning environment or training" (Admiraal and Lockhorst, 2009). The findings from the previous literature on E-learning in the context of developing countries like Vietnam has confirmed that limited budgets and funds were the major obstacles to integrating ICT within education, especially for implementing and adopting E-learning in education at all grades. The lack of financial capacity has created an ineffective technological infrastructure, and ineffective staff training and development, which significantly facilitates and diffuses E-learning in the institution, if disseminated properly. Over the decades, prior to this research, Vietnamese universities were reformed, so that educational institutions became more autonomous in many aspects, such as personnel, strategy and finance (Ca and Hung, 2011). However, they were not yet businesses; the financial aspect, in particular, has been strictly controlled by the government. Except for two Vietnamese national universities, all universities have followed the compulsory ceiling policy of fees and exemptions, which have been set very low, meaning that the university cannot survive without state funding. On the one hand, every university is very strict in their spending, as well as investment; on the other, the number of students admitted must be as high as possible in order to increase its budget. Cobbe (2007) pointed out that Vietnamese higher educational institutions are free in relation to non-regular programs, "for all of which they keep all or most of the fees which are important sources of income for academic staff". As a result, operational budgets and institutional resource planning are argued over, as well as the high ratio of students to lecturers.

In this context, the two types of resources which are mobilized in implementing E-learning, namely the institutional and individual resources, do not facilitate E-learning implementation. Individually, the use of E-learning requires an investment of personal time to use new technology and overcome unfamiliarity, which might be outside the users' experience and knowledge. Even though the number of students in Vietnamese higher educational institutions is relatively high, compared to the number of teaching staff, student enrolment is dramatically increasing. Therefore, the teaching staff do not have sufficient time for learning

activities (Ca and Hung, 2011). Even if E-learning is adopted, support and teaching staff will have less time for supporting and interacting with students on the system. Institutionally, the scarcity of resources requires a strategic priority for allocating resources. Thus the benefits and opportunity costs of investing in E-learning will be in competition with other investments. E-learning has to indicate a significant return on investment to compete for resources which otherwise may be allocated to other activities. While the cost of E-learning and the return on that investment have not been clearly defined yet in E-learning practices and literature, E-learning, after the implementation stage, will remain suspended. In this situation, it is apparent that external resources and funding will be a major source of investment for developing ICT within Vietnamese higher education. However, all funded projects always have the same end point; E-learning implementation cannot depend entirely on external source to be continuous.

8.5.1.2 Local culture

E-learning implementation in developing countries like Vietnam could be viewed as a technological innovation in the context of education. Elgort (2005) suggested a multi-dimensional approach, in which E-learning innovation could be viewed as a technological and pedagogical innovation. Since E-learning adoption in higher education in developed countries has a decade to mature, it is likely that the adoption of e-learning has moved into teaching and learning innovation. However, less developed countries like Vietnam are left behind, and it appears that both individual and institutional adoption of E-learning is usually related to technological rather than teaching and learning innovation.

The study of the relationship between institutional policies, organisational culture and e-learning use by Czerniewicz and Brown (2009) confirms that there is a strong relationship between policy and use of E-learning in which organisational culture is a critical factor to policy mediation for integrating e-learning into educational institution. As Roger (2003) said, early diffusion of technology is always based on a few innovators. Although equal with other departments, E-learning is used by adopting departments, proving that they can overcome technical and organizational challenges without investment and support from the institution. It is remarkable that, although abuse of technology can be recognized in some academic departments, a positive signal from these departments indicates that, when the right policy and investment does not appear, the innovative culture will be an important factor in facilitating the continuance of E-learning implementation. Within the context of E-learning adoption and implementation, E-learning implementation can stop “if it is not integrated into

the current culture" (Black et al, 2007). In the light of this point, when the limitation of resources and technological difficulties appear as barriers to the implementation of E-learning, innovation culture, when compatible with E-learning technological innovation, can foster technological adoption. In addition, the dual role of the cultural factor as driving and constraining E-learning implementation was also confirmed from the literature. In the study by Erumban and De Jong (2006), it was found that technological adoption is significantly impacted by cultural factors. They point out that, in some counties, cultural factors can "act as a barrier to ICT adoption". In particular,, in the collective and high uncertainty avoidance culture like Vietnam, they stated that "people willing to conform to the norms of the group" and "the implementation of a new technology might go more smoothly when the uncertainty around the product and the uncertainty concerning the implementation process are lowered."

8.5.1.3 E-learning recognition and policy

In the context of Vietnamese higher education, the Ministry of Education and Training (MOET) control and determine several aspects of the institution, such as enrolment quotas; curriculum structure and academic disciplines; and budgets and financial management. Despite reforming the sector in recent years, a strong culture of centralism in decision-making, which controls higher educational institutions in Vietnam, still exists (Hayden and Thiep, 2007). Most universities and colleges have to report directly to MOET and follow its regulations and policies. Despite calling for a renovation of Vietnamese education, the autonomy of educational institutions has not improved. One the one hand, MOET has not released its control and administration to the education sector. On the other hand, educational institutions have not been ready for autonomy. In the context of ICT implementation, an education institution, when implementing E-learning, should have a strategic plan for how the E-learning system will meet its objectives over the long-term (Black et al. 2008). Curran (2004) suggested that an institutional e-learning strategy may reflect institutional ethos. It is clear that Vietnamese educational institutions are not capable of independence in strategic planning and policy related to E-learning implementation.

In MOET's Directive 55 on Promoting Teaching, Training and Applying ICT in Education - 2008-2012, MOET emphasize that ICT has an important role in the renovation of Vietnamese higher education by encouraging the application of ICT to improve the quality of training and administration. However, as observed by Peeraer and Petegem (2012), there is a major gap between policy and implementation in practice. Despite high expectations of the role of ICT, the policy guidelines on ICT implementation were addressed very generally and were too

weak to spell out exactly how the integration of ICT in education should be instituted (Peeraer and Petegem, 2012). In the context of E-learning, MOET has not responded to the needs for E-learning and implementation in practice within the university context yet.

Moreover, studying the transformative potential of E-learning in the context of the challenges facing higher education, Garrison and Kanuka (2004) concluded that E-learning is consistent with the values of traditional higher education institutions. Vietnamese culture is dominated by the values of Confucianism, in which there remains a strong hierarchy in social relationships, which contrasts to the values of western culture (Nghi, 2010). This culture only emphasises examinations and appreciates passively-internalized direction and guidance in teaching and learning. Meanwhile, E-learning, as an advanced development of technology, has transferred constructional pedagogy from western culture to Vietnam. However, it is likely that students, lecturers, educational administrators and policy-makers need time to adapt to changes in educational philosophy. As a result, face-to-face teaching and learning in the classroom respects entirely the whole educational system.

Politically, Vietnam is a one party nation where "there is a strong network of party cells in workplaces, and administrative divisions at all levels, which are responsible for disseminating and applying communist party policy" (George, 2010). Without direction from MOET related to E-learning, the use of E-learning within academic training may be treated as an unofficial approach. Vietnamese universities are supposed to develop and implement E-learning and embed it into academic policy but they are not allowed to use E-learning to assess students' academic performances. This cultural tradition, together with the political system, has not supported the assimilation and adoption of E-learning in the context of Vietnamese higher education.

8.5.1.4 Organizational structure

Gunn (2010) concluded that a sustainable implementation of E-learning required a supportive organization structure which can provide "a cross-functional collaboration to accommodate different and sometimes conflicting perspectives". From a managerial perspective, Vaughan (2007) pointed out three challenges of blended learning in educational institution were to align blended learning with goals and priorities; overcome resistance to change; and address the issue of a lack of organisational structure, collaboration and partnership. He argued that decision-making in implementing blended E-learning involved different aspects of institutional administration. Therefore, it was required to aggregate and consult across many

functional departments within the organizational structure. As pointed out by Gunn (2010), there is a need for consultation across institutional levels to use organizational knowledge, experience and practices to inform a strategic development and planning of E-learning implementation, which involves "a different mind-set and new institutional systems". Without a supportive structure, E-learning implementation and adoption will face challenges and obstacles associated with institutional issues, such as strategic planning, staff training and development, and appropriate infrastructure. Reviewing the literature, Mapuva (2009) points out that university structures are rigid and unproven, regarding the incorporation of technological development. Therefore, it is very difficult to implement E-learning without "the re-alignment of organisational structures and a paradigm shift in pedagogical approaches" (Mapuva, 2009).

Findings of this study confirm that organizational structure was bureaucratic and rigid borders caused several problematic issues of ICT development and cooperation across functional departments, so these institutions did not recognize the changes needed in organizational structure to prepare for E-learning implementation and respond to advanced technological adoption with a new pedagogical method. With existing approaches and current practices in E-learning, it was likely that E-learning would be seen only as an issue related to technical instalment and deployment as an LMS on hardware. As a consequence, these institutions were not fully convinced they should change their institutional settings to respond to requirements for the integration of ICT into education practices.

8.5.1.5 Management support

According to Jarvenpaa and Ives (1991) management support includes participation, defined as a psychological state, and involvement, defined as behaviours and activities. Management support has an important role in information technology implementation, "developing an understanding of the capabilities and limitations of IT, establishing reasonable goals for IT systems, exhibiting strong commitment to the successful introduction of IT, and communicating the corporate IT strategy to all employees"(Somers and Nelson, 2001). Many studies have found that management support has an essential role, as well as being a driving force in successful implementation of information technology in organizations (Basu et al., 2001; Birch and Burnett, 2009; Orr et al, 2009). For example, Orr et al (2009) argue that management support could have a significant impact on all faculty members' willingness to use E-learning and encourage them to expand their efforts. In the study by Welle-Strand and Thune (2003), they found that management normally strongly demonstrated an institutional

policy commitment to E-learning. In practice, however, it was rhetoric rather than a systematic approach to problematic E-learning issues, which required more top management involvement and support in reality. For the study of E-learning in developing countries, many researchers also found that management support was a major constraint to E-leaning implementation because of a lack of commitment and involvement from top management to follow up the problematic issues of E-learning in practices within organizations (Ali and Magalhaes, 2008; Siritongthaworn et al, 2006; Shraim and Khlaif, 2010). For instance, in their study of E-learning implementation in Palestine, Shraima and Khlaif (2010) found that the institutional procedure and management support was the most problematic issue in E-learning implementation, such as the technical limitations of the network, lack of e-learning skills, poor time management, and workload pressure. A study by Ali and Magalhaes (2008) indicates that a major barrier to E-learning implementation in Kuwait was that a lack of management support led to a negative impact on staff, low motivation and resistance to adopting E-learning.

8.5.1.6 Professional development and training

In reviewing the literature of E-learning implementation and adoption, Keengwe et al (2009) pointed out that three factors which are influential in faculty willingness to adopt E-learning include organization support, leadership and professional training and development. If faculty are not confident in their ICT ability, competency and skills, they cannot use E-learning in their academic activities. Therefore, a lack of faculty professional development and training could be a constraint to E-learning implementation, otherwise faculty need training to work well with technology. In addition, they also found that faculty must be trained and developed not only in "how to use technology" but also how to "fundamentally change the way they teach"

In the context of Vietnam higher education, technology and staff for E-learning implementation have not been made ready for widespread adoption across the whole system. From a cultural perspective, studies in E-learning implementation showed implementation was significantly different between western and Confucian-dominated cultures. In Eastern and Confucian-dominated cultures like Vietnam, time is needed to change the mind-set of participants who are involved in implementing E-leaning within the context of an institution. In particular, traditional pedagogy, which is led and instructed by teaching staff, should be changed via training to adapt to the constructionist philosophy. Therefore, as pointed out by Govindasamy (2001), successful implementation of e-Learning has to take pedagogy into

account. The studies in E-learning pedagogy conclude that professional development and training have an important role in applying ICT to transforming and reforming education. Where teaching staff are left behind, the adoption and adaptation of E-leaning will never achieve the expected results (Elgort, 2005).

In the context of centralized education governance, like in Vietnam, educational institutions have been directly oriented by MOET's policies and state regulation. For MOET's policy toward ICT development and integration into education, although basic ICT skills training was carried out on how to use ICT in teaching practice, ideas, topics, best practices and guidelines for training teaching staff on the use of ICT for teaching and learning were not provided by MOET. Meanwhile, ICT infrastructure development in Vietnam institutions was always the top priority of state investment, while professional development and training, especially on pedagogy in the era of information technology, was very limited (Peeraer and Petegem, 2012). In this context, it is clear that educational institutions have to acknowledge that it is responsible for providing professional training and development. In their study, Omidinia et al., (2011) pointed out that "In developing countries, wherein educational institutions depend on governmental support to get the infrastructure and determine policies, institutional support plays a crucial role in the acceptance of e-learning."

8.5.1.7 Technological integration and isolation

In their study, Admiraal and Lockhorst (2009) pointed out that the lack of an adequate IT infrastructure would be a major drawback for implementing and adopting e-learning. More especially, Brusilovsky (2004) and Dong et al, (2009) point out the major problem with current E-learning technology is a lack of integration of the architecture of the E-learning system and the digital infrastructure of organization. An E-learning infrastructure consists of a learning content management system to enable organizations to manage the teaching and learning process, a content delivery system allowing teaching and learning to be delivered over the network and tools to create digital content (Uden et al, 2007). From a technological perspective, an E-learning system can easily be installed on an available IT resource, such as a server. However, beside the performance of this system when it is used on a large scale, E-learning content and objects should be reused to facilitate teaching and learning process. As a result, institutional management is responsible for providing and maintaining an adequate infrastructure and support services to E-learning. A LMS, such as Moodle, should be integrated with current IT infrastructure, where users will use the institutional internet and network, as well as other business and authority applications, to access E-learning. It is clear

that integration between E-learning and infrastructure is required to support all critical functions of an E-learning system (Henry, 2001; Uden et al, 2007, Brusilovsky, 2004). Lack of integration in institutional infrastructure causes obstacles in providing support to E-learning users, which in turn negatively influences the ease of learning and the efficiency of use (Rosmalen et al, 2006). In a study on ICT in Vietnam education, Peeraer and Petegem (2012) found that Vietnamese educational institutions are normally equipped with a basic package of equipment and standard office applications. In ICT development, almost all institutions did not plan to obtain a complete solution of ICT within their campus. Findings in this study indicate that, along with IT governance, limitations of resource in ICT development and planning cause major problems in isolation and fragment of digital infrastructure. E-learning implementation in this context has been based on inadequate infrastructure in which the isolation and fragmented structure do not have the ability to support E-learning. As a consequence, it has become difficult to implement integration of ICT infrastructure for E-learning development and implementation. All these issues together have contributed negatively to the implementation and use of the E-learning at the university.

In conclusion, the analysis and discussion of this study made it clear that E-learning was adopted and used in teaching and learning at one institution while it was nominally implemented at the others in other contexts, rather than being absorbed into daily academic activities. In other words, the result of E-learning implementation in the Vietnamese higher education context was generally influenced by the following drivers and constraints, identified as important in the course of this study.

8.6 Framework for E-learning implementation

8.6.1 Sustainability of E-learning implementation in the Vietnamese context

The concept of sustainability is not new in the literature, but recent research has taken an interest in sustainability in E-learning. Stepanyan et al. (2013) concluded that the concept of sustainable E-learning has not been systematically explored and defined. In their study, they suggest that "sustainability is the property of e-learning practice that evidently addresses current educational needs and accommodates continuous adaptation to change, without outrunning its resource base or receding in effectiveness". Stepanyan et al. (2013) also revealed that the theme of sustainable E-learning was categorized into three domains, consisting of resource management, educational attainment and professional development and innovation. Resource management refers to the cost aspect of E-learning implementation.

Educational attainment relates to benefits to users from E-learning. The third domain refers to adaptation and continuous improvement to change through professional development and innovation. Robertson (2008) suggested that sustainable E-learning should normatively meet present and future needs of E-learning. In addition, Gum (2010) pointed out that sustainable E-learning might be achieved when maintenance, use and further development does not depend on creators.

The findings in this study indicate that the Technology push-Need pull is applicable for equilibrium configuration to bring sustainability to E-learning implementation (See Figure 7-11 in section 7.5). The E-learning technology-push strategy represents needs of management and external stakeholders rather than the needs of primary users: teaching staff and students. It is clear that, whether bottom-up or top-down implementation is undertaken, E-learning implementation will be driven by the real needs and demands of teaching staff and students. There are similarities between impetuses expressed by the sustainable framework of E-learning implementation in this study and the conditions described by Gum (2010) in terms of dependency of creators. As illustrated in this study, E-learning could not be continuously implemented when depending completely on external resources and support. E-learning initiatives in Vietnamese educational institutions have benefited from international support and donation. However, without a relevant institutional budget and investment, it is clear that funded E-learning implementation will be phased out at the end of the project. As implied by Gum (2010), sustainable E-learning implementation should not depend entirely on support. Findings in this study also indicate that, where external resources led to E-learning implementation, E-learning was not continuous. In other words, if a sustainable E-learning implementation without institutional investment does not exist, the demand for E-learning will not be met. Therefore, many E-learning funded projects will not be sustained.

The sustainable framework of E-learning implementation suggested in this study is coordinated with properties of the sustainable E-learning domain model proposed by Stepanyan et al. (2013). In this study, the equilibrium of the sustainable framework of E-learning implementation can be reached when E-learning demand is met by E-learning capacity. At this point, this framework relatively supports the sustainable aspects of cost, benefit, professional development and innovation, as illustrated by Stepanyan et al. (2013). The components of this framework are built from several elements. The E-learning demand and capacity of this framework are based on a cost effectiveness strategy for future development of E-learning in the post-implementation stage, involving the requirement for

institutional investment and allocation of an operational budget for the continuation of E-learning implementation during the implementation stage of the sequenced stage process. Secondly, this sustainable framework of E-learning implementation illustrates that all stakeholders involved in E-learning not only benefited from E-learning implementation but also recognized the important role of E-learning in higher education. In this study, although the benefits and awareness of E-learning were achieved to varying degrees in specific contexts of E-learning implementation, the sustainable framework of E-learning implementation pointed out that, where the primary user of E-learning has gained benefits from E-learning, they will consistently use E-learning, despite technological difficulties and organizational challenges. Finally, the real driver of E-learning is local culture fostering innovative ideas within an institution. Despite lacking support from the institution, not having been trained in new instructional technology, users adopted innovation through peer-to-peer support and learning. This confirms that learning and adopting new technology is important. However, collaboration and cooperation among users is also important, where official training and professional development have not been provided.

In this framework, the continuity of E-learning implementation reflects a strategic perspective on the different facets leading to sustainable implementation. The strategic alignment pointed out that an organization could gain competitive advantage when aligning business strategy and IT strategy (Henderson and Venkatraman, 1993). Henderson and Venkatraman (1993) pointed out that the strategic alignment requires a strategic fit and functional integration between the business strategy, information technology strategy, organizational infrastructure and processes, and IT infrastructure and processes. For decades, the concept of strategic alignment was considered not only in business but also in higher educational institutions, where ICT was intensively invested in and applied to teaching and learning, as well as improving administration. In the context of E-learning within the Vietnamese higher education, the sustainable framework recommended in this study shows that E-learning will not continuously be implemented and adopted if it does not align with institutional goals and priorities, resists change and lacks collaboration within the organizational structure.

Because business strategy has not been aligned with ITC, the universities in Vietnam have not been ready to implement E-learning on campus. The demand side of this framework will lead to an institution committed to improving the quality of teaching and learning through integrating ICT on campus (Vaughan, 2007). To achieve this goal, E-learning must be implemented by resource investment and administration consideration and involvement

(Vaughan, 2007). In the light of this point, the needs for E-learning will be transformed into the demand for E-learning in an institution. As pointed out by this framework, when the actual need for E-learning exists, the sustainability of E-learning will be reached at its equilibrium, because the demand for E-learning will be matched.

In addition, one of the important issues which occurred during the implementation process was that the change process was not managed effectively or efficiently. Bates (2008) argues that, to be successfully implemented, E-learning requires significant changes in attitude and organization by understanding and supporting the stakeholders involved. Change management has been identified as playing an important role in implementing and adopting ICT within an organization. In fact, E-learning implementation, in the Vietnamese higher education context, has had issues regarding the management of change in organizational culture, business process and strategy, as well as creating an open and transparent academic environment. Educational institutions should develop and design a strategy to change the mind-set of these key user groups if they want E-learning to be successful. Indeed, E-learning continuity is not only a technological issue; it is also an opportunity for organizational change in terms of culture, structure, and communications. Sustainable E-learning implementation is increasingly a driver generating a strategic alignment of efficient and effective flexible information systems, allowing the educational institution to adopt technology while assuring the readiness of the organization in facing risks, damage and a better perceived quality of services in terms of timeliness and cost benefit. Nowadays, referring to organizational change and culture, E-learning implementation must be considered a campus-wide approach, not an IT-focused one. Supportive measures must be introduced to encourage managers to adhere to the strategic vision of E-learning sustainability. In particular, management as a whole should be committed to E-learning. Sustainability requires changes of key assumptions and values within the organizational structure and culture, having implications for the role that the E-learning must play within the strategic management processes of the organization, as well as within the levels of strategic risk that an organization may wish to undertake to secure a sustainable implementation.

8.6.2 Towards a framework for E-learning implementation

Based on the literature review of value co-creation and service systems research, and research findings and discussions on the sustainability of E-learning implementation, this section provides a synthetic picture of E-learning implementation. The framework which generalised from E-learning implementation in the context of Vietnam higher education consists of four

interdependent components (see Figure 8-1) with two different configured impetuses. The demand impetus consists of E-learning needs and E-learning demand, while supply impetus is related to E-learning competence and E-learning capacity. The framework consists of analytical concepts that explain how sustainability of E-learning implementation is reached by value co-creation taking place. This framework frames the sustainability as a function of its components and the value co-creation as their interrelationships.

The findings and discussion in this study indicated that the sustainable implementation of E-learning requires both push and pull impetuses to be well orchestrated. The sustainability of E-learning implementation within an educational institution requires not only a need for E-learning to build on the demand side but also a sustainable capacity to meet the demand for E-learning on the supply side. On the demand side, the impetus illustrates the needs for E-learning services from customers, both instructors and students. On the supply side, the impetus indicated a capacity to provide an E-learning service by the service provider, an educational institution (see Section 7.5). As a result, the customer and service provider can meet intangibly on the E-learning system.

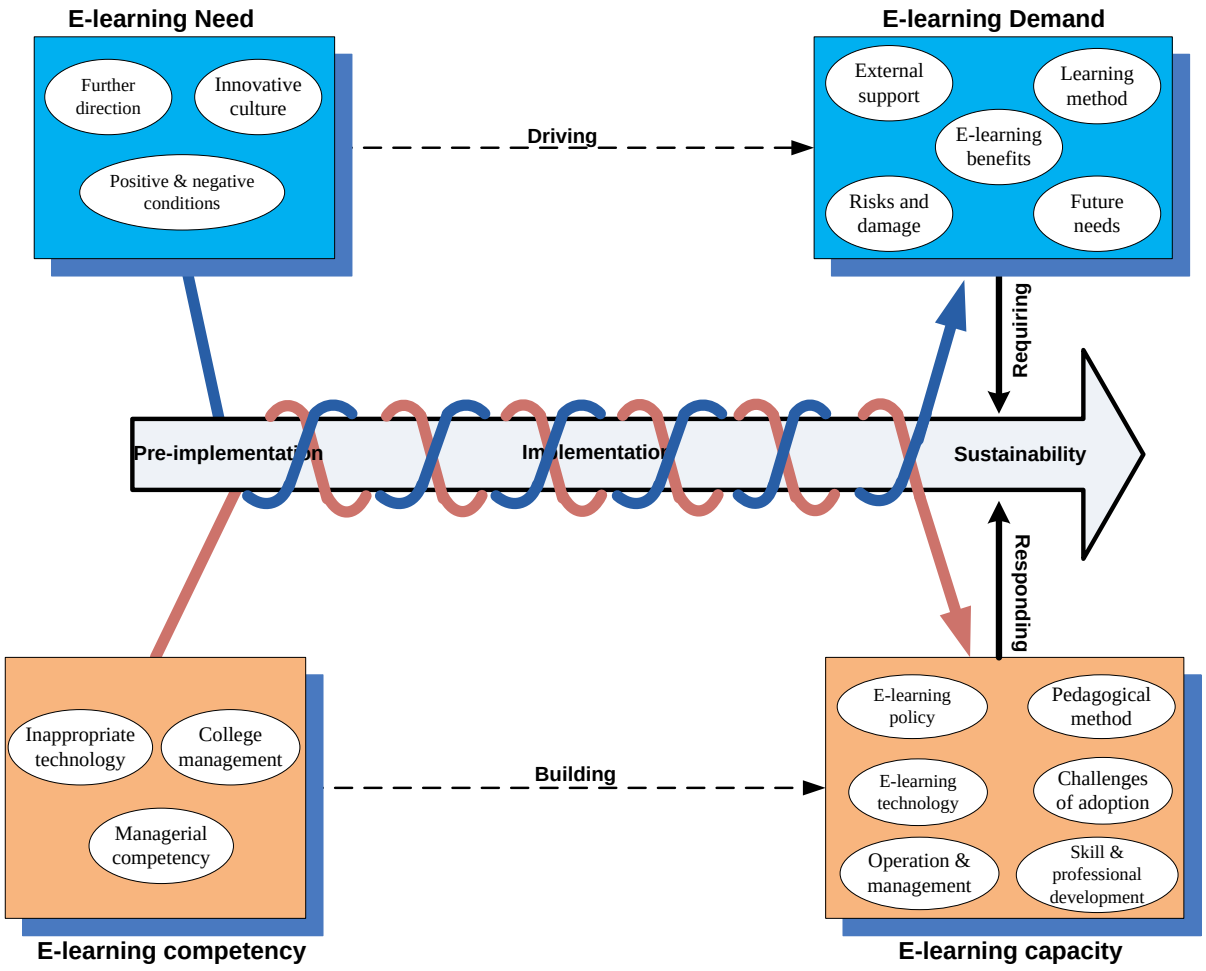

Figure 8-1: Framework of E-learning implementation

From a service system perspective, the impetus of the sustainable framework of E-learning implementation towards equilibrium significantly involves the concepts of value co-creation. The previous chapters illustrated the working mechanism of the framework as the movement towards an equilibrium point where sustainability of E-learning implementation will be reached. Because technological adoption needs time to be absorbed, so E-learning implementation will be gradually brought into an institution by all parties, involving in a process in which the concept of value co-creation can come into play. From a service science perspective, the "E-learning" value will be co-created by both demand and supply impetuses on a service system in that process. The value co-creation will provide insight into how service providers and their customers collaborate and cooperate in creating the E-learning service. In the other words, the value co-creation approach to E-learning implementation can feasibly lead an institution to be successful.

The service-dominant logic suggests that the E-learning value is perceived and determined by the customer, so that a customer-centric mind-set should be presented within all institutional settings. As an E-learning service provider, an educational institution needs to know what the E-learning value they are creating for its customer is, their E-learning needs. It should learn and understand the customer's needs for E-learning in order to offer a right solution to meet customer demand. It is obvious that learning and understanding customer needs is a critical challenge for all business sectors, not only education. In light of this point, the E-learning competency has an important role in how E-learning value is conceptualized within an institutional setting. The E-learning value that an institution thinks it should provide will determine what E-learning capacity should be built. As a result, whether or not E-learning demands led by E-learning needs will be satisfied depends on how an institution responds to its customers. Not waiting until E-learning service system completely comes into operation; the value co-creation offers a viable way in which E-learning value is co-created dynamically through interaction between learners, instructors and the institution during the implementation process. At this point, the principles of modern learning theory will be the critical guidelines for the service provider, instructor and institution, and an effective way to implement and deliver E-learning in order to meet its customer's needs. In the post-implementation stage, much work will focus on how E-learning services will be delivered on that system. This stage involves deciding how E-learning pedagogy is approached and how support services will be provided to maximize the benefit of the value-in-use of the system.

The proposed framework has spawned new efforts to understand E-learning value co-creation that can bring value to the service science perspective from the sustainable framework proposed in this study, which has been co-created by impetuses that have more implications for the theoretical approach and practices. Therefore, it is necessary to provide definitions for practitioners and researchers, so that they can apply this framework for E-learning implementation, by making clear what the attributes and features of these components are. The data analysis and findings from this study suggest that the E-learning needs have three main attributes, including challenges to and opportunities for E-learning from internal and external environment; organizational culture; where E-learning will be adopted; and the future direction of E-learning, based on what both learners and providers want. The E-learning demand determined by customer recognition of E-learning benefits, as well as risks and the potential damage they could face when new technology is adopted. In addition, the demand for E-learning will depend on external resources and support, and future demand for ICT transformation in education, becoming a facilitator for technological adoption and adaption within educational settings. Furthermore, learning methods also have an impact the way in which demand for E-learning will be expressed from both technological and pedagogical perspectives.

Derived from research analysis and findings in this study, E-learning competency has an important role in building managerial and technological foundations for E-learning implementation and adoption. Managerial competency allows the institutional administration to manage the change process, especially that from a provider-centric to a customer-centric mind-set, as a priority for participating in the value co-creation process. It is obviously necessary for educational institutions in developing countries, where state-ownership means the important role of the customer is not always appreciated. In addition, technological competency also allows the envisioning for strategic development of ICT within education settings and will impact significantly on alignment between technological strategy and business strategy, which in turn determines the reliability and scalability of the service system in use later.

E-learning competence in this framework includes three attributes: institutional management, managerial competence, and appropriate technology to pave the way for building E-learning capacity and determine the quality of E-learning services on that system. E-learning service will be delivered depending on six attributes of E-learning capacity. These include the pedagogical method, which is derived from academic policy and strategy; and E-learning

policy, which has the key role of motivating staff to adopt E-learning and support staff development and training. The challenges to adoption will be overcome by managerial competence, thus ensuring an appropriate technological platform for E-learning, as well as correct management of technology.

This framework provides a deeper understanding of how the mechanism of value co-creation works to make the impetuses reach an equilibrium point where the E-learning system implementation is sustainable. The framework's main strengths are linked to interdependence between service needs and capacity. The framework also describes how the components are formed and function in order to create benefits for the learner or the institution, recreating and modifying service on system in a specific area, E-learning. The study believes that the proposed framework needs more research, both theoretical and empirical. The suggested framework and the sustainability of implementation should be empirically studied and tested in other service and contextual settings. To better understand sustainability of implementation and the working mechanism of value co-creation, we have to study what happens when the implementation activities are co-created. That is, we must understand what implementation outcome happens in practice, because sustainability of implementation continues or ceases in practice. To further develop and empirically ground this framework, the study suggests that implementation of other service systems are selected and studied at different system levels. By comparing different types of service systems, the framework can be further developed and its components refined. Future research may include external stakeholders where derivative demand is important.

We also suggest empirical studies, where the E-learning service system is given different norms, culture and institutional settings in order to identify and analyze the working mechanism of impetuses on sustainability of implementation, led by the value co-creation. By studying and comparing different contexts of E-learning service practices, we could identify and analyze influential factors and the driving and inhibiting forces which are most influential in shaping sustainability of implementation under the value co-creation approach. This result would be useful when developing theoretically sound and managerially relevant implementation framework for a service system, as well as when developing guidelines for implementing systems in practice.

Finally, in order to better understand E-learning service systems in action, scholars could also study them in a context where two systems are heavily dependent on one another, and where the educational institution operates on more than one system simultaneously. An example of this would be a student information system or library system where the learner uses learning

resources, curriculum and other digital resources for learning on the E-learning service system. Therefore, E-learning service systems can and should be studied as embedded in one another. In light of this point, scholars will better understand the extent to which and why such practices enable or constrain value co-creation.

8.7 Chapter conclusion

This chapter discusses the findings related to how e-learning was implemented and the key influential factors associated with the process of E-learning implementation in the context of Vietnamese higher education. E-learning implementation, as discussed in this study, refers to the online environment used to support teaching and learning in Vietnam universities. From the factor perspective, this study discusses seven contextual factors which influence E-learning implementation: managerial settings; capacity; ICT policy and management; academic changes and challenges; IT governance; ICT strategy and capacity; learning motivation; academic transition; and a one-way teaching method. From the process perspective, the findings of this study indicate that the continuity of the implementation process was shaped by nine characteristics identified during a three stage process of implementation. Form an integrated view, the seven drivers and constraints which significantly impact on E-learning implementation in the context of Vietnam higher education have been discussed.

This study proposes a sustainable framework of e-learning implementation which represents the interaction and interplay of the influential factors and the nature of the implementation process within the contexts of Vietnamese university. The framework proposed in this study takes into account the sustainability of E-learning implementation where it is shaped by the value co-creation from E-learning need, E-learning demand, E-learning capacity and E-learning competency. In this way, the framework of E-learning implementation reveals the impetus of demand for E-learning and capacity of E-learning within an educational institution, moving towards an equilibrium configuration, where the sustainability of E-learning implementation could be reached by the E-learning value co-creation.

Chapter 9 – Conclusion

9.1 Introduction

The purpose of this final chapter is to conclude the study by briefly revisiting the methodological approach, conceptual framework and the outcomes of the study. Secondly, this chapter will present this study's contribution to the body of knowledge. Thirdly, implications and suggestions will be given. Finally, the limitation of this study will be identified along with suggestions as to how further research could develop from these findings.

9.2 Summary of study

9.2.1 Research Methodology

A qualitative methodology was adopted for this study by its potential to provide answers to the research questions. More specifically, a multiple case study research method sought to give advanced understanding of the studied phenomenon (Stake, 2006; Yin, 2003; Eisenhardt, 1989, and Creswell, 2005). To achieve this goal, the researcher initially spent four weeks at one studied site to conduct a pilot study, which reinforced and consolidated the research question. A further two trips were made to collect the data for the study and validate primary findings. During the weeks at the studied sites, the study conducted 39 in-depth interviews with administrators, staff, academic mangers and students. Data were also collected through the study of documents and focus groups. Analysis of the data was facilitated by the use of the computer program Nvivo. In this study, a thematic analysis network was used as a tool to assist coding and analyse the qualitative data. The result of data analysis was interpreted by the configuration method which was designed to integrate individual thematic networks into a virtual layer. The configuration approach assisted analysis of the individual cases, as well as cross-case analysis, to identify findings and make assertions for this study.

9.2.2 Research findings

The literature reviewed in Chapter 2 provided an integrated implementation perspective on factors and processes in research design. Synthesising the conceptual framework of E-learning implementation for this study emerged from previous research and the work of many authors and researchers (Kwon and Zmud, 1999, Walton, 1993). The research initially is

designed to explore the E-learning implementation in the context of Vietnamese higher education in term of technology, organization and pedagogy. The research, presented in this thesis, contributes to the area of E-learning implementation. Our main findings are the following:

- From a factor perspective, we identified a set of contextual factors which influence the E-learning implementation. These factors have been categorized into organizational, technological and pedagogical contexts; consisting of managerial settings; capacity & working environment; IT governance; academic changes & challenge; ICT strategy and capacity; ICT policy and management; and teaching and learning.
- From a process perspective, we also identified a set of factors from a sequenced stage process impacting on E-learning implementation. At the pre-implementation stage, resources for E-learning and the cost of system were factors which were mainly related to the approach to E-learning implementation. At the implementation stage, there were five influential factors, consist of involvement and commitment; motivation of adoption; operation and management; budget allocation & investment; and technological problems significantly determining the success or failure of E-learning implementation within given organizational settings.
- We analysed and evaluated how an influential factor impacted separately on the E-learning implementation and developed an approach to integrate the influential factors from the context with factors of process, based on Lewin's model. As a result, drivers and constraints of E-learning implementation were presented in an integrated way, with influential factors from the context and process providing a better understanding of how influential factors facilitated and inhibited E-learning implementation as a whole.
- We proposed a sustainability framework of E-learning implementation, developed from a number of key findings of the study. Firstly, the sustainability of E-learning implementation was achieved at an equilibrium point where the demand for E-learning is satisfied by the E-learning capacity within contextual settings. Secondly, the sustainability of E-learning implementation derived from interaction and interrelation among the components of the framework was co-created by learners (demand side) and the institution (supply side) during the process of implementation. Thirdly, the actual need for E-learning was the most important factor leading to continuous implementation and adoption; and finally meeting the E-learning need required an E-learning competency which will be supplied by the availability of E-learning capacity within these contexts.

9.3 Study contribution

9.3.1 Contribution to knowledge

The literature review in this study revealed that research on E-learning implementation has neglected the post-implementation phase of IT/IS implementation, particularly on E-learning. A rich body of E-learning research has focused more on integrated E-learning in classrooms from different perspectives. In addition, E-learning implementation has been applied to verifying models of technology acceptance or new pedagogy with teaching and learning from users' perspectives. Only a few studies have suggested integrating views and areas which influence E-learning implementation and practice. Continuously implementing an E-learning system and sustained acceptance by users does not only need an appropriate technological infrastructure but also requires organizational strategy and pedagogical integration.

The design of this study has undertaken an integrated perspective from different areas, including organizational, technological and pedagogical perspectives. The outcome of this study proposes a framework of E-learning implementation which illustrates all influential factors in the process and context of E-learning implementation, based on the knowledge and experience of managers, staff, lecturers and students. Their response allows a developing comprehensive framework of E-learning implementation, which aims to assure the success of E-learning implementation within institutional settings.

The implementation framework derived from this study supports the view that E-learning implementation as a whole is a socio-technical system. Participants in the study raised the benefits, challenges, risks and problems involved in their adoption of E-learning in a manner that pointed out that E-learning implementation was shaped by technological, pedagogical and organizational contexts. The framework proposed in this study takes into account alignment between factors and the process of implementation, where these alignments were configured with technological infrastructure, E-learning policy, organization settings, management commitment and support. In this way, the framework reveals that value co-creation of E-learning has to be taken up during E-learning implementation to achieve sustainability of implementation.

This study fills the gap in the existing body of knowledge by addressing the need for a theoretical as well as a practical framework for understanding E-learning implementation. Firstly, despite the fact that the body of E-learning research is highly developed, it is an empirical study in a field where there is a lack of such studies focusing on the issues in the

post-implementation stage of the implementation process (See Figure 2-8 in Section 2.6). Secondly, an implementation framework is proposed that focuses on the sustainability of implementation from an integrated perspective, configured with the process and context of implementation (See Figure 7-11 in Section 7.5). This framework provides a systematic approach to E-learning implementation, by emphasising the nature of sustainability of E-learning implementation, especially at the post-implementation stage. At this point, the study calls for more research focusing on the nature of E-learning implementation to compensate for the dearth of literature at this stage of E-learning implementation, as revealed on the review of literature in this study. It addresses the problematic issues of implementation, taking into account the interaction and interplay of technology, organization and pedagogy, which are the major aspects of E-learning implementation at all educational institutions. Therefore, the finding is significant because the proposed framework of this study places great emphasis on an integrated view of the interrelation of factors and processes on contextual settings. This framework can explain how educational institutions can sustainably implement an E-learning system, having real needs for E-learning and the ability to provide an E-learning capacity to meet these needs. This framework relates most closely to the equilibrium of demand and supply led by value co-creation.

Finally, this study draws attention to E-learning implementation within the higher education system of Vietnam by proposing a conceptual framework which explains how E-learning was implemented among the top ten universities in Vietnam. This country has recently boosted reform of the higher education sector, but E-learning is for the most part neglected in both research and practice. This study claims to be the first empirical study focusing on E-learning implementation in higher education systems in Vietnam. However, this study proposes a new perspective that encourages further exploration of the comprehensive framework and improvement of practices by operationalizing the proposed framework into a set of attributes and interrelationships from theoretical aspects (See Section 8.6.2).

9.3.2 Methodological contribution

In this study, it has been demonstrated that there was a significant difference between data analysis and case analysis and interpretation. The study applied a thematic analysis network tool for analysing the data collected. However, interpretation of results emerging from the data analysis needed further development. The study devised thematic network tools by levelling up the global themes to super-themes, which represents the highest abstract level. By doing so, this development allows us to integrate different themes in different areas into a

comprehensive frame. At this point, the configuration approach proposed comes into play by integrating all individual thematic networks into a comprehensive one.

An additional contribution of this research is that this study is the first to integrate the factor and process perspective by developing a configuration model as a fresh approach to E-learning implementation. The study results provide a practical example of the application of a configuration approach in a short-term research project by aligning factor and process into a simplified thematic network which is levelled up into the highest abstract level. This approach was useful in studying a phenomenon which requires an interdisciplinary approach to address research problems. This involved the development of a configuration for integrating various components from different perspectives into a framework to interpret and understand the phenomenon. By doing so, it acted as a mechanism for making sense of the elements of ambiguity in the sequenced phases of process and factors of contextual settings; and allowed for alignment between factor and process, leading to the increased consolidation of the emerging conceptual framework.

9.4 The practical implications

One of the main findings from this study for E-learning implementation within Vietnamese higher education is the need for sustainability of E-learning implementation. While a learning content management system is well matured, simply established and deployed, a significant distance to successful E-learning implementation within educational institutions remains with regards to challenges of organizational, technological and pedagogical aspects. In addition, the huge body of research in E-learning has been advanced in this area, as E-learning implementation has been somewhat neglected, especially the final stage of the implementation process. The findings of this study suggest the need for a greater recognition and awareness that educational institutions should be prepared for sustainability of E-learning implementation.

The proposed framework of sustainable implementation presented in this study can be used by those working in higher educational institutions, primarily senior university managers involved in E-learning practices. Although these managers are experts in the education sector, their knowledge and background are often restricted to a particular specialist area. IT managers, for example, will have deep knowledge of information technology, such as networking and software engineering, but may lack knowledge of pedagogy in higher education, organizational issues, and educational context. Implementing an E-learning

environment could involve deployment of web application software on a server, which may be referred to as E-learning implementation. The same can be said of other functional managers, such as human resource and financial and procurement managers. This study will provide such university managers with a focal point for implementation, with an emphasis on the sustainability of E-learning implementation.

University managers can undoubtedly refer the findings of this study to develop an appropriate way of implementing an E-learning environment as well as improving current E-learning practices within their institutions. Sustainable implementation provides a concrete framework for E-learning managers to plan an effective strategy for E-learning implementation. Sustainability of E-learning requires an acceptance and consideration of a board range of factors in the sequenced stage process of implementation within contextual settings and university situations. University managers should recognize the benefits, challenges, technical difficulties, and risks and dangers for instructors and students use of E-learning identified in this study and provide a suitable policy, and change management practices and practical technical support, in order to maximize the factors that facilitate, and minimize factors that constrain, teaching staff and students' use of e-learning.

Strategic development and investment on ICT infrastructure which focuses on technological scalability and integration for university infrastructure needs to be considered in E-learning implementation. The need to provide a reliable network and accessible ICT is an important implication arising from the study. Universities need to maintain the network and internet connection for E-learning and, if possible, provide a single sign-on function that can simplify university infrastructure accessibility. This suggests that adequate funding and investment are required to ensure that e-learning implementation is sustainable from a financial resource perspective. In addition, E-learning platforms should be effectively operated, maintained and managed by qualified staff who are able to provide support services and responses to users' needs in a timely manner, in order to reduce damage and risk when using E-learning. Meanwhile, online pedagogy should also be concerned to avoid the abuse of technology when using n E-learning platform for academic activities. These factors need to be taken into consideration in E-learning when planning for further development and practice. Given the complexity of organizational structures and university charters, making decisions around e-learning implementation and policy needs skilled and knowledgeable leaders who are able to commit and develop a sustainable approach to e-learning practice.

Furthermore, this study would benefit educational institutions wishing to improve the current status of E-learning. The study provides an overview of the sustainability stage, in which an institution seeks to improve practical E-learning and overcome obstacles. Although E-learning may have already been implemented thoroughly and management may be very knowledgeable about it, the findings of this study provide institutions with an integrated perspective, based on sustainability, and will be of assistance, in particular, during the post-implementation stage of the E-learning implementation process.

Finally, this study has shown how three aspects of E-learning implementation, (organization, technology and teaching and learning), identify different issues of E-learning implementation and unify them in a way in which problematic issues of E-learning implementation at an institution might be addressed. This study suggests that people from these different areas are likely to differ in their specialist expertise and professional approaches, as they are based on separate theoretical backgrounds, but that they will be able to agree on one solution for E-learning practices.

9.5 Limitation and future work

This research aimed to advance understanding of how E-learning has been implemented at universities in Vietnamese higher education during a transitional period of reform, responding to the need to renovate Vietnam, as a result of globalization. In this period, the regional and national universities have been intensively invested in and supported by government and international bodies to apply ICT for improvement and development. However, the data used in this study was collected solely from regional universities. Although E-learning has operated in Vietnamese national universities and others, they are not included in the boundary of research. As the researcher was originally from the University of Danang and had a professional network at the regional level, he was able to gain access to these regional universities where he was supported by professional contacts. This limitation could be an opportunity for future research, focusing on national and other lower ranked universities. Extended data collection through future research will certainly exhibit many similarities and differences, and level up our understanding of E-learning implementation in Vietnam. Furthermore, this study has been shaped by aspects of organisation, technology and pedagogy in implementing E-learning, which limited the opportunities to explore other aspects of implementation potentially involved in adopting E-learning. This limitation, however, leaves the door open for future research, including other aspects and domains in E-learning implementation within an educational institution, which will certainly enrich

knowledge and understanding about E-learning implementation in Vietnam. In addition, due to the nature of case study research, the generalisability of this framework to practice is questionable, as it was derived from the context of Vietnamese higher education, in which the equilibrium of configuration for sustainability of E-learning implementation was reached at the specific situation of the given educational institutions. In other words, the configuration of a model is dependent on some particular situation of equilibrium/non-equilibrium.

Furthermore, this research has presented an advanced understanding of E-learning implementation within a sustainable implementation framework. It laid the foundations for similar studies to test proposed sustainable implementation in other areas of information technology and information systems in education and beyond. The framework could also be extended to cover E-learning needs at different levels of the education sector. Alternatively, the framework can also be applied in exploratory and comparative studies of blended E-learning versus other types of E-learning.

Finally, a major trend of education in the information technology age relates to social networks of learning. The role of social and collaborative learning on networks can be considered to include facilitating adoption and implementation of E-learning. In the light of this, studies on networking in E-learning implementation can lead to other areas of study that examine the role of knowledge sharing and collaborative learning among adopters and users, outside the boundaries of an institution, which could change the way that an institution approaches the implementation of E-learning.

9.6 Concluding remarks

This research project sought to develop an understanding of how E-learning was successfully implemented in Vietnamese Universities, and was based on the assumption that valuable data can be gathered by studying sites that have operated an E-learning system. The findings of this study showed that E-learning implementation was a complex and unique process to the contextual settings in which it was taking place.

While each university studied was distinctive and possessed its own unique culture, initial conditions and resources, the findings of this study highlighted the importance of the interaction of the interdependent components of a sustainable framework of implementation, namely, E-learning need, E-learning demand, E-learning competency and E-learning capacity. In doing this, the findings of the study revealed the prime importance of the actual need of E-learning in each of the research universities, and linked this demand to the level of capacity

and competency build through the implementation process and management of technology. The findings suggested that the sustainability of E-learning implementation rests with a university's capacity and competency to meet the E-learning demand, which is derived from the actual need of E-learning implementation for the particular academic environment. In addition, the local culture in each university shaped and facilitated the implementation process in which the driving and inhibiting factors significantly impacted on the continuity of the implementation process and outcome.

To this end, the findings of this study show that a sustainable approach to E-learning implementation outlined in the conceptual framework of implementation is most successful when E-learning need exists. Sustainability is generated when E-learning need is built on the actual desire to improve and renovate performance of training at all levels. The driving implementation factors interacting in the implementation stage are considerable and need to be encouraged. In short, university administrators and strategic technology planners need to understand the significance of the integration and convergence of technology and ensure that support continues for the end-user.

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Appendix A: Pilot project

College of Economics, University of Danang

Introduction

Along with the present researcher's experiences and background, a pilot study aimed at seeking useful guidelines for developing this study. The pilot study was conducted at College of Economics (COE), University of Danang (UD) Vietnam. COE is one of the six members of UD founded in 1975. COE has been recognized as one of the leading college in Economics and business studies in Vietnam. COE is a large public, teaching intensive, multi-campus college with 13 co-campuses in other provinces across Vietnam. At present, there are more than 9,000 students studying at the main campus and 7,000 students learning off-campus foundations in the Central and Western Highlands. This college was chosen for the pilot because of its proximity to the researcher's interests, the willingness of senior college managers to participate in pilot study, captured by researcher with many years of experiences. The pilot was used to aim at an exploration of what the current status of development of ICT in general; E-learning in particular is to determine some possible future directions of research in this field. An open interview was used to explore current practices and challenges faced on development and application of ICT at COE by interviewing people targeted for administrator, IT and academic staff (Appendix B).

From 2001 to 2009, there were four projects which had intensively invested on developing ICT at COE and funded by several sources. The total budget of four projects is approximately one million of US Dollar, a huge amount of investment on operation budget of COE. Two projects funded by the World Bank was for building a core campus Network, another project was targeted at increasing capacity of network access and the last one was for creating student computer labs. As a result, the investment on ICT at COE was biggest comparing with other college members of UD.

Historically, E-learning based on MOODLE platform was only introduced and used to support teaching and learning at Department of Business administration (DBA), COE in middle of 2005. Recognizing the potential to deliver substantial benefits to the student, the project was asked to transfer to COE for further development by the end of 2006. One key manager of COE said: "we will strategically invest and develop this system at boarder scope for teaching and learning at the whole COE". COE do believe that financial incentives will be

the best motivation for going online. Therefore, an incentive policy for courses taught both in classroom with online supports will be applied. Along with available online courses in previous system, there are totally 212 courses from 2007 to middle of 2010 which have been instructed via the E-learning system from four out of eight academic departments in COE. The use of E-learning at COE has several benefits and challenges.

Practices of E-learning at COE

With intensively investment on digital infrastructure, the ICT application in general, E-learning in particular should be potentially succeeded at COE level. However, the engagement and use of ICT have been very slow and poor results. The presentation and conclusion in the next sessions have been purposefully structured around the findings captured in practices to get implication and direction from the pilot study for further research developments.

Learning and teaching

Interviewees indicated that the use of e-learning predominantly involved in applied in E-learning tools such as announcements, quizzes, web link, upload and forum. Some courses also used media components such as images, audio and video to demonstrate specific contents. There is strong evident on E-learning system that student and teaching staff of DBA were positive about the use of online environment for discussion and learning efficiency.

Staff interviewed also responded that they mainly used the system to provide lecture notes for student instead of giving the printed materials. The most responses on teaching method were connected to conveniences of E-learning for teaching staff because the E-learning system helps them do automatically teaching works. When they cannot come to classroom, student should go online to discuss or do the exercises in certain time required by the functions configured on the E-learning system. It is remarkable that teaching staff have not recognized the differences between E-learning and in-classroom pedagogy when using the E-learning environment. The use of the E-learning seemed to involve fairly unsophisticated use of available tools designed on system, and in some cases it was used primarily to provide access to learning materials, rather than to engage students directly learning in online environment.

Technical issues

The interview also paid attention to the technical conditions, digital infrastructure at COE, and technical support services offered at COE. Responses from interviews indicated that the

reliability and stability were the most consideration on technological issues for using the digital services at COE. Staff complained about the low speed of network, both on campus and off- campus connection. It was understandable that the whole COE's campus shared the bandwidth of 2 Megabits because the cost of internet connection is very high as one COE's manager said "the college only is affordable for that amount". The main IT infrastructure issues raised by staff users related to server downtimes, server performance and complication of log on service.

There is a conflict between IT division and teaching staff in relating server performance and E-learning functionality, resulting from the decision that the chat function of E-learning has been turn off to improve server performance. Because the E-learning system is hosted on one server which has to serve normally for more than 300 concurrent connections; the E-learning server cannot run well at that scale. Meanwhile, the chat function consumed a lot resources of server led to reduce server performance. There are a lot comments about COE's IT infrastructure. Teaching staff claimed that technical problems have been stem from an inadequate IT infrastructure and unskilled staff.

The strongest complaints were involved in logging into E-learning system and accessing COE's mail server. Login on E-learning system requires authentication and validation by username and password provided by IT division. Teaching staff mentioned that their students were not able to access the E-learning when required. In case student lost their password, it is very complex for them to get back password. Another technical issue reported that the working session of students sometimes suddenly lost without any known reasons. In addition, student had to remember at least three usernames and passwords for using the email service, student information system and E-learning. To register the E-learning account, student must use the email account provide by COE's IT division where student will receive the username and password on paper. And then, they will register for account on E-learning system by using the email account validated via email. Meanwhile, to register for a course or view timetable, student will work with Department of Academic affairs. It is very complex procedure on using the digital services offered by COE. At this point, pilot study has recognized that why an integration of digital services offered has not been implemented in COE yet.

Training staff and support

Training and professional development for teaching staff in relation to the use of E-learning had been offered two times after transferring from DBA to COE. According to COE's documents, the formal training sessions did not require staff attended on. As indicated by IT division, there was few teaching staff coming to the training sessions. In addition, printed and digital resources or user guide and manual have not been developed yet at the time pilot study conducted. It seems to be likely that the needs for training have not existed in using E-learning at COE. It may stem from the fact that teaching staffs do not want to adopt E-learning widely at the whole college. The responses indicated that the preferred training method for staff without experience of MOODLE-based system was face to face workshops, followed by one on one mentoring, and printed resources.

Teaching staffs who have used the E-learning system reported that their student do not know where the first point of contact is if they had problems such as log on, register account and disconnection. General satisfaction with the support services from IT division and COE was reported that support services are very poor and should be improved and provided more viable support during the working time. The two main purposes were to seek assistance with login problems and to access features or materials on E-learning system.

In pilot study, support services for student and teaching staff were also focused. These services have been provided by academic affairs, administration, and IT division at COE. Staff perceived the service provided by the IT division to be inefficient, though many had not used it. They claimed that that the level of expertise was not sufficient to deal with technological problems. E-learning users were particularly dissatisfied about the arrangement for them to seek support from IT division. The staff though that COE let them go to online with strategy "learning by doing yourself".

Training, technical support, pedagogical support, and administrative leadership are the crucial components of support which are important to the successful implementation of E-learning. In the case of COE, there are the real needs for staff training when introducing the E-learning. There was not recognition of the need for pedagogical support in the way that the training was framed, which links to the learning component of the platform. Teaching staff and COE have not considered seriously the importance of individual people gaining the skills to use the technology appropriately and recognized the important role of online pedagogy when applying new teaching and learning environment.

Conclusion

The ICT application and development at COE has been significantly in a status in which the system reacts passively to what will happen rather than responses proactively. Two factors have rooted to a difficult development of ICT application at COE might be stem from the separation of ICT development and the voluntary adoption.

Without a database centre that could be as bases upon which E-learning and other digital services could be built and integrated together, IT supports and digital services developed and offered at COE has been digitally isolated and separated from its environment. It is likely that E-learning problems at COE have been closely connected with the separated and isolated its infrastructure. Even if a single sign carried out to integration of the digital resources, the major challenges till remain unchanged. The single sign on solution entirely is one of technological issue; the development and adoption of ICT at COE are another. IT management and quality services offered by college should be improved. Vietnamese education has been presently reformed so Vietnamese educational institutions have been autonomy more than before. However, the college is still managed by administrative rather than management-based manner. In this context, it is difficult for college manager to adopt and adapt modern knowledge of management and professional skill in educational management.

Another major challenge is the use of E-learning at COE that until now have been successful at departmental level, Department of business administration, rather than college level as a whole. For years, there have been general talks about the reform and renovation of Vietnam higher education. Quite recently it has also become a matter of institutional capacity and long-term strategy as the MOET has launched a national ICT strategy in education such for E-learning, demanding more better use of ICT in teaching and learning. However, it is likely that the ICT development and application at COE have yet to be carried out seriously. COE could not wait for things to change automatically basing on volunteer adoption of ICT. It is clearly that the “let it be” strategy and policy of ICT did not work at COE. COE has to change attitude and approach to ICT development and application among managers, staff and faculty and recognize the significance role of E-learning in improving quality of its training.

The challenges discussed above involve the concept of separation with existing ITC infrastructure, inappropriate method of teaching and learning and resistant to changes of organization. More importantly, how to solve these problems should be overcome. The

“how” can be implemented from an organizational point of view by means of strategy, policy, requirements, structure and professional training. It can be approached from the point of view of technology such as alignment between business and IT strategies. From pedagogical view, E-learning pedagogy should be embedded into new learning and teaching environment. When successfully handled, the appropriate application of ICT in education will be developed successfully.

Appendix B: Interview question of the pilot study

1. How does strategic development of college relate to ICT strategy?
2. What mechanism has been used to provide support to ensure that teachers make use of technologies for their teaching?
3. What are the key organizational issues and challenges associated with E-learning initiatives at College?
4. Could you mention key points of college policy related to ICT development and use?
5. What are the institutional barriers and enablers to ICT application and developments?
6. What support mechanisms are in place to support the development and delivery of e-learning and how are they?
7. What E-learning expertise do tutors have currently?
8. What support do tutors get in the development of courses? How online support is available to students? To teacher? from the school service
9. What institutional issues are arising as a result of E-learning activities?
10. What in-house development is being done into the support to technical infrastructures? To learning system?
11. How tools on the E-learning system have been used?

Appendix C: Example of the interview guide

A. Manager interview

1. How E-learning has been implemented at your University? How about E-learning application at School member?
2. What are the main events related to process of E-learning implementation?
3. What are challenges and favourable conditions to your university in developing E-learning?
4. How do you plan for developing E-learning?
5. What are major steps of preparation before applying E-learning in your teaching and learning environment?
6. How the E-learning system is managed at your university?
7. What is future development of E-learning system at your university?
8. What is the E-learning policy developed at your university?
9. What is your role in E-learning development at your university?
10. How do you evaluate result of E-learning at your university?
11. When implementing E-learning, what are major changes in academic operation, management and any others?
12. If so, how your university deal with changes?
13. How does ICT development has been mentioned in strategic development at your college?
14. Along with volunteer factor, do you have any supports for adopters in E-learning? Training? Motivation?
15. How does college manage and organize IT?

B. Lecturer interview

1. Could you illustrate the process of E-learning development at your department?
2. How do you approach E-learning to teach on the system?
3. Have you got any support from College, department to approach E-learning? What are they?
4. What do you think about the role of college management? Role of department in developing E-learning?
5. What are pressures you facing with when approaching E-learning?
6. Could you mention about difficulties when teaching on the system?
7. How do you feel about using E-learning to support teaching?
8. When using E-learning, how do you do when having a problems? What are they?
9. How do you design the course to teach on the system?
10. How do you use the course on the system to support your teaching in classroom?
11. What do you think about differences from teaching with E-learning support and without E-learning support?
12. What are factors impacts on the use of E-learning? How do they impact on?
13. What are recommendations you want to do for E-learning at the college?

C. Student interview

1. When registering, what are digital services you get to use? How do you use them?
2. Does your lecturer use E-learning to support your study?
3. How do you learn on E-learning system?
4. To access E-learning, what do you do? How do you get support to access it?
5. When you face with difficult, what do you go? How to solve it?
6. Have you access digital services from college network? How do you use them? How about internet connection and computer lab?
7. With course supported by E-learning, how do you study it?
8. What are different between courses have been supported by E-learning and not?
9. What are activities you do on E-learning system?
10. What difficulties do you face with when learning on the system?
11. How do you solve the problem related to E-learning?
12. How do you connect to internet? And where?

D. IT staff interview

1. What are your responsibilities in this IT department?
2. Could you describe the process of implementation of E-learning in your department? How about your role in this process?
3. How did you plan to implement E-learning and other digital services in this college or universities?
4. How do you organize the support services for E-learning user?
5. What are requirements of support your department usually get from E-learning users, from staff? And why?
6. Has you got any training or professional development during time working with college?
7. When you got new technology, how do you learn to use it?
8. Could you describe about IT support you are involve in?
9. How IT strategy has been planned at college? How about IT department involve in this process?
10. How about the budget of operation of your department?
11. Could you evaluate about skill of staff to meet with the needs of college?
12. What are weakness and strengths of IT infrastructure from your point of view?
13. How do your department incorporate with other functional departments in college? University?
14. Could you describe the relationship between your department and IT department at university?
15. If you can make your own decision, what are the most important things you will do for information technology at college in the near future?

Appendix D: University Research Ethics Application Form

Đại học Sheffield
Trường Nghiên cứu thông tin,
Regent Court
211 Portobello Street
Sheffield S1 4DP

Bản đồng thuận

Tên dự án nghiên cứu:

Thực hiện E-learning tai các cơ sở đào tạo đại học Việt nam

Tên người nghiên cứu: **Đặng công Tuấn**

	Đánh chéo
1. Tôi xác nhận rằng tôi đã đoc và hiểu thông tin về dự án nghiện cứu tháng 11 năm 2010 và tôi có cơ hội trao đổi về dự án.	☐
2. Tôi biết là sự tham dự của tôi vào dự án nghiên cứu là tự nguyện và tôi toàn quyền từ chối tiếp tưc tham dự vào bất cứ lúc nào mà không cần giải thích lý do và sẽ từ chối khi cho rằng dư án sẽ gây ra những tác động tiêu cực. Hơn nữa, tôi toàn quyền từ chối trả lời bất kỳ câu hỏi hay vấn đề nào đó bằng cách thông báo cho Ông Đặng Công Tuấn (0913432434).	☐
3. Tôi hiểu rằng thông tin trả lời của tôi hoàn toàn bí mật. Tôi cho phép thành viên dự án nghiên cứu có thể tiếp cận trả lời của tôi. Tôi biết là danh tính của tôi sẽ không gắn liền với tài liệu của dự án nghiên cứu và tôi sẽ không được nhận ra và có thể nhận ra trong báo cáo hay kết quả nghiên cứu.	☐
4. Tôi đồng ý dữ liệu do tôi cung cấp sẽ được sử dụng trong nghiên cứu tương lai	☐
5. Tôi đồng ý tham gia vào dự án nghiên cứu nói trên.	☐

_____	_____	_____
Họ và Tên	Ngày tháng	Ký tên
_____	_____	_____
Đặng Công Tuấn	Ngày Tháng	Ký tên

(Ký tên và ghi ngày trước sư hiện diện của người tham dự)

Copies:
Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent form, the letter/pre-writ
ten script/information sheet and any other written information provided to the participants. A copy

of the signed and dated consent form should be placed in the project's main record (e.g. a site file), which must be kept in a secure location.

The University of Sheffield
Department of Information Studies,
Regent Court
211 Portobello Street
Sheffield S1 4DP

Participant Consent Form

Title of Research Project:

E-learning implementation in Vietnamese higher education Institutions

Name of Researcher: Dang Cong Tuan

Participant Identification Number for this project: **Please initial box**

4. I confirm that I have read and understand the information sheet dated November 2010 explaining the above research project

   and I have had the opportunity to ask questions about the project. ☐

5. I understand that my participation is voluntary and that I am free to withd at any time without giving any reason and without there being any negati consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline. I can do so by simply contacting Mr Dang Cong Tuan at 0913432434. ☐

6. I understand that my responses will be kept strictly confidential. I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research. ☐

4. I agree for the data collected from me to be used in future research ☐

5. I agree to take part in the above research project. ☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Mr. Dang Cong Tuan	Date	Signature

To be signed and dated in presence of the participant

Copies:

Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent form, the letter/pre-written script/information sheet and any other written information provided to the participants. A copy of the signed and dated consent form should be placed in the project's main record (e.g. a site file), which must be kept in a secure location.

Information School
The University of Sheffield
Regent Court
211 Portobello Street
Sheffield
S1 4DP
UK

1. Tên dự án nghiên cứu:

Thực hiện E-learning tại các trường đại học Việt Nam

2. Giới thiệu

Kính mời Ông (Bà) tham gia hỗ trợ dư án nghiên cứu của chúng tôi. Trước khi chấp thuận, điều quan trọng ông (bà) muốn biết tại sao chúng tôi tiến hành dư án nghiên cứu này và những vấn đề liên quan đến dự án nghiên cứu. Sự chính xác và khách quan thông tin do ông (bà) cung cấp sẽ có tầm ảnh hưởng quan trọng đến kết quả nghiên cứu. Ông (bà) vui lòng bỏ ít thời gian quyết định Ông (bà) giúp hỗ trợ nghiên cứu của chúng tôi hay không. Nếu ông (bà) có bất kỳ câu hỏi hay quan tâm nào, vui lòng thông tin cho chúng tôi. Cảm ơn Ông (bà) đã đọc tài liệu này.

3. Mục đích của dự án nghiên cứu?

Mục đích của nghiên cứu nhằm tìm hiểu thực hiện E-learning thông qua thực tế sử dụng E-learning tại các cơ sở đào tạo đại học Việt nam. Nắm bắt tình hình hiện nay cho phép nhận dạng các nhân tố ảnh hưởng đến quá trình thực hiện E-learning. Những bài học kinh nghiệm từ thực hiện E-learning sẽ đóng góp vào quá trình đổi mới và thay đổi giáo dục đại học Việt nam trên nên tảng ứng dụng công nghệ thông tin.

4. Tại sao ông (bà) được chọn để hỗ trợ nghiên cứu?

Có 4 bên hữu quan liên quan đến thực hiện E-learning tại các cơ sở đào tạo đại học của Việt nam, bao gồm các nhà quản lý chủ chốt tại các cơ sở đào tạo liên quan đến bất kỳ các mạt của công nghệ thông tin và truyền thông (ICT), giảng viên, nhân viên và sinh viên. Dự án nghiên cứu đề xuất các bên hữu quan nói trên là nguồn thông tin tiềm năng mà dự án cần có để làm rõ thực hiện E-learning tại Việt nam. Do vậy, Ông (bà) được mời tham gia phỏng vấn với kỳ vọng rằng kinh nghiệm cá nhân của Ông (bà) và thông tin cung cấp sẽ giúp ích rất nhiều đến kết quả nghiên cứu.

5. Tôi phải tham dự hay không?

Ông (bà) không có bất kỳ ràng buộc nào liên quan hay phải tham gia nghiên cứu này. Nếu Ông (bà) đồng ý hỗ trợ dự án nghiên cứu, Ông (bà) có thể điền tên vào bảng đồng thuận khi phỏng vấn. Ông (bà) có thể rút lui hay từ chối bất kỳ luc nào khi muốn, đơn gian thông báo cho tôi theo thông tin sau:

Mr. Dang Cong Tuan.
Email: d.c.tuan@sheffield.ac.uk
Mobile: 0913432434

6. Tôi sẽ làm gì khi đồng ý hỗ trơ nghiên cứu?

Nếu Ông (bà) đồng ý hỗ trợ nghiên cứu, ông (bà) sẽ cho phép phỏng vấn để trả lời một số câu hỏi và cho ý kiến liên quan đến những vấn đề mà dự án nghiên cứu quan tâm. Việc trả lời các câu hỏi hoàn toàn trên kinh nghiệm và hiểu biết của cá nhân.

7. Ông (bà) sẽ làm gì ?

Dựa trên sự đồng ý và cho phép của Ông (bà), tôi sẽ thu thập dữ liệu theo hình thức phỏng vấn. Phần chủ yếu của buổi phỏng vấn là tôi sẽ hỏi ông (bà) về kinh nghiệm thực hiện E-learning, phương pháp giảng dạy, cơ sở hạ tầng về công nghệ thông tin, kết quả đạt được của chương trình E-learning, chính sách và chiến lược liên quan đến thực tiễn thực hiện E-learning. Buổi phỏng vấn dự kiến có thời lượng từ 30-45 phút. Trong cuộc phỏng vấn, việc trả lời các câu hỏi sẽ không có bất kỳ ràng buộc liên quan đến cá nhân ông (bà) về hiện tại hoặc trong tương lai. Để thực hiện việc nghiên cứu, tôi sẽ, sau khi ông bà cho phép, ghi âm cuộc phỏng vấn để tiến hành các công việc phân tích dữ liệu sau này. Tôi có thể liên hệ lại với Ông (bà) sau cuộc phỏng vấn để làm rõ hơn một số thông tin. Thông tin ghi âm sẽ được lưu trữ an toàn và những người khác không liên quan trực tiếp đến dự án nghiên cứu sẽ không thể tiếp cận. Thông tin sẽ là nặc danh, không ai có thể được nhân dạng hay có thể nhận dạng trong bất kỳ báo cáo hay các bài viết từ dự án nghiên cứu.

8. Những rũi ro hay bất lợi có thể khi tham gia hỗ trợ dự án nghiên cứu?

Tuyệt đối không có ảnh hưởng tiêu cực hay bất lợi cho cá nhân hay cơ sở đào tạo khi hỗ trợ dự án nghiên cứu. Tuy nhiên, khi dư án cần những dữ liệu liên quan đến kết quả của quá trình thực hiên chương trình E-learning, điểm nổi bật của nhà trường về E-learning; có thể vài người cảm nhận sự bất tiện cho cá nhân hay tổ chức. Nếu điều này xuất hiện, vui lòng thông báo và buổi phỏng vấn sẽ kết thúc ngay lập tức.

9. Có những lợi ích gì ó thể khi hỗ trợ dự án nghiên cứu?

Trong khi khó có ngay những lợi ích cụ thể cho cá nhân hay tổ chức hỗ trợ dư án nghiên cứu. Dự án nghiên cứu này nhằm góp phần phát triển và thúc đẩy ứng dụng ICT để nâng cao và cải thiện chất lượng giảng dạy và học tập trong công cuộc đổi mới giáo dục đại học tại Việt Nam.

10. Sẽ như thế nào nếu dự án nghiên cứu dừng sớm hơn thời gian dự án?

Nếu dự án nghiên cứu bị đình chỉ sớm hơn dự kiến, mọi người tham gia hỗ trợ sẽ được thông báo và lý do dừng nghiên cứu dư án sẽ được thông tin rõ ràng đến mọi người.

11. Nếu có điều gì sai trái?

Tất cả thông tin Ông (bà) cung cấp sẽ hoàn toàn bảo mật và sẽ chỉ sử dụng cho mục đích nghiên cứu khoa học. Tuy nhiên, nếu ông (bà) có bất kỳ vấn đề nào hoặc phàn nàn về người nghiên cứu, vui lòng liên hệ với người phụ trách học thuật theo thông tin sau:

DR. Harvey Philip,
Registrar and Secretary,

University of Sheffield,
Firth Court, Western Bank,
Sheffield, S10 2TN
Email: Registrar@sheffield.ac.uk

12. Sự tham gia của tôi trong nghiên cứu này có giữ bí mật không?

Sự tham gia hỗ trợ của Ông (bà) rất quí giá và vô cùng ý nghĩa đối với nghiên cứu của dư án. Mọi thông tin mà ông (bà) hỗ trợ hoàn toàn bí mật tuyệt đối. Ông (bà) không thể nhận dạng trong bất kỳ báo cáo hay bài báo khoa học được đăng trong tạp chí. Không một ai, ngoài trừ người nghiên cứu và giáo viên hướng dẫn có thể tiếp cận được bất kỳ thông tin nòa của dự án. Kết thúc dự án, tất cả hồ sơ và tài liệu sẽ bị phá hủy.

13. Loại thông tin mà dự án dự định thu thập là gi?

Dự án nghiên cứu quan tâm đến thông tin liên quan đến quá trình thức hiện E-learning tại các cơ sở đào tạo của Việt Nam. Dữ liệu và thông tin về cơ sở hạ tầng công nghệ, phương pháp giảng dạy và học tập trên hệ thống, quản lý và sử dụng E-learning, sự hỗ trợ sử dụng của nhà trường liên quan đến E-learning và các dịch vụ công nghệ thông tin đang được cung cấp.

14. Kết quả của dự án nghiên cứu sẽ làm gì?

Dữ liệu sẽ được thu thập cho luận án trong chương trình đào tạo tiến sĩ. Kết quả nghiên cứu được sử dụng để trình bày luận án. Một vài thông tin và dữ liệu có thể được sử dụng trong các cuộc hội thảo và viết báo đăng trên các tạp chí khoa hoc chuyên ngành. Không một cá nhân nào có thể được định danh, hoặc có thể định danh trong bất kỳ báo cáo liên quan đến dự án nghiên cứu nếu không có sự đồng ý của chủ thể.

15. Ai là người tổ chức và tài trợ nghiên cứu?

Dự án nghiên cứu này đặt dưới sư quản lý và tuân thủ nghiêm ngặt qui chế về nghiên cứu sau đại học của Đại học Sheffield. Dự án là đề tài nghiên cứu được tài trợ của Đại học Đà Nẵng và cá nhân là nghiên cứu sinh.

16. Ai là người phê chuẩn tư cách đạo đức nghiên cứu của dự án?

Qua quá trình xem xét và đánh giá của hội đồng đạo đức tại Trường thông tin, Đại học Sheefield, dự án đã được chấp thuận cho triển khai thực hiện

17. Thông tin liên hệ

To contact the researcher:
Mr. Dang Cong Tuan
Email: d.c.tuan@sheffield.ac.uk
Mobile: + 07881585072

To contact the supervisor
Dr. Jonathan Foster
Email: j.j.foster @sheffield.ac.uk
Tel. 0114 2222665

Địa chỉ thư tín của nghiên cứu sinh và Giáo viên hướng dẫn
Information School,
University of Sheffield,
Regent court,
211, Portobello Street,

Sheffield, S1 4DP

Nếu ông bà muốn nhận kết quả nghiên cứu, vui lòng cho biết đia chỉ:

Xin gửi Ông (bà) sự trân trọng của tôi về sự quan tâm hỗ trợ dự án nghiên cứu.

Information School
The University of Sheffield
Regent Court
211 Portobello Street
Sheffield
S1 4DP
UK

1. Research Project Title:

E-learning implementation in Vietnamese higher education Institutions

2. Invitation paragraph

You are invited to participate in this research project. Before you agree to participate it is important to understand why the research is being undertaken and what it will involve. The accuracy and objectivity of your response will have a significant impact on the research findings. Please take your time to decide if you wish to be involved in the research sample or not. If you have any questions regarding the study please, feel free to ask. Thank you for reading this.

3. What is the project's purpose?

The purpose of this project is to understand E-learning implementation by exploring the use of E-learning in Vietnamese higher education institutions. The understanding of current status of E-learning will permit to identify factors which have significantly influenced to process of E-learning implementation. Lessons learnt from E-learning implementation will contribute to the process of innovation and reform of Vietnamese higher education system.

4. Why have I been chosen?

There are potentially four groups of stakeholders involved directly in E-learning implementation at Vietnamese education institutions. They are key managers who in charge of ICT at institutions, IT staff, faculty member and student. Research project proposes that these stakeholders will be potential informants to seek data for interpreting E-learning implementation in Vietnam. Therefore, you are invited to take part an interview with expectation that your experiences and data provided will help significantly in this research's results.

5. Do I have to take part?

You are not compelled to participate in this research project. If you choose to participate you might be asked to sign a consent form. You can withdraw at any time as you like. Simply notify me using contact information as follows:

Mr. Dang Cong Tuan.

Email: d.c.tuan@sheffield.ac.uk

Mobile: 0913432434

6. What will happen to me if I take part?

If you agree to participate in the research project you will be asked to engage in an interview, to answer some questions and to provide some individual comments about the research topic. Answering the questions depends on your personal experience and your own knowledge.

7. What do I have to do?

With your permission I would like to collect data through interview when visiting your office. The main part of our meeting will consist of an interview during which I will ask you about your information experiences which will enable me to appreciate and become familiar with E-learning implementation, online teaching and learning method, information technology infrastructure, outcomes, policies and strategies related with E-learning practices from your institution. The interview is estimated to take approximately 30-45 minutes. In this interview, answering the questions will not place any obligations on you in the present or in the future. In order to conduct my research, I will with your permission:

Make an audio recording of our discussions

I may need to contact you for further clarification after our meeting. The audio recordings will be kept securely, and will not be made available to anyone not directly involved in the research. All data will be anonymous, and none will be identified, or identifiable, in any report or publication arising from this research.

8. What are the possible disadvantages and risks of taking part?

There should be no negative impact on individuals or institutions taking part in this research. However, since this research deals with difficult issues such history data related with implementation practices and outcomes of process, performances of E-learning project; some people may find that the interview becomes distressing. If this occurs please indicate this and the interview will stop immediately.

9. What are the possible benefits of taking part?

Whilst there may be no immediate benefits for those individuals and organisations participating in this research project, in broader terms my research aims at contributing to the development and promotion to application information and communication technology to enhance and improve quality of teaching and learning in order to pay the way for innovation and reform of Vietnamese higher education.

10. What happens if the research study stops earlier than expected?

If this research project stops earlier than expected, all participants will be informed and the reason for stopping earlier will be communicated.

11. What if something goes wrong?

All information you will provide will be confidential and will only be used for scientific purposes. However, if you have any problem or would like to complain regarding your treatment by the researcher, please feel free to contact the University Registrar and Secretary on the following address:

DR. Harvey Philip,
Registrar and Secretary,
University of Sheffield,
Firth Court, Western Bank,
Sheffield, S10 2TN

Email: Registrar@sheffield.ac.uk

12. Will my taking part in this project be kept confidential?

Your assistance in providing required information is highly appreciated and valued. All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any reports or publications. No one, except those closely involved in the research process (researcher and supervisor) will have access to the data. At the end of this research project, all transcripts of interview, the audio recording will be destroyed.

13. What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

The research project will be interested in data related with process of E-learning implementation. The data and information will indicates about technology infrastructure, learning and teaching method in E-learning system, E-learning management and administration process and support related with E-learning and ICT services at your institution.

14. What will happen to the results of the research project?

The data is being collected for a Doctor of Philosophy (PhD) degree. Findings of this research project will be used in writing a PhD thesis. Some of the collected data might be presented at conferences, and published in journals such as the Journal of Management Information Systems, Journal of Documentation, and the Journal of Information Systems. No participants will be identified, or identifiable, in such presentations and publications, without their express permission.

15. Who is organising and funding the research?

This project is conducted under the rules and regulations governing post-graduate research at the University of Sheffield. It is being organised and funded by University of Danang, Vietnam and myself as a doctoral student.

16. Who has ethically reviewed the project?

This research project has been reviewed and approved via the ethics review procedure of the Information School at the University of Sheffield

17. Contact for further information

To contact the researcher:	To contact the supervisor
Mr. Dang Cong Tuan	Dr. Jonathan Foster
Email: d.c.tuan@sheffield.ac.uk	Email: j.j.foster @sheffield.ac.uk
Tel.: 0114 2222678	Tel. 0114 2222665
Mobile: + 07881585072	

Postal address for the researcher and supervisor

Information School,
University of Sheffield,
Regent court,
211, Portobello Street,
Sheffield, S1 4DP

If you wish to receive a copy of the research findings, please give contact details:

Please receive my grateful appreciation for your cooperation.

Appendix E: Thematic codes and themes

No	University of Danang			University of Hue			University of Cantho		
	Name	**Source**	**Reference**	**Name**	**Source**	**Reference**	**Name**	**Source**	**Reference**
1	Academic administration	1	4	Academic services	1	1	Academic application system	1	1
2	Academic needs	1	2	Academic support service	3	3	Academic Registration	2	5
3	Academic Registration	1	4	Administrative styles and leadership of college	1	1	Academic support services	1	3
4	Academic support services	1	11	Ages of teaching staff	1	1	Academic System	1	2
5	Academic Transparency	1	1	Author's permit	2	4	Achievement of pilot activities	1	2
6	Administrative improvement for ICT	1	1	Bureaucratic and complex procedure	1	1	Age of lecturer	1	2
7	Advanced Courses	2	3	Challenges of ICT development	1	1	Assessment of learning on E-learning	1	1
8	Age of Lecturer	1	2	College Improvement of administration	1	1	Availability of E-learning	1	1
9	Age of Student	1	1	College's digital infrastructure	1	1	Benefits of E-learning to Student	2	3
10	Available learning resources	2	2	Complex and difficult Digitalization	1	5	Challenges of ICT manager	1	1
11	Bureaucratic administration	1	2	Connection to college's infrastructure	1	1	Changes of academic system	1	1
12	Claimed procedure for E-learning incentives	1	1	Course design and development	1	1	Changes of LMS	2	4
13	COE management	4	22	Cross- functional management	1	1	Changes of mindset of ICT management	1	1
14	Complexity of claimed procedure	1	1	Cross-functional collaboration	1	1	Characteristics of early adopter	1	1
15	Conflicts between Wants and resources	1	1	Database and Data warehouse	1	1	Close ties among college members	1	1
16	Conservative Thinking	1	1	Database centre	1	1	Cloud computing approach	1	1
17	Copyright & violating user right	2	3	Database developed at University centre	1	1	Collaboration learning	1	2
18	Creative Thinking	1	1	Dedication of staff for ICT	1	1	Consistency leadership	1	1
19	Departmental collective culture	1	1	Delegation Vs responsibility	1	1	Continuous maintenance but without development plan	3	4
20	Departmental Culture to facilitate E-learning	3	7	Developing partnership with IT service provider	1	1	Copyright	1	1
21	Developing skill	1	2	Differences from generation	1	1	Course format	1	1
22	Development of Employees	2	2	Difficulties of digital content development	1	4	Culture of online communication	1	1
23	Different level of use	2	2	Digital content and user participation	1	4	Difficulties of remote area's student	1	1
24	Difficult to approach E-learning at beginning	1	1	Digital services provided	2	3	Digital services provided	2	3
25	Difficult to in-house development of Software	1	1	Dissemination information of IS	1	1	Digitalized University administration	1	1

26	Earning of living is biggest motivation	1	1	Distance learning project by E-learning	1	1	Discrimination of types of learning	1	1
27	Important of Earning to E-learning adoption	1	1	Divergent application development	1	1	E-learning Access	2	4
28	E-learning attitude	1	1	Duplication of Software development	1	3	E-learning activities on system	3	3
29	E-learning Benefit	5	30	Each member used different domain	2	4	E-learning benefit	3	4
30	E-learning benefits	1	1	E-learning and ICT initiatives	4	11	E-learning Communication	1	2
31	E-learning Communication	4	10	E-learning benefit	1	1	E-learning Convenience	4	11
32	E-learning guide and consult for lecturer	1	1	E-learning challeges at Hue University	1	1	E-learning device for study	1	1
33	E-learning Knowledge	2	7	E-learning challenges	1	1	E-learning Interactive	5	6
34	E-learning management	2	2	E-learning communication	2	3	E-learning investment	1	1
35	E-learning problem solved by individual teacher	1	1	E-learning Consultancy	1	5	E-learning Knowledge	1	1
36	E-learning recognition	1	1	E-learning drivers	1	1	E-learning Objective	1	2
37	E-learning Registration	1	1	E-learning future plan	1	2	E-learning Operation	1	1
38	E-learning Skeptical	1	1	E-learning materials development	2	2	E-learning pedagogy support	2	2
39	E-learning solution solved by Department	1	1	E-learning operation and management	1	1	E-learning Preparation	4	6
40	E-learning Support	4	13	E-learning Projects funded	1	1	E-learning procedure	1	1
41	Employee retention	1	1	E-learning Recognition	1	1	E-learning project preparation	3	4
42	Employee Stress	1	1	E-Learning requirements	1	1	E-learning Recognition	5	6
43	Encouraged and supportive policy	1	1	E-learning resistance	2	3	E-learning result quantitative results counted	5	9
44	Evaluating and appraisal	1	5	E-learning supported by managers	1	1	E-learning support of Department	1	3
45	Face book Protest	1	1	E-learning understanding	2	2	E-learning teaching method	4	5
46	Financial Incentive	2	2	Electronic devices and facilities	1	2	E-learning Technical Support	4	6
47	Future digital services planned	1	1	Electronic textbook	1	1	E-learning Tool - Assignment	2	2
48	Future policy of E-learning	1	1	Email services	1	2	E-learning tool - Online exams in classroom	1	1
49	Having policy but lack of monitoring	1	1	Executive information system	2	3	E-learning Tool Link	2	4
50	Inadequate student support and working timetable	1	1	Features of Discipline	1	1	E-learning Tool -News and feedback	3	6
51	Increasing student learning space and facilities	1	1	Feedback for student performance	1	1	E-learning Tool-Calendar	2	2
52	Innovative culture	2	2	Functions and responsibility of IT department	1	4	E-learning Tool-Forum	2	2
53	Innovator	1	1	Functions of application	1	3	E-learning Tool-Group work and project	2	3
54	Institutional work	1	1	Funds of E-learning development	2	4	E-learning Tool-Quiz	4	7
55	Intensive investment on network	1	1	Government regulation	1	1	E-learning Tool-Student Assessment	1	2
56	Introduction stage	3	10	Hardware of IT infrastructure	2	6	E-learning Tool-Syllabus	1	1

57	IT skill of Lecturer	1	1	Having Direction but no specific action plan	1	3	E-learning training	1	2
58	Knowledge of ICT	1	4	History foundation	1	1	E-learning used for counselling	1	1
59	Lack of general IT strategy at UD	1	1	Introduction of HITEC	2	4	E-learning used for grade	4	4
60	Lack of IT staff	1	1	ICT investment and budget	1	1	Encourage staff	1	1
61	Leadership	3	12	ICT management	1	1	External support for ICT planning	2	2
62	Learning Organization	1	1	ICT market	1	1	Feature of Course	1	3
63	Level of Use	2	3	ICT of University	1	1	Feature of Discipline	2	2
64	Limitation of budget	2	2	ICT service development	1	4	From E-learning to Email	1	1
65	Localized oriented organization	1	1	ICT Strategic objective	1	4	Functions of IT department	1	1
66	Long time to build digital infrastructure	1	1	ICT strategy of University	1	1	Further training	1	1
67	Low Salary	2	4	ICT-based administration	1	3	Future Plan	2	4
68	Management Commitment	1	2	ICT-based Administration	1	2	Graduated from abroad	1	2
69	Management Power	1	2	ICT-based teaching	2	3	Hardware	1	2
70	Mistakes of network planning	1	1	Improvement of teaching method	1	1	Hardware centralized-Software-decentralized management	1	2
71	More Earning by more teaching	1	1	Inertial psychology	1	1	Hardware for E-learning	1	1
72	Motivation and Rewards	4	13	Information system project	1	2	ICT delegation of management	1	1
73	Needs and Want of UD	1	1	Integration of technology and application	1	1	ICT knowledge of management	1	1
74	Needs of qualified IT staff	1	1	Internal competition	1	1	ICT recognition	3	5
75	Needs of Support for E-learning adoption	1	1	International assistance for training	3	5	ICT Strategic development	1	1
76	Needs of supports and agreements	1	1	International support and funding	2	7	ICT-based communication	1	1
77	Negative Impact	3	6	International supports E-learning	1	1	ICT-based improvement of administration	1	1
78	Network access	1	1	Internet use	1	1	ICT-centralized management	1	1
79	No Fund for digital Plan developed	1	1	IT and E-learning recognition from staff	1	1	Impact of financial incentive	2	4
80	Not be supportive and appreciated	1	1	IT centre of University	2	5	Implementation selected subject and courses	1	2
81	Not implementing incentive policy	1	1	IT facility investment	3	5	Improvement of administration and procedure	1	1
82	Not implementing intention	1	1	IT Functional relations	1	3	Improvement of communication	3	5
83	Other college 's E-learning application	1	1	IT recognition	1	1	Infrastructure	1	4
84	Payment incentive for E-learning adoption	1	1	IT support for College	1	1	Inherited and legacy investment	1	1
85	Planning at university level	1	1	IT Supports from service provider	1	1	Initiative activities	1	2
86	Positive impact	2	5	Knowledge of IT	1	3	Initial approach	1	1
87	Pressure on administrative works	1	1	Lack and Low budget for digitalization of college	1	1	Integration of E-learning	2	4
88	Pressure on teaching	2	3	Lack of ICT skill	1	1	Integration to leverage facility capacity	1	1

89	Principles of E-learning development and adoption	1	2	Lack of integration	1	1	Interactive web-based IS	1	1
90	Distance learning as E-learning	1	1	Lack of time	1	1	International assistance	1	1
91	Promoted solution of E-learning	1	1	Lack of training and professional development	3	5	International support and funding	3	7
92	Promoting E-learning by financial incentive	1	1	Law of charter	1	1	International supports for IT training and development	1	1
93	Reduction of teaching pressure	2	3	Level of use	5	10	Internet connection of Student	1	2
94	Reputation damaged	1	5	Library service	1	1	Introduction	1	1
95	Requirement of motivation of leader	1	1	Limitation of IT budget	1	1	Involvement of manager	2	2
96	Requirement of skilled learner	1	1	Limitation of teaching staff	1	1	IT management	2	7
97	Requirement of skilled staff	1	1	Limitations of E-learning facilities	1	1	IT services	1	1
98	Resist change	1	1	Love of Technology	1	1	IT support	3	5
99	Role of Academic Group	1	1	Low capacity of Network and Server	2	2	Lack of IT capacity	2	4
100	Role of College in E-learning development	1	1	Low payment of IT job	1	1	Lack of Knowledge of E-learning	1	1
101	Role of Dept in E-learning	1	1	Low qualified service provider	1	1	laziness of student	1	1
102	Role of educational change	1	1	Low quality of in-house application development	1	1	Laziness of Adoption	1	2
103	Saving of time	4	8	Motivation and encouragement	1	2	Learning material	4	5
104	School Culture	1	2	Multimedia embedded on E-learning	1	1	Learning resource centre	1	1
105	Scope and Level of E-learning use	1	1	Negative effects of E-learning	1	1	Level of Use	6	17
106	Staff appraisal	1	1	New credit academic system	1	1	Library Services	1	2
107	Staff Assessment	1	1	New digital service development	1	2	Limitation of E-learning	1	1
108	Staff graduated from abroad	1	1	No profit for centre and no benefit for staff	1	2	Low salary	1	1
109	Standardization	2	2	Objectives of academic service	1	1	Mandated adoption for Student	2	2
110	Strategic planning for E-learning development	1	1	Objectives of E-learning plan	1	3	MOET's regulation	2	2
111	Strategic Thinking	1	5	Open and public	1	4	Need of User	2	3
112	Student laziness	2	3	Open source	2	3	Network access quota	2	2
113	Student Satisfaction	1	3	Overload of network	1	2	Network and system performance	1	2
114	Suitable form of learning	1	1	Overload of Server	1	2	Network connection	2	2
115	Team Work	2	2	Passive situation for working	1	1	Nominating and motivating	4	5
116	Though and idea	3	5	Payment to encourage E-learning adoption	1	1	Obligation vs volunteering	2	2
117	Time consuming	5	8	Poor library service	1	3	One way teaching and learning on E-learning	1	4
118	Training and professional Development	4	9	Positive thinking of young lecturer	1	1	Organic-based delegation	1	1
119	Unqualified IT Staff	1	1	Principles of ICT development at HU	1	1	Organizing E-learning	4	7

120	Unskilled staff	1	2	Principles of information system development	1	1	Out of date E-learning course	1	3
121	Use of Computer Lab	1	1	Profit-oriented approach	1	2	Out of date E-learning materials	1	1
122	User involvement	1	1	Public access learning resources	1	1	Participation recognition	1	1
123	Working Attitude	1	2	Reading a book in class	1	1	Pilot implementation	2	2
124	Working culture of academic department	1	1	Recognition of ICT	1	1	Professional development	5	7
125	Changing from yearly to credit academic system	1	1	Remember and experience based method	1	1	Professional development	1	1
126	Conservative teaching method	1	1	Role of collective culture	1	1	Project Time	2	2
127	Consult from service provider	1	2	Role of HR	1	1	Quality of learning on E-learning	1	3
128	Course Development	2	4	Role of IT	1	1	Real time communication	2	3
129	Course Format	3	5	School E-learning and ITC management	1	4	Reducing use and interests	1	3
130	Differentiation of student assessment	1	1	School E-learning plan	1	3	Refresh E-learning course	3	5
131	Education philosophy	1	1	School Implementation	2	4	Regulation	1	1
132	E-learning tool- Group assignment	1	1	School Web-based services	3	10	Relationship of structure	1	1
133	E-Learning Tool-Diary	1	1	Separated Development and investment on E-learning	1	3	Reward	4	5
134	E-learning Tool-Feedback	1	1	Separated software application development	1	2	Saving time	1	1
135	E-learning Tool-Forum	3	8	Separation of library system	1	1	Self motivation	6	12
136	E-learning Tool-Quiz	2	2	Separatist ideology	2	2	Self-learning and studying	1	1
137	E-learning Tool-Team Learning	1	2	Short term Investment and development	1	1	Sharing and supporting	4	6
138	Freedom Learning	1	1	Similarity of applications developed and invested	2	3	Single sign on system	1	1
139	Improvement and Changes of Pedagogy	5	18	Splitting project to avoid governmental regulation	1	2	Spillover of implementation	1	1
140	Improvement of Colleague relationship	2	3	Standardization and Unification of content	1	4	Student learning	1	3
141	Improvement of relationship among students	2	2	Student Demography	1	2	Strategic Development of ICT	1	1
142	Improvement of relationship with student	4	8	Student information system	1	1	Student laziness	1	1
143	Learning Environment	2	14	Student laziness	2	2	Student Learning	1	1
144	Learning Material	1	2	Student's computer literacy	2	2	Student recognition of E-learning	1	2
145	Learning Self-control or Obligation	2	6	Study abroad	1	3	Student skill	1	1
146	Mandatory registration from Lecturer	1	1	Supports for E-learning users	1	1	System Overload	3	5
147	Nature of courses	2	3	Taking time for Standardization	1	1	Taking time to learn and use	2	4
148	Needs for System	2	5	Technology, determination and leader's support	1	1	Technical Training	2	2
149	Needs of integration	1	1	Three directions of College's ICT development	1	3	Time consuming for ICT management	1	1
150	Needs of lecturer's E-learning	2	2	Time	1	1	Time Resource	1	2

151	No learning resources- No E-leaning adoption	1	1	Time consuming for teaching on system	1	1	Time table	1	1
152	Pressure on lecture by E-learning's need	1	1	Traditional communication channel and method	1	1	Training contents	1	1
153	Proactive teaching and learning process	1	1	Transparency of information	1	1	Two way teaching and learning	1	1
154	Reducing attractive	2	2	Unclear and ambiguity of IT investment	2	2	Unified mechanism of ICT management	1	1
155	Slow response and feedback on E-learning	1	1	University E-learning Plan	1	5	Unsafe on open and published environment	1	1
156	Standardization for adopting E-learning	1	1	University ICT future plan	1	4	Vendor neutral strategy of ICT development	1	1
157	Standardization of course preparation	1	1	University IT department	2	7	Vietnamese recruitment & labour relationship	1	2
158	Student Assessment on E-learning	3	10	User participation and involvement	1	6	Volunteer adoption	1	1
159	Student's deal of learning	1	1	Violation of academic regulation	1	1			
160	Teaching and learning environment	1	1	Young lecturer VS Old Lecturer	2	3			
161	Teaching overloaded	1	1						
162	Teaching preparation	1	3						
163	Transparency	1	1						
164	Unrealised time saving of E-learning	1	1						
165	Amateur and scattered database	1	1						
166	Become a file transfer system	1	1						
167	Development plan for digital services at UD	1	1						
168	Difficult to incorporate IT applications together	1	2						
169	Distributed and Isolated ICT	1	3						
170	E-learning Hardware	4	9						
171	E-learning Software of system	2	3						
172	Existing technical problem of E-learning	2	2						
173	Focus on Hardware not on Application software	1	1						
174	Hardware Maintenance	1	2						
175	Hardware Vs Software	1	1						
176	Independent IT management	1	1						
177	Infrastructure at UD	1	1						
178	In-house software development	1	1						
179	Internet Connection	1	2						
180	Isolated development of Network & infrastructure	1	1						

181	IT management	1	1						
182	IT Policy	1	1						
183	IT support	2	6						
184	Local-oriented development of IT	1	1						
185	Low speed network	1	1						
186	Need of network infrastructure	1	1						
187	Needs of Network service	1	1						
188	Needs of User	2	15						
189	Objectives of ICT investment	1	1						
190	overload of network	1	1						
191	Problem Solving	2	2						
192	Professionals of organization	1	1						
193	School Digital Technology	5	14						
194	School Network	4	15						
195	Shared Infrastructure	1	1						
196	Technical Collaboration	1	2						
197	Technical complaint of user	2	2						
198	Technical Duty	1	1						
199	Technological competency	1	1						
200	The overload of network	1	1						
201	Uniformity of network	1	1						
202	Uni's service on Wan	1	2						
203	Unreliable system	4	7						
204	Wan campus network	1	2						
205	Wasting time of student and teacher	1	1						
206	Weakness of server capacity	1	1						
207	Web-based Subjects	1	2						
208	Wi-Fi campus network and security	3	4						

Appendix F: Thematic analysis of University of Danang

Organization

No	Issues discussed	Basic themes	Organized themes	Global themes	Super global themes
1	Academic Registration	Suffering from registration	Academic service	Capacity and oversize	Organizational configuration
2	Academic support services	Poor academic services			
3	Academic administration	Span of administration			
4	Conflicts between Wants and resources	Facility limitation	Limitation facility		
5	Support service and working timetable	Providing support services			
6	Increasing student learning space and facilities	Needs for more facility			
7	Student Satisfaction	Student satisfaction			
8	Encouraged and supportive policy	None-implementation	Losing control of policy		
9	Having policy but lack of monitoring	Policy without implementation			
10	Institutional work	Institutional works	Work overload		
11	Pressure on administrative works	High volume teaching			
12	Departmental collective culture	Adoption by Collective culture	College culture	College culture	
13	Departmental Culture to facilitate E-learning	Culture impacts on adoption			
14	School Culture	Destroy individual endeavours			
15	Working culture of academic department	Role of Culture			
16	Administrative improvement for ICT	Challenges in administration	Challenges in administration	Managerial settings	
17	Bureaucratic administration	Administrative-based operation			
18	Knowledge of ICT	Manager's ICT knowledge	College management		
19	Localized oriented organization	Separated project management			
20	Management Power	Power and duty			
21	COE's Management	Management performance			
22	Needs of supports and agreements	UD management	UD management		
23	Other college 's E-learning application	UD's member 's E-learning			
24	Planning at University level	Distance learning			
25	Objectives of ICT investment	Professional & completion			
26	Development of Employees	Stress	Working condition Working condition	Working environment	
27	Employee Stress	Job stress			

28	Earning of living is biggest motivation	Salary motive	Salary motivation		
29	Earning per month	Salary motivation			
30	Low Salary	Low salary			
31	Employee retention	Job retention	Job retention		
32	Lack of IT staff	Lack of qualified staff			
33	Needs of qualified IT staff	Needs for qualified staff			
34	Unqualified IT Staff	Lack of staff			
35	Staff appraisal	Staff appraisal	Job satisfaction		
36	Staff Assessment	Staff Assessment			
37	Working Attitude	Staff satisfaction			
38	Staff graduated from abroad	Skills from abroad			

Technology

No	Issues discussed	Basic theme	Organized theme	Global theme	Super global theme
1	School Digital Technology	Poor quality service	Network service	ICT capacity	ICT competency
2	School Network	Unreliable service			
3	Weakness of server capacity	Low configuration server capacity	Network Capacity		
4	Overload of network	Network bottleneck			
5	The overload of network	Low capacity of network			
6	Technical Duty	ICT skills and task	ICT skills and task		
7	Wi-Fi campus network	Open Wi-Fi network	Security of network		
8	Wi-Fi Network and security	Unsecure network			
9	Difficult to incorporate IT applications together	Separate oriented development	Isolated management	Isolated and separated ICT	
10	hardware Vs Software	None compatibility			
11	Local-oriented development of IT	Local-bounded development			
12	Distributed and Isolated ICT	Divided development of ICT	Separated development		
13	Isolated development of Network & infrastructure	Disconnected IT infrastructure			
14	Uniformity of network	Differentiated technology invested	Budget limitation for ICT	Fragmented investment	
15	Difficult to in-house development of Software	In-house development to save budget			
16	No Fund for digital Plan developed	ICT Plan without budget			
17	Limitation of budget	Budget allocated in many times	Fragmented Budget for ICT		
18	Long time to build digital infrastructure	Time to accumulation for project budget			

19	Consult from service provider	Technological consultancy	Partner cooperation	College's ICT development	
20	Technical Collaboration	Technical cooperation			
21	Mistakes of network planning	Poor ICT planning	College's ICT planning		
22	Use of Computer Lab	PC malfunction	ICT maintenance		
23	Hardware Maintenance	Poor maintenance works			
24	Network access	Weakness of wave			
25	Independent IT management	Independent ICT	IT governance	UD's ICT strategic development	
26	IT management	Decentralized			
27	Future digital services planned	University's ICT role to member	University's ICT strategy		
28	Intensive investment on network	Network-oriented focus			
29	Lack of general IT strategy at UD	Comprehensive ICT development			
30	Amateur and scattered database	Hardware-biased planning	University's ICT technology scope		
31	In-house software development	Compatibility among network layers			
32	IT Policy	Connection and link			
33	Development plan for digital services at UD	Administration-supported development			
34	Focus in Hardware not on Application software	hardware-oriented			
35	Infrastructure at UD	IT infrastructure	University's ICT infrastructure development		
36	Wan campus network	Connecting member campuses			
37	University service on Wan	Internet connection priority			

Teaching and learning

No	Issues discussed	Basic themes	Organized themes	Global themes
1	Student laziness	Student learning	Resource and motivation	Ambiguity of academic environment
2	Student's deal of learning	Deal of learning		
3	Pressure on teaching	None time resources allocated for adopting		
4	Teaching overloaded	Time resources allocated for lecturing		
5	Standardization	Time required for academic standardization	Challenges for Academic changes	
6	Standardization of course preparation	Standard of course designed		
7	Principles of E-learning development and adoption	Academic transparency		
8	Transparency	Transparency as solution		

9	Teaching preparation	Academic resources	Teaching method	
10	Differentiation of student assessment	Academic discipline		
11	Education philosophy	Teacher-centred approach		
12	Conservative teaching method	Instruction-based method		
13	Changing from yearly to credit academic system	Chance for academic changes	Academic transition and changes	
14	Teaching and learning environment	Current transition period		
15	Role of Academic Group	Administrative rather than academic role		
16	Advanced Courses	Academic development		
17	Academic needs	Changes of academic support		
18	Promoted solution of E-learning	ICT-oriented cirriculum		

Pre-implementation

No	Issues discussed	Themes identified	Basic themes	Organized Themes
1	Difficult to approach E-learning at beginning	Challenges to adopter without support of training	No Training for adopter	Initiative approach
2	E-learning guide and consult for lecturer	Training and professional development	User guide material	
3	Introduction stage	Exciting psychology and attractiveness	Positive psychology	
4	Innovative culture	Innovation of technology adoption	Innovation culture	Innovative culture

Implementation

No	Issues discussed	Basic theme	Organized Theme	Global theme
1	Age of Lecturer	more Ages, less adoption	Favourable condition	Position condition
2	Age of Student	more Ages, less adoption		
3	Innovator	E-learning has been adopted at innovative working place		
4	Nature of courses	Characteristics of courses impact on user involvement		
5	E-learning Benefit	Benefits recognized will lead to adopt more system		
6	E-learning attitude	Do not respect to educational technology	E-learning awareness	
7	E-learning Knowledge	good knowledge will lead to adopt technology		
8	E-learning recognition	recognition of E-learning from manager is important to develop E-learning		
9	Though and idea	good thinking will lead to adopt otherwise will resist		
10	Learning Self-control or Obligation	Student participate E-learning due to force by lecturer and grade	volunteer vs obligation	E-learning policy & operation
11	Mandatory participation to student	Mandatory E-learning registration from Lecturer		
12	E-learning Communication	Lack of information due to poor communication and ambiguity of policy	Clarity and guidance	
13	Strategic planning for E-learning development	Lack of strategic planning for E-learning development		

14	Strategic Thinking	ICT development and application are not priority		
15	Payment incentive for E-learning adoption	Payment incentive for E-learning adoption	E-learning motivation policy	
16	Promoting E-learning by financial incentive	Promoting E-learning by financial incentive		
17	Conservative Thinking	Traditional method is better	Resisting factor	Negative condition
18	Copyright	worrying lost of right and benefit		
19	Learning Environment	E-learning access to learn at non-academic places	Learning environment	
20	Internet Connection	Internet fee costs for student learning		
21	IT skill of Lecturer	IT skill of Lecturer	Skill & professional development	
22	Training and professional Development	Neglecting this tasks		
23	Unskilled staff	Lack of ICT skill to participate		
24	Professionals of organization	Lack of professional workings		
25	Available learning resources	Learning content and digital material are challenges for participating E-learning	Developing learning resources	
26	Learning Material	Rich learning material on system		
27	Claimed procedure for E-learning incentives	Implementing E-learning policy	Bureaucratic administration	College management
28	Complexity of claimed procedure	Procedure of financial incentives		
29	Motivation and Rewards	Lack of motivation and encouragement from management	Poor management	
30	Not be supportive and appreciated	Not be supportive and appreciated-barrier from management		
31	Financial Incentive	Make policy but did not followed	Control and monitor	Managerial competency
32	Not implementing incentive policy	Having incentive policy but not implementing		
33	Not implementing intention	Having Intention but not implementing yet		
34	E-learning management	Evidence for inappriciation of E-learning from college managers	Management Unsupported	
35	Evaluating and appraisal	Not do right things of appraisals for active involvement		
36	Management Commitment	Lack of commitment from management		
37	Requirement of motivation of leader	Requirement of motivation of leader	Leadership competence	
38	Leadership	Not leading to ICT development and application		
39	E-learning tool	Group Work and Project	Technology-based teaching method	Pedagogical method
40	E-Learning Tool-Diary	Function used to teach on system		
41	E-learning Tool	Feedback Function used to teach on system		
42	E-learning Tool-Forum	Forum-Function used to teach on system		
43	E-learning Tool-Quiz	Function used to teach on system		
44	E-learning Tool-Team Learning	Team Learning-Function used to teach on system		
45	Course Development	Using tool to develop E-learning courses		
46	Course Format	Course designed on the system	Teaching method	

47	Slow response and feedback on E-learning	Slow response and feedback on E-learning		
48	E-learning Registration	Simple to join system but why it is technical problem	Technical problems of system	Inappropriate technology
49	Technical complaint of user	User complained about technical problem		
50	Technical problem of E-learning	A lot technical problems of E-learning existed		
51	Low speed network	Low speed wasted time for user	Performance of system	
52	Unreliable system	Learning process on system is not continuous		
53	E-learning Hardware	ICT capacity do not meet with user need, E-learning requirements	Low capacity of E-learning system	
54	Shared Infrastructure	Shared Infrastructure		
55	Technological competency	Did not matched with needs of system		
56	E-learning Support	Support service is very poor, not right time, delay and becrauratics	E-learning support	Challenging to adoption
57	E-learning Software of system	E-learning admin work fails to support learning on system		
58	Problem Solving	Support service is poor		
59	IT support for E-learning	Poor support service designed and provided		
60	Requirement of skilled learner	Requirement of skilled learner	Challenges of HR	
61	Requirement of skilled staff	Requirement of skilled E-learning staff		
62	Time consuming	Time requires to learn and adopt technology	Time consuming for adoption	
63	Unrealised time saving of E-learning	Unrealised time saving of E-learning		
64	User involvement	Some staff make a deal of participation	Organizational politics	
65	Web-based Subjects	Left behind in other college member		
66	Developing skill	E-learning helps professional development	Benefit for adopter	E-learning benefits
67	Positive impact	Effect to users		
68	Role of educational change	E-learning will change teaching method	Improvement of E-learning	
69	Freedom Learning	Flexible learning and teaching method		
70	Improvement and Changes of Pedagogy	E-learning help improvements of teaching and learning method		
71	Improvement of Colleague relationship	Learning from colleagues		
72	Collaboration of students-student learning	Improvement of relationship among students		
73	Improvement of relationship with student	Enhancing relationship with student		
74	Student Assessment on E-learning	Student assessment effects to student participation, and unbelive about online assessment	Benefits of adoption Benefits of adoption	
75	Proactive teaching and learning process	Help to save time for teaching pressure		
76	Reduction of teaching pressure	Using E-learning to meet with amount of teaching works	Reducing teaching volume and works	
77	Saving of time	Saving time for teaching staff		
78	E-learning benefits	Remedy for shortage of infrastructure	Generating revenues or income	
79	More earning by more teaching	Teaching staff want to teach more for earning		

80	Role of Dept in E-learning	Role of Dept in E-learning	Institutional rather academic function	
81	Resist change	Difficulty and challenge make user leaving the system	Frustration of E-learning implementation	

Post-implementation

No	Issued discussed	Basic themes	Organized themes	Global Themes
1	Reducing attractive	Reducing attractive	Declination of interest	Outcome
2	Become a file transfer system	Technical problem unsolved		
3	Resist change	Disappointed feelings		
4	Different level of use	Different location, different adoption	Different level of adoption at different department	
5	Level of Use	Different level adoption of department		
6	Scope and Level of E-learning use	different scope of adoption		
7	Negative Impact	Damage of learner	Damages and risk of E-learning adoption	Risk and damage
8	Reputation damaged	Reputation lost		
9	Wasting time of student and teacher	Waste time due to technical issue		
10	E-learning problem	Individual problem solving	Self-solving problem	Future development
11	E-learning solution	Department problem solving		
12	Face book protest	Student problem solving		
13	Team Work	Team problem solving		
14	E-learning Skeptical	E-learning suspect	Future plan	
15	Future policy of E-learning	E-learning to solve oversize		
16	Promoted solution of E-learning	Distance rather than blending learning		
17	Suitable form of learning	Academic change's opportunity		
18	Learning Organization	E-learning to change	Social networking for E-learning	
19	Pressure on lecture	E-learning pressure		
20	Needs for System	Multimedia services	Need for integrated services	Needs for E-learning
21	Needs of integration	Digital service integration		
22	Needs of Network service	Network and internet improvement	Need for digital infrastructure	
23	Needs for infrastructure	Infrastructure improvement		
24	Needs of Support	better support service	Needs for E-learning supports	
25	Needs of User (teacher)	Increasing the use E-learning		
26	Needs of lecturer's E-learning	E-learning standards	Need for standardization of pedagogy	
27	Teaching material and references	Standard teaching approach		

Appendix G: Thematic analysis of Cantho University

Organization

No	Issues discussed	Basic Themes	Organized themes	Global Themes	Super global theme
1	Close ties among college members	Managerial relationship	Organizational structure	Organizational setting	Organizational configuration
2	Relationship of structure	Cooperation in Organizational structure			
3	Organic-based delegation	University foundation	University charter		
4	Regulation-based agreement for regional University	Regulation-based University			
5	Delegation of ICT management	Content-decentralized development	ICT development and investment	ICT governance	
6	Hardware -centralized management	Cost-oriented management of Hardware			
7	Unified mechanism of ICT management	ICT management	Management and leadership		
8	Consistency leadership	ICT leadership			
9	Time consuming for ICT management	Time required to ICT management	Time requirement for ICT	Challenges of ICT development	
10	Time Resource	Time consuming for ICT application			
11	Challenges of ICT manager	ICT knowledge and skill	High qualified manager		
12	ICT knowledge of management	ICT knowledge and skill			
13	Digitalized University administration	ICT-based administration	ICT-oriented administration	ICT-based administration	
14	ICT-based improvement of administration	ICT-oriented improvement	Administrative improvement		
15	Improvement of administration and procedure	ICT-based work flow			
16	Academic Registration	Long and complex procedure	Quality of academic service	Poor services & support	
17	Academic support services	Low quality support service			
18	Library Services	Low quality library service			
19	Low salary	Low salary	Public working environment		
20	Vietnamese recruitment and labour relationship	Public recruitment			

Technology

No	Name	Basic themes	Organized Themes	Global themes	Super global
1	Cloud computing approach	Saving cost orientation	Technological strategy	ICT strategy	ICT competency
2	Vendor neutral strategy of ICT development	Independent technology			
3	Inherited and legacy investment	Integration-oriented development	Enterprise integration		
4	Integration to leverage facility capacity	Integral availability of platform			
5	Single sign on system	Integral service			
6	External support for ICT planning	External support and consultancy	ICT investment and resources		
7	Hardware	External funding			
8	Changes of mindset of ICT management	ICT thinking	ICT strategic development		
9	Strategic Development of ICT	ICT-applied administration			
10	Functions of IT department	Functions of ICT centre	ICT organization	ICT policy & management	
11	IT management	Centralized management			
12	Hardware centralized VS Software decentralized	Application decentralized development			
13	Digital services provided	Academic support for student	IT support services		
14	Interactive web-based IS	Information system for student			
15	Academic application system	Academic management support			
16	IT services	Academic support for student			
17	Internet connection of Student	Low bandwidth	Shortage of network access		
18	Network access quota	Limitation of network access			
19	Infrastructure	Limitation of ICT resource	ICT capacity		
20	Lack of IT capacity	Lack of ICT resource			
21	Network and system performance	Low network capacity	Network Capacity and performance		
22	Network connection	Limitation of network			
23	System Overload	Network overloaded			

Teaching and learning

No	Name	Basic themes	Organized Themes	Global themes	Super global
1	Academic System	Heavy curriculum	Changes of academic system	Challenges of academic environment	Learning motivation
2	Changes of academic system	Academic change approach			
3	Learning resource centre	High disciplines	Unsupported learning		
4	Student skill	Lack of learning skill			
5	Laziness	Student laziness	Student laziness	Passive learning	
6	Student laziness	Student laziness			
7	Student Learning	Learning approach	Student learning		
8	Self-learning and studying	Learning style			

Pre-implementation

No	Codes	Basic Themes	Organized themes	Global themes
1	International assistance	E-learning training by international expertise	International training supports	External supports
2	International supports for IT training and development	ICT professional development by international partner		
3	International support and funding	International funds for E-learning platform	International funding	
4	Characteristics of early adopter	Enthusiasm	Early adopter	Trial and error approach
5	Participant attraction	Love technology		
6	E-learning Preparation	Availability resource and plan for Implementation	E-learning Preparation	
7	E-learning project preparation	Implementation plan developed well		
8	Initiative activities	Static webpage course for distance learning	Developing distance learning	
9	Initial approach	Using chat function to talk		
10	Introduction	Complex and difficult feelings to adopters	Gaining experiences	
11	Pilot implementation	Learning experiences		
12	Achievement of pilot activities	Lack of technological absorbability	Encouragement of adoption	
13	Nominating and motivating	Motivating E-learning adoption		

Implementation

No	Issue discussed	Basic theme	Organized theme	Global theme
1	Assessment of learning on E-learning	Unbelief about quality of E-learning	E-learning skeptical mindset	Negative conditions
2	Discrimination of types of learning	Traditional rather than technology-based learning		
3	Quality of learning on E-learning	Low learning quality of E-learning		
4	Copyright	Losing or violating Copyright of content	Resisting factor	
5	Taking time to learn and use	Time consuming for adoption		
6	Technical Training	Technical training for adopter	Technical training	Skill & professional development
7	Training contents	Technical-focused training		
8	E-learning training	Training end users	E-learning training	
9	Further training	Continuous training for adopter		
10	Professional development	Training by partner expert	International support for training	
11	Professional development	Training in abroad		
12	E-learning Knowledge	E-learning knowledge impact on adoption	E-learning awareness	Positive conditions
13	ICT recognition	ICT recognition		
14	Lack of Knowledge of E-learning	Knowledge of E-learning		
15	Age of lecturer	Age of lecturer	Facilitating factor	
16	E-learning Recognition	E-learning recognition		
17	Graduated from abroad	Experience learning with E-learning		
18	E-learning benefit	Effectiveness-led adoption		
19	E-learning Communication	E-learning implementation communication	Communication and support culture	
20	Sharing and supporting	Sharing and support to adoption		
21	ICT-based communication	Management involvement on implementation	Managerial involvement	
22	Involvement of manager	Management involvement on promotion		
23	Benefits of E-learning to Student	Improving learning performance	Benefit of E-learning adoption	
24	E-learning Convenience	Saving time and convenience for working		
25	Course format	Course syllabus	Teaching method	Pedagogical method
26	E-learning activities on system	E-learning design		
27	E-learning teaching method	Tech-based method		
28	E-learning Interactive	Interactive teaching and learning	E-learning pedagogy	
29	Real time communication	Real time communication		
30	Two way teaching and learning	Two way teaching and learning		
31	E-learning Tool	Assignment tool used	Technology-based method	

32	E-learning tool	Online exam tool used		
33	E-learning Tool	News and feedback tool used		
34	E-learning Tool	Tool used		
35	E-learning Tool	Forum tool used		
36	E-learning Tool	Group work tool used		
37	E-learning Tool	Quiz tool used		
38	E-learning Tool	Functional tool used		
39	E-learning Tool	Syllabus tool used		
40	E-learning Tool Link	Link tool used		
41	Learning material	Upload and download approach	System as file server	
42	One way teaching and learning	Extra reference		
43	E-learning support of Department	E-learning support services offered by dept.	E-learning organization	E-learning policy & operation
44	Organizing E-learning	Cross-functional management		
45	E-learning Operation	Centralized E-learning operation		
46	Encourage	Motivating adoption	Volunteer and self-motivation	
47	Self motivation	Volunteer adoption		
48	Volunteer adoption	Volunteer adoption policy		
49	Mandated adoption for Student	Mandating student adoption	Mandatory adoption	
50	Obligation vs volunteering	Forcing student participation		
51	Availability of E-learning	Availability of system	Promoting adoption policy	
52	Impact of financial incentive	Financial incentive		
53	Reward	Financial rewards as main promotion		
54	E-learning Technical Support	Technical support services	IT support service for adoption	
55	IT support	IT support service		
56	Implementing selected subject and courses	E-learning experience	Learning by doing	
57	Spillover of implementation	Learn to do better		
58	Hardware for E-learning			
59	E-learning Objective	Academic Support objectives	Blend E-learning	
60	E-learning pedagogy support	Teaching support on the system	Pedagogy support	
61	Feature of Course	Nature of course	Influential factor to adoption	Challenges of adoption
62	Feature of Discipline	Nature of discipline		
63	Out of date E-learning course	Using the same courses	Out of Date learning material	
64	Out of date E-learning materials	Using the same content		
65	Refresh E-learning course	Forcing updating coursed by deleting old one		

66	Culture of online communication	Online communication skill	Online communication	
67	Unsafe on open and published environment	Worrying about sensitive information		
68	Difficulties of remote area's student	Low ICT literacy	Lack of IT skill & literacy	
69	Student recognition of E-learning	Un-recognition of E-learning		
70	E-learning procedure	Integration support adoption	Integration of E-learning	E-learning technology
71	Integration of E-learning	Technological integration of system		
72	E-learning Access	Easy to access system by integration		
73	Changes of LMS	Losing course contents	Technical problem and limitation	
74	E-learning device for study	lack of devices for learning		
75	Limitation of E-learning	Limited storage capacity		
76	E-learning used for counselling	Counselling on E-learning system	None-teaching activities	Learning method
77	E-learning used for grade	Informing grade on E-learning system		
78	Collaboration learning	Learning collaboration	Student learning on system	
79	Improvement of communication	communication improvement		
80	Student learning			
81	Time table	Convenient time schedule for teaching on system		

Post-implementation

No	Issue discussed	Basic theme	Organized theme	Global theme
1	Continuous maintenance without development plan	Continuously encouragement to adoption	Volunteered adoption	Volunteered-based development
2	Reducing use and interests	No pay, no adoption		
3	Future Plan	No development plan	No strategy for E-learning	
4	ICT Strategic development	Un-planning for E-learning		
5	Laziness of Adoption	Reducing interests in E-learning	Reducing adoption	E-learning needs
6	From E-learning to Email	Avoiding E-learning use		
7	E-learning result quantitative results counted	Outcome implementation	Needs of adoption	
8	Level of Use	Different level of adoption		
9	E-learning investment	Departmental budget for E-learning	Needs of further adoption	
10	Need of User	Needs for more functions of system		

Appendix H: Thematic analysis of University of Hue

Organization

No	Issues discussed	Basic Themes	organized Themes	Global Themes
1	Cross- functional management	Poor management across-functions	Across-function and relationship	Organizational setting
2	IT Functional relations	Weakness relationship of IT function		
3	Cross-functional collaboration	Weakness of Functional relations		
4	History foundation	Complex university structure	Complex structure	
5	Internal competition	Conflict of attraction of student enrolment		
6	Law of charter	University charter need to be regulated by Law	Charter of University	
7	Separatist ideology	College member want to be independent		
8	Functions and responsibility of IT department	Unstable function of IT unit	Unstable structure and function	
9	University IT department	IT administrative function		
10	HITEC	Profit-oriented IT Unit	Profit-oriented function	IT Governance
11	IT centre of University	Independently budgeting		
12	ICT Strategic objective	Investment-centralized ICT at Headquarter	IT Budget Controlled by University	
13	ICT strategy of University	Investment- centralized ICT for administration improvement		
14	Delegation Vs responsibility	Unbalanced between power and duty	IT Budget allocated by college	
15	Funds of E-learning development	E-learning funded by college budget		
16	Administrative styles and leadership of college	Unprofessional management	IT project management	
17	Bureaucratic and complex procedure	Bureaucratic administration		
18	ICT investment and budget	Small and fragmentary IT project	IT investment and resources	ICT resources
19	Lack and Low budget for digitalization of college	Step-by-step investment		
20	Splitting project	Project split to avoiding government control		
21	Challenges of ICT development	Limited resources for developing ICT	Lack of staff and budget	
22	Role of HR	Qualified staff to technology adoption		
23	Limitation of IT budget	Limitation of IT budget	Limited investment budget	
24	Short term Investment and development	Limited resource for long-term development		
25	Lack of ICT skill	Lack of qualified IT staff	Unqualified IT staff	
26	IT staff recruitment	Low payment of IT job		
27	International assistance for training	International support for training	International funding and support	

28	International support and funding	International funding for infrastructure		
29	Developing partnership with IT service provider	Low development of biz support service	External low expertise	
30	ICT market	Low development of biz support service		
31	IT Supports from service provider	Quick response support from provider	Good support service from provider	
32	Low qualified service provider	Low qualified provider selected		
33	IT support for College	Low response IT support services	Poor support services	
34	Passive situation for working	Low response to need's support		
35	Academic services	Basic service offered	Academic services offered	
36	Academic support service	Online registration provided		
37	Digital services provided	Limited digital service offered for student's use		
38	Library service	Small library		
39	Poor library service	Lack of resources and out of data technology's library		
40	Government regulation	Regulation-driven change for education	Academic changes	
41	New academic system	Flexibility of academic system		
42	Open and public	Academic transparency		
43	Role of IT	Role of IT in academic changes	IT support to change	
44	Traditional communication channel and method	Poor communication to changes in academic system		
45	Objective of Information system	Transparency of information		
46	ICT-based administration	ICT-based administration	Administration improvement	
47	ICT-based Administration	ICT-based Administration		
48	College Improvement of administration	ICT-oriented administration at college	IT-based improvement	
49	Dissemination information of IS	Information for managing college works		
50	IT recognition	Executive management's appreciation of IT	IT awareness	
51	Knowledge of IT	Change based on ICT knowledge		
52	Recognition of ICT	Improvement of ICT role		
53	Dedication of staff for ICT	Love IT from staff		
54	ICT management	Unsuitable IT policy of University		
55	Role of collective culture			

Technology

No	Issues Discussed	Basic Themes	Organized Themes	Global
1	Divergent application development	Limitation of knowledge lead to divergent development	Divergent of development	Isolation & separation
2	Separated software application development	Separated software application development		
3	Duplication of Software development	Waste of resources due to duplicated development	Separated management	
4	Similarity of applications developed and invested	Similarity of applications developed and invested		
5	Separated Development and investment on E-learning	Separated Development and investment on E-learning		
6	Complex and difficult Digitalization	ICT development without master plan		
7	Separation of library system	Various library software system used	Proprietary platform	
8	Lack of integration	Various technological vendors used		
9	College's digital infrastructure	Capacity of IT infrastructure	Network capacity	ICT capacity
10	Overload of Server	Low capacity of application servers		
11	Functions of application	Poor functions of application	Poor qualified in-house development	
12	Low quality of in-house application development	In-house application development at college		
13	Email services	University's email service provided	Administration-focused development	ICT development orientation
14	Information system project	IT investment focusing on administration works		
15	Principles of ICT development at Hue University	Developing infrastructure located at Headquarter		
16	Principles of information system development	IS built on information needs	Decision support system development	
17	Student information system	Online communication for student		
18	Executive information system	Executive information system developed		
19	Three directions of College's ICT development	Principles of college's IT development		
20	Hardware of IT infrastructure	IT resources available for E-learning	Multimedia investment	ICT strategy
21	Electronic devices and facilities	Multimedia classroom		
22	Each member used different domain	Separated online presents of college member	Independent governance	
23	IT facility investment	Investment followed by member's objective		
24	Connection to college's infrastructure	Inter-network connection	WAN-oriented investment	
25	ICT of University	WAN-oriented development		
26	Database centre	Data centre supported-University administration	Data centre investment	
27	Database and Data warehouse	Data warehouse focus		
28	Database developed at Uni level	Skeptical IT investment at University level	Ambiguity of ICT policy	
29	Unclear and ambiguity of IT investment	Unclear and ambiguity of IT investment		

Teaching and learning

No	Issue discussed	Basic theme	Organized Theme	Global theme
1	Internet use	Using internet for news	Student learning	Academic conflict
2	Student laziness	Student laziness		
3	Differences between generations	Pedagogical conflicts of generations	Pedagogical conflict	
4	teaching method	Experience-emphasised teaching of old lecturers		
5	Student assessment	No feedback for student's performance	Student assessment	
6	Violation of academic regulation	Grade for student submitted late		
7	ICT-based teaching	Intensive multimedia for teaching	Teaching method	
8	Reading a book in class	Reading-based pedagogy		
9	Course design and development	Lack of reference sources for designing course	Teaching content	
10	Differences teaching contents on same course	Standardization and Unification of content		
11	Standardization of teaching	Time required for standardization of pedagogy		
12	Student Demography	E-learning demand depends on student demography		

Pre-implementation

No	Issues discussed	Basic theme	Organized Themes	Global themes
1	E-learning and ICT initiatives	College member and university have their own approaches	E-learning as business	Peculiar approach
4	No profit for centre and no benefit for staff	No profit, stop implementation		
5	Profit-oriented approach	E-learning as profit centre		
2	E-learning Consultancy	Buying software to implement	Special understanding	
3	E-learning understanding	E-learning as academic management system		

Implementation

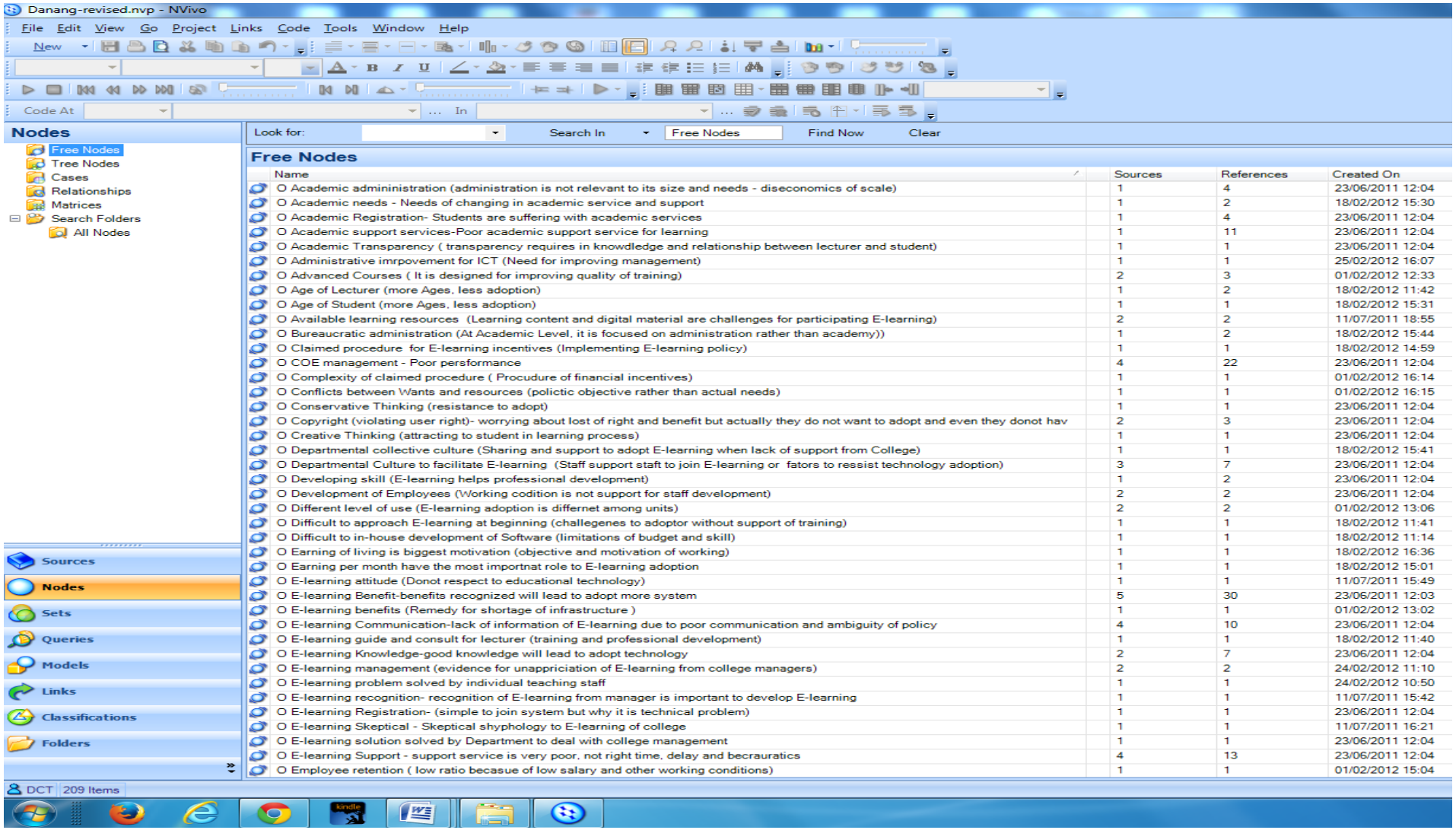
No	Name	Basic Themes	Organized Themes	Global Themes
1	E-learning Recognition	Facilitating changes to adoption	Facilitating factor	Positive conditions
2	Facilitating E-learning development	E-learning knowledge supports for adoption		
3	Love of Technology	Willingness to adoption by staff graduated from abroad		
4	Study abroad	Study abroad facilitates to E-learning adoption		
5	Positive thinking of young lecturer	Self motivation and change by young lecturer	Love technology	
6	Young lecturer VS Old Lecturer	Young lecturer prefer IT than old one		
7	Ages of teaching staff	Young staff love technology adoption		
8	E-learning supported by managers	Executive's support messages on communication	Management involvement	
9	Technology, determination and leader's support	Key points for successful adoption		
10	Digital content development	Technical support to design online course	Learning materials	Negative conditions
11	Role of digital content and user participation	No lecturer adopting E-learning		
12	E-learning challenges at Hue University	No adoption from learner and lecturer		
13	IT and E-learning recognition from staff	Positive mindset but passive adoption	Resisting factor	
14	Inertial psychology	Psychologically change to E-learning		
15	E-learning resistance	E-learning resistance by Experience and nature of course		
16	Training and professional development	Lack of training and professional development	Difficulty of adoption	
17	Limitation of teaching staff	Lack of training for E-learning adoption		
18	Limitations of E-learning facilities	Lack of resources to support E-learning		
19	E-learning communication	Encouraging E-learning adoption	Volunteer adoption	E-learning Policy
20	Motivation and encouragement	Volunteering E-learning adoption		
21	E-learning materials development	Paying for E-learning adoption	Motivation adoption	
22	Payment to encourage E-learning adoption	Financial incentive to encourage E-learning adoption		
23	Student's computer literacy	Student lack of ITC literacy and skill	Challenges of user	Challenges of adoption
24	User participation and involvement	No adopter on E-learning system		
25	E-learning challenges	Skeptical about qualification of E-learning performance	Challenges of pedagogy	
26	Features of Discipline	Nature of course is not suitable for E-learning		
27	Time consuming for teaching on system	Taking time to learn system	Limited time resource	
28	Lack of time	Time consuming as adoption		
29	Time	Time consuming as adopting		
30	Integration of technology and application	Separating between E-learning and library	Limitation of software	Inappropriate technology
31	Open source Platform	Using open source platform		

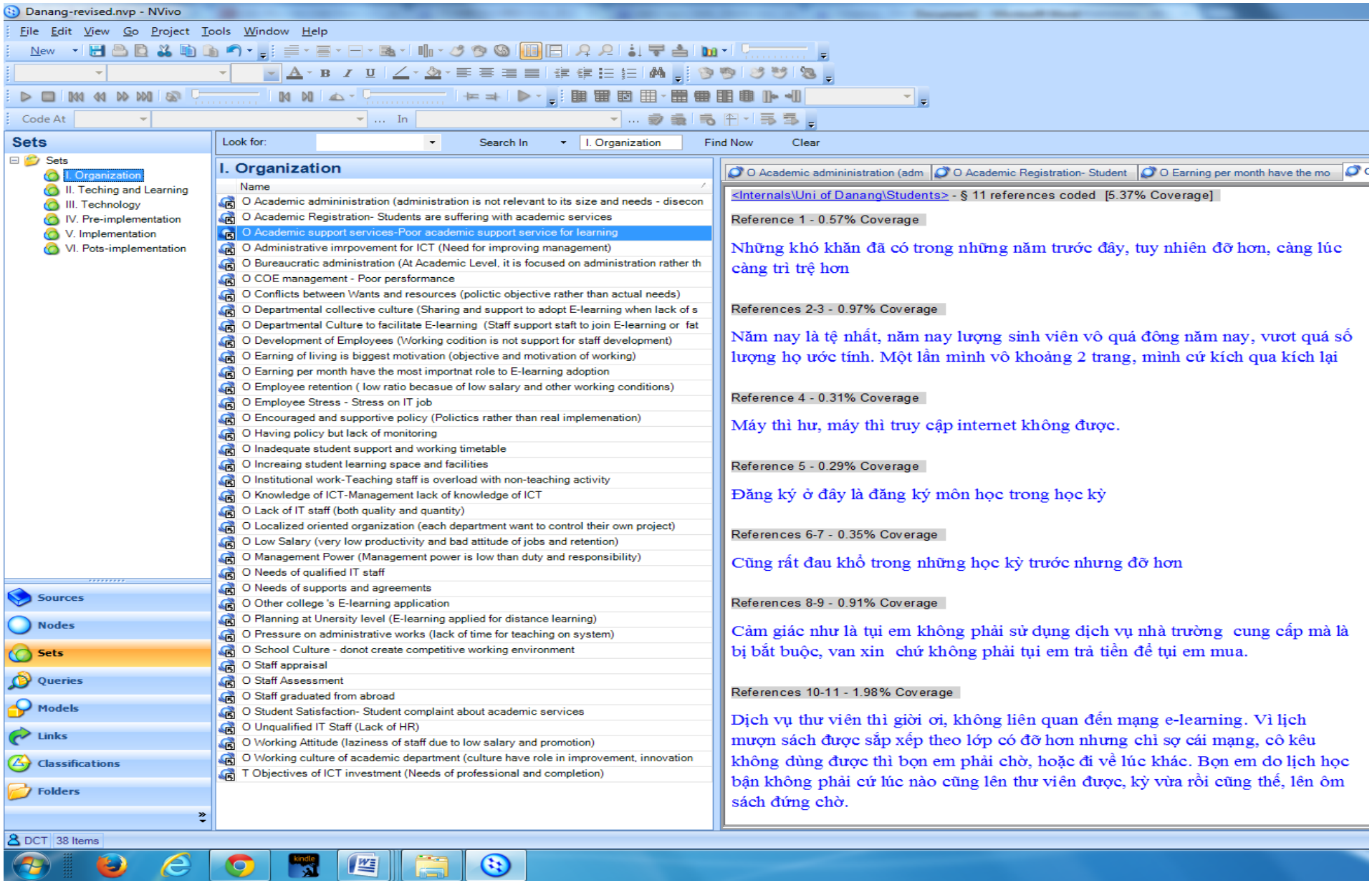
32	Low capacity of Network and Server	Infrastructure capacity do not meet the demands	Limitation of network	
33	Overload of network	Network stuck as registration		
34	E-learning benefit	Transparency of courses	E-learning Benefits	Benefit and damage
35	Public access learning resources	Promotion Freedom, democracy, transparency of academic		
36	Improvement of teaching method	IT-based improvement for teaching		
37	Author's permit	Violating copyright on E-learning system	Damages	
38	Negative effects of E-learning	Damages from E-learning adoption		
39	E-learning Projects funded	Commitment from project's beneficiaries	External supports and funding	Operation and management
40	International supports E-learning	International funding and support for training at medical school		
41	Distance learning project by E-learning	Pilot project: distance learning		
42	E-learning operation and management	Unprofessional operation of E-learning	E-learning operation	
43	School E-learning and ITC management	Organizing E-learning Unit		
44	School Implementation (current status)	Planning but have not implemented yet		
45	E-Learning requirements	Needs for investment on facility, Staff and references	E-learning needs	
46	Electronic textbook	Developing textbook to support references		
47	ICT service development	Facilitating online communication	E-learning support	
48	Objectives of academic service	Developing online support for learning		
49	School Web-based services	Support service offered by web-based system		
50	Supports for E-learning users	Technical issues and learning supports		

Post-implementation

No	Issue discussed	Basic theme	Organized theme	Global theme
1	E-learning future plan	Distance learning rather than Blend learning	Future development	Intention without action
5	New digital service development	Generating revenue from digital service		
8	University E-learning Plan	Technological integration		
9	University ICT future plan	Data centre priority		
6	Objectives of E-learning plan	College E-learning plan	College's E-learning planning	
7	School E-learning plan	Open source platform for saving budget		
4	Multimedia embedded on E-learning	Enrich content by multimedia		
2	Having Direction but no specific action plan	No actual E-learning plan	E-learning interest	
3	Level of use	E-learning as file server		

Appendices K: Coding By Nvivo

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O Academic admininistration (administration is not relevant to its size and needs - disecon
O Academic Registration- Students are suffering with academic services
O Academic support services-Poor academic support service for learning
O Administrative imrpovement for ICT (Need for improving management)
O Bureaucratic administration (At Academic Level, it is focused on administration rather th
O COE management - Poor persformance
O Conflicts between Wants and resources (polictic objective rather than actual needs)
O Departmental collective culture (Sharing and support to adopt E-learning when lack of s
O Departmental Culture to facilitate E-learning (Staff support staft to join E-learning or fat
O Development of Employees (Working codition is not support for staff development)
O Earning of living is biggest motivation (objective and motivation of working)
O Earning per month have the most importnat role to E-learning adoption
O Employee retention (low ratio becasue of low salary and other working conditions)
O Employee Stress - Stress on IT job
O Encouraged and supportive policy (Polictics rather than real implemenation)
O Having policy but lack of monitoring
O Inadequate student support and working timetable
O Increaing student learning space and facilities
O Institutional work-Teaching staff is overload with non-teaching activity
O Knowledge of ICT-Management lack of knowledge of ICT
O Lack of IT staff (both quality and quantity)
O Localized oriented organization (each department want to control their own project)
O Low Salary (very low productivity and bad attitude of jobs and retention)
O Management Power (Management power is low than duty and responsibility)
O Needs of qualified IT staff
O Needs of supports and agreements
O Other college 's E-learning application
O Planning at Unersity level (E-learning applied for distance learning)
O Pressure on administrative works (lack of time for teaching on system)
O School Culture - donot create competitive working environment
O Staff appraisal
O Staff Assessment
O Staff graduated from abroad
O Student Satisfaction- Student complaint about academic services
O Unqualified IT Staff (Lack of HR)
O Working Attitude (laziness of staff due to low salary and promotion)
O Working culture of academic department (culture have role in improvement, innovation
T Objectives of ICT investment (Needs of professional and completion)
O Academic admininistration (adm
O Academic Registration- Student
O Earning per month have the mo
<Internals\Uni of Danang\Students> - § 11 references coded [5.37% Coverage]
Reference 1 - 0.57% Coverage
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References 2-3 - 0.97% Coverage
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Reference 4 - 0.31% Coverage
Máy thì hư, máy thì truy cập internet không được.
Reference 5 - 0.29% Coverage
Đăng ký ở đây là đăng ký môn học trong học kỳ
References 6-7 - 0.35% Coverage
Cũng rất đau khổ trong những học kỳ trước nhưng đỡ hơn
References 8-9 - 0.91% Coverage
Cảm giác như là tụi em không phải sử dụng dịch vụ nhà trường cung cấp mà là bị bắt buộc, van xin chứ không phải tụi em trả tiền để tụi em mua.
References 10-11 - 1.98% Coverage
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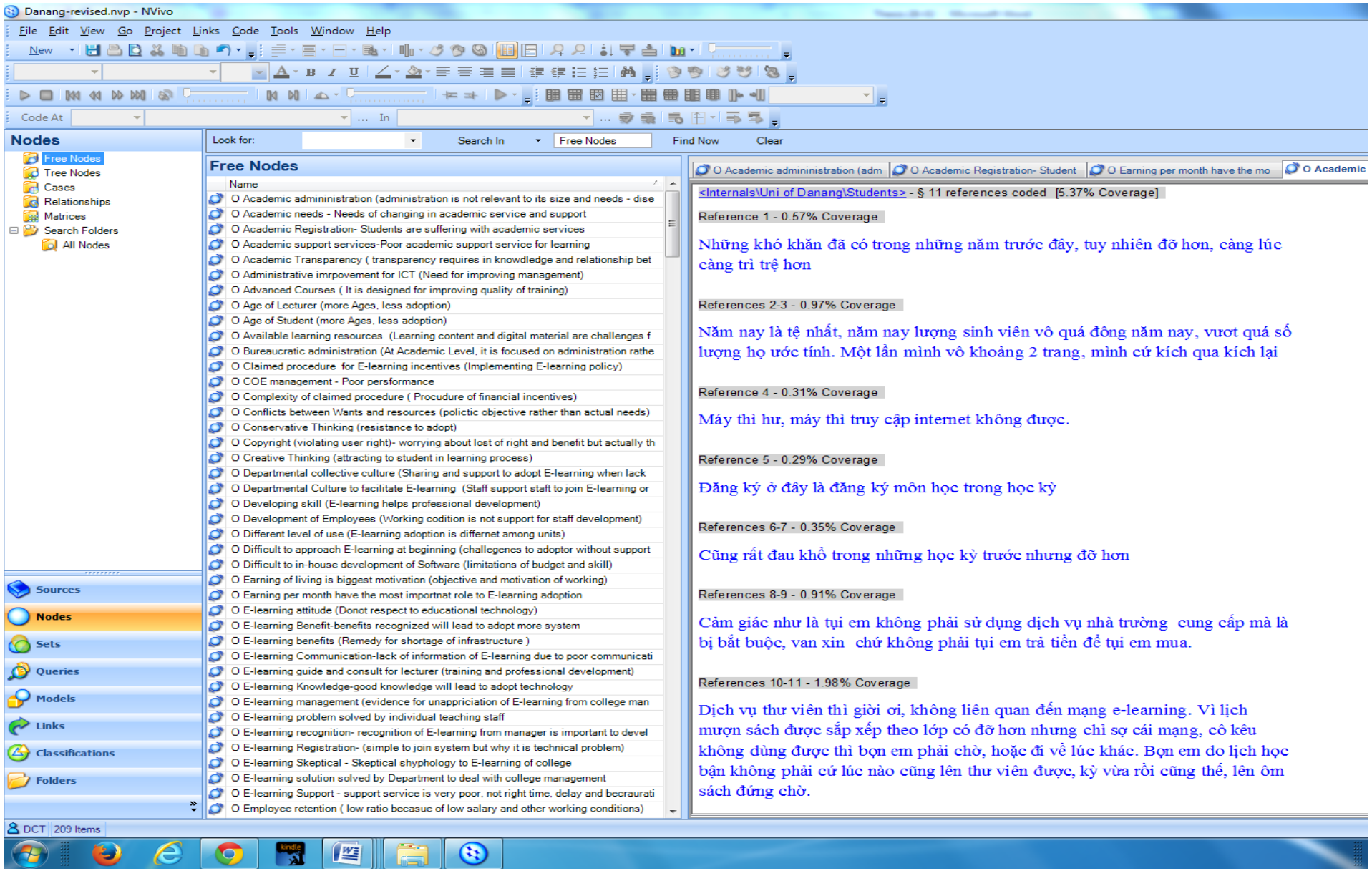
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O Administrative imrpovement for ICT (Need for improving management)
O Advanced Courses (It is designed for improving quality of training)
O Age of Lecturer (more Ages, less adoption)
O Age of Student (more Ages, less adoption)
O Available learning resources (Learning content and digital material are challenges f
O Bureaucratic administration (At Academic Level, it is focused on administration rathe
O Claimed procedure for E-learning incentives (Implementing E-learning policy)
O COE management - Poor performance
O Complexity of claimed procedure (Procudure of financial incentives)
O Conflicts between Wants and resources (policitic objective rather than actual needs)
O Conservative Thinking (resistance to adopt)
O Copyright (violating user right)- worrying about lost of right and benefit but actually th
O Creative Thinking (attracting to student in learning process)
O Departmental collective culture (Sharing and support to adopt E-learning when lack
O Departmental Culture to facilitate E-learning (Staff support staft to join E-learning or
O Developing skill (E-learning helps professional development)
O Development of Employees (Working codition is not support for staff development)
O Different level of use (E-learning adoption is differnet among units)
O Difficult to approach E-learning at beginning (challegenes to adoptor without support
O Difficult to in-house development of Software (limitations of budget and skill)
O Earning of living is biggest motivation (objective and motivation of working)
O Earning per month have the most importnat role to E-learning adoption
O E-learning attitude (Donot respect to educational technology)
O E-learning Benefit-benefits recognized will lead to adopt more system
O E-learning benefits (Remedy for shortage of infrastructure)
O E-learning Communication-lack of information of E-learning due to poor communicati
O E-learning guide and consult for lecturer (training and professional development)
O E-learning Knowledge-good knowledge will lead to adopt technology
O E-learning management (evidence for unappriciation of E-learning from college man
O E-learning problem solved by individual teaching staff
O E-learning recognition- recognition of E-learning from manager is important to devel
O E-learning Registration- (simple to join system but why it is technical problem)
O E-learning Skeptical - Skeptical shyphology to E-learning of college
O E-learning solution solved by Department to deal with college management
O E-learning Support - support service is very poor, not right time, delay and becraurati
O Employee retention (low ratio becasue of low salary and other working conditions)
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