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Implementing e-Learning in a Vietnamese University: Towards a Configurational Approach

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Abstract

This paper reconstructs the process of implementing e-Learning at a Vietnamese University. A case study approach incorporating interviews with relevant stakeholders including managers, faculty, and students is described. A thematic network analysis (TNA) identifying and categorising the issues relevant to the e-Learning implementation process and its attendant organizational, pedagogical and technological factors is presented. The main findings of the thematic analysis are that it is organizational factors, e.g. lack of management commitment, a bureaucratic structure, technology availability, rather than other factors that most significant in influencing the sustainability of the implementation process. A configurational analysis is then presented that explains the reasons why the interaction between contextual factors and the implementation process led on this occasion to an unsustainable outcome; an explanation supported by the interaction between e-learning needs, demands, capacity and competencies. In a conclusion suggestions are given as to why implementers of e-Learning can benefit from adopting a configurational approach within their own institution.

Keywords: e-Learning, information systems implementation, sustainability, configuration analysis

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1 Introduction

During the 1980s the Socialist Republic of Vietnam underwent a period of widespread economic reform. The purpose of these reforms, termed “doi moi”, was to engineer a transition from an economy that had previously been centralized and planned to one that was more market-oriented in nature. Anticipating the impact that these reforms would have on the employment sector, the Vietnam government invited higher education institutions to participate in a set of centrally funded ICT projects, particularly in the area of e-Learning. The purpose of these projects was both to enable institutions to improve the efficiency of their internal operations, but also in the case of e-learning to anticipate delivery of education to a broader population of students, both on and off campus. The government’s approach to these projects was initially laissez-faire, with the formulation and implementation of ICT strategies largely left to the institutions themselves. During the 2000s, the laissez-faire approach of the 1980s and 1990s was replaced with a more interventionist approach, with government taking a leading role in strategy formulation. Whether laissez-faire or interventionist however the majority of ICT projects have not delivered on their intended purposes; and a key question remains as to how to implement ICTs in a way that illustrates their usefulness for e-Learning not just as a one-off exercise but over a sustainable period of time. This paper presents findings from a case study of implementing e-Learning at a Vietnamese university. The case study was guided by a general research question: How had e-Learning been implemented within the university? The paper is organised as follows. A review of current models of how to implement e-Learning is first presented. This is followed by a description of our case study approach, including data collection and data analysis methods used. A thematic network analysis (TNA) of the process of implementing e-Learning in the university studied, and the factors impinging on this process is initially presented, before a configurational interpretation and analysis of the themes is provided. In a conclusion we suggest how e-Learning implementers can adopt a configurational approach that can aid the integration of the process- and factor-based aspects of e-Learning implementation into a systematic and sustainable framework.

2 Models of the e-Learning implementation process

Models of the e-learning implementation process have typically drawn on frameworks used in the implementation of information systems. The main models used have been diffusion of innovations (Rogers, 2003) and the technology acceptance model (TAM) (Davis, 1989); with the former studying the decision-making process surrounding the adoption and diffusion of new instructional technology, and the latter investigating users’ acceptance or rejection of e-Learning technology. From a theory of diffusion perspective, technological innovation occurs via a five-stage process of adoption within a population over time; including awareness, persuasion, decision-making, implementation and confirmation stages (Rogers, 2003; Straub, 2009). There has been significant interest in applying diffusion of innovation

theory to a number of institutional aspects of implementing e-Learning; including its adoption by teachers (Jebeile, 2003), students' perceptions (Keller & Cernerud, 2002), and its sustainability (Nichols, 2008). With regard to students Keller & Cernerud (2002) emphasize that higher education institutions should develop an implementation strategy so as to inculcate a positive attitude towards the adoption of e-Learning among those who have the motivation to use computers for learning purposes. Nichols (2008) points out that unless broader consideration is given to the institutional suitability of adopting e-Learning, enthusiasm for its adoption will be limited for the long term. According to Davis (1989), user acceptance of technology is influenced by two key characteristics: perceptions of the usefulness of the technology for certain tasks, along with perceptions of the ease of use of the technology. In the TAM model, intention to use a new technology is related to perceived usefulness and perceived ease of use, which in turn impacts on observable behaviors surrounding the use of the technology. This framework has been adapted and extended to uses of e-Learning technology, including teachers' acceptance of e-Learning technology (Yuen and Ma, 2008), students' attitudes towards e-Learning (Berdea, 2009), their motivations to use it (Sánchez and Hueros, 2010; Zhang et al., 2008), and the success factors contributing to learner acceptance (Lee, 2006). This theory has also been used to study the outcomes of adopting e-Learning systems (Islam, 2013), along with predictions as to the intention to continue to use e-Learning (Lin, 2011, Lee et al., 2009, Liu et al, 2005). While both diffusion of innovations and TAM have been extensively used in the study of e-Learning implementation, they have also been subjected to critique. While diffusion of innovations theory is useful in systematically tracing the adoption of a technology over time, its focus is typically descriptive rather than explanatory. Questions as to how to improve and facilitate the process of innovation are also often left aside (Straub, 2009). On the other hand the TAM model has also been critiqued on the basis of its lack of "theoretical support regarding the relationships between e-learning adoption behaviors and outcomes" (Islam, 2013); while Straub (2009) considers that the theory gives insufficient attention to how individual differences in self-efficacy influence perceptions of the ease of use of e-learning technology. Both diffusion of innovations and the technology acceptance model present generic models for investigating the process of technology transfer, and its attendant factors. We now turn our attention to studies that have investigated the specific conditions influencing the implementation of e-Learning systems within educational organizations.

3 Contextual Factors Influencing the e-Learning implementation process

The factors impinging on the effectiveness of e-Learning can be broadly categorized into three areas: organization, pedagogy and learning, and technology. Research into each of these areas is reviewed here.

3.1 Organizational factors

An organization's readiness to implement e-Learning is a necessary condition if e-Learning implementation is to be successful; and can refer to the readiness of managers, and faculty, along with the availability of financial and technological resources. Bates (2007) for example emphasizes the need for strategic planning around e-learning implementation. Institutions need to envision what is to be achieved, and as a means to this end prepare a strategic analysis of the current needs, status and recommended future developments: "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, strategic knowledge of and managerial competence in e-learning implementation are identified as key facilitators of the process at an institutional level. Initial planning for e-Learning implementation may also depend on a positive relationship across functional departments (Penrod and Harbor, 2000); with the establishment of inter-departmental cooperation a prerequisite for successful systems implementation. This will create support and a process for implementing E-learning, taking into account the support needs of both faculty and students. In addition, E-learning cannot be implemented in isolation and requires input from service providers, financiers, and all academic departments (Penrod and Harbor, 2000; Sadik, 2007). In terms of campus-wide knowledge of the technology, Chan & Ngai (2007) develop five indicators that can 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.

Apart from issues of institutional readiness around strategy formulation and implementation, the readiness of faculty is also a major issue. Sadik (2007) points out for example that, although equipped with adequate pedagogical knowledge and skills, academic staff's lack of knowledge and skills related to web-based interaction and authoring tools create barriers to the adoption of E-learning; with experience, levels of computer literacy, nature of degrees held, and professional training all being relevant variables influencing faculty acceptance and use. Negative attitudes towards the use of technology are also cited as a reason for faculty resistance to the use of e-learning materials in university teaching (Uzunboyulu, 2007). This resistance can stem from a host of factors including organizational change, a lack of teaching experience with ICTs, on-campus support for teachers using technology, a lack of specialist ICT teachers to teach students computer skills, the time required to successfully integrate technology into the curriculum, adequate financial support, and computer availability (Mumtaz, 2000). As a result, appropriate and effective faculty training and development programs for E-learning adoption should assess the factors that influence the process of adopting e-Learning among faculty members (Keengwe et al, 2009; Mumtaz, 2000). Ward and Parr (2009) emphasize how the aim of faculty 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". In sum institutions also need to develop a human resource strategy that can incentivize the participation and involvement of teachers and staff in the implementation of e-learning (Sadik, 2007).

3.2 Pedagogical factors

When implementing E-learning, higher education institutions not only need to address strategic campus-wide issues in relation to its management, development, and technological support. Universities also face challenges of developing an appropriate pedagogy. In their review of learning theories and models, Conole et al (2004) summarize a number of pedagogical theories applicable to e-Learning, including experiential, behavioral, cognitive, and constructivist approaches, along with more socially situated learning and activity theory-based approaches; each of which has implications for the design and facilitation of e-learning. Despite the range of pedagogical approaches available, Vrasidas (2004) criticizes how teaching with e-Learning systems is often ineffective due to the fact that teachers use a Learning Management System (LMS) to disseminate content without applying any principled pedagogy. With their default pre-configured structure e.g. structured course content, functional buttons such as discussion, syllabus, and quiz making, a typical LMS supported environment makes it easy for instructors to teach online without needing to work out their own pedagogical style. Lane (2007) argues that a default LMS is different from a constructivist pedagogical approach for example and this is likely to limit academic creativity and flexibility. At the same time designers of e-Learning systems such as *Blackboard* and *Moodle* claim that they are open and flexible; with the latter developers stating that their system has been guided by constructivist approach that aims to deliver a "powerful set of learner-centric tools and collaborative a learning environment". It has been further claimed that the *Blackboard* system can be utilized by a number of pedagogical models specifically applied for E-Learning, such as the Mayes' Conceptualisation Cycle, Laurillard's Conversational Mode and Salmon's E-tivities (Blackboard Training Resource, 2013). If so, it could be concluded that educational institutions are using *Blackboard* and *Moodle* software are applying constructivist principles, also no such inference can necessarily be made. In sum Govindasamy (2001) points 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". There is a need to explore and configure how this pedagogy arises however, and whether it rests with the technology developers or with the pedagogical culture of the institution.

3.3 Technological factors

One of the core factors of E-learning, along with organization, and pedagogy, is technology. In an e-Learning environment a Learning Management System (LMS) provides the "services that manage the delivery and tracking of learning content to a learner" (Liu et al, 2003) (see *Figure 1*). These services are invoked based on the mechanism of SCORM. A learning content management system (LCMS) is a multi-user environment that manages the process of creating and delivering learning content and permits users to create and reuse digital material and content (Liu 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, a LCMS has to be designed to conform to industry standard specifications, including those of content metadata, content

packaging, and content communication. The LMS is responsible for interchanging information about user profiles and user registration with other systems, locating the course from the LCMS and receiving learner actions from the LCMS. Web service technology will help to successfully integrate communications between the LMS and the LCMS so as to ensure interoperability between the LMS, the LCMS and if needed other learning systems (Lui et al, 2003). When planning implementation the choice of e-Learning technology and components can then be more easily made by its developers and implementers While this provides an understanding of the basic architecture of an LMS it is also worthwhile mentioning the basic technologies that enable the system to be used for e-learning; and include dynamic hypertext mark-

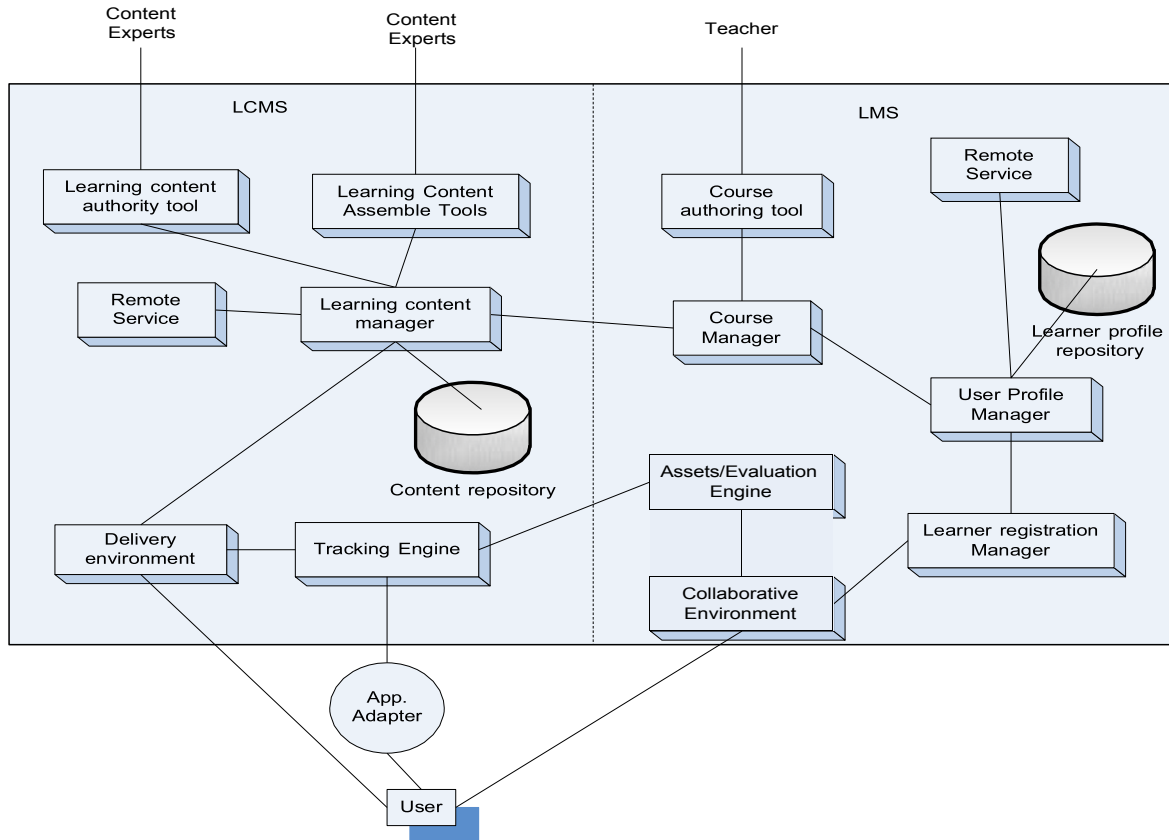


Figure 1 Model of functional E-learning system (adapted from Lui. et al, 2003)

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). Further multimedia improvements such as Silverlight, Flash, and HTML5 developments significantly improve the multimedia, interactive and real-time communicative capabilities of e-Learning systems. At the same time such improvements represent barriers for developing countries where bandwidth bottlenecks act as a major barrier to applying educational technology. An e-Learning system cannot be deployed independently to provide its functionality without communicating with other systems and applications within an organization; hence interoperability, standardized data structures and communications protocols for e-learning objects and cross-system workflows represents key research issues (Liu et al, 2003). Liu et al. (2003) have categorized these e-Learning standards and specifications into five types: i) 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 ii) 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. iii) Learner profile refers to the personal data of learners in many aspects, such as learning plans, status participation, degrees, learning history, etc. iv) Learner registration helps to provide information on learners to identify, manage and deliver suitable system services to registered learners. v) 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 also 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.

4 Methodology and methods

Case study method. This study utilized the case study method for investigating the implementation of e-learning at a Vietnamese university. The university was selected to be the case because it has operated E-learning environments with a long history of using internal processes to support learning and teaching. As a research strategy, the case study has been the most frequently used research method in the fields of business, information system, and education. Yin (2003) proposed that case study research is a method of "an empirical inquiry that investigates a contemporary phenomenon within its real life context". From this view, case study research could be applied when the potential role of contextual settings help to investigate the phenomenon of study. The inquiry structure of case analysis could be visibly constructed on three areas; within- case, contextual settings and the case and its context. In other word, the process of case analysis will incorporate the parts of study, the case and its context together to investigate the studied phenomenon. In this case the process of implementing e-Learning is the phenomenon being investigated, with the factors impinging on this process acting as its context. Together they form the case-in-context. *Institutional background.* Founded in 1994 by the government, the University of Danang (UD) was a merger of four public universities, along with junior colleges and vocational schools located in Danang City, Central Vietnam. Under a new legal institution, UD is a multi-disciplinary research university that 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 174.812m VND. UD has been incorporated as a public and regional university and is recognized today as among the top ten universities within the Vietnamese higher education system. UD offers various academic degrees in the areas of business and economics, engineering, education, foreign languages, medicine and health. UD has also entered into a strategic partnership with more than 20 provincial centres of Continuing Education across the country to further offer off-campus degree programs for in-service students. Being a multi-level and multi-disciplinary university, UD holds an important role in training human resources and doing research that meets the needs of socio-economic development in Vietnam. UD's corporate strategy is to target Research University status by 2020, with its key role being to train a highly qualified workforce and acting as a major centre for research and international exchange for the people of Central Vietnam and the Western Highlands. *Data collection method.* Data were collected via semi-structured interviews and focus groups, which were conducted with four key groups at two different time periods, including managers, staff, lecturers and students. Thirty-two subjects participated in the data collection exercise including four senior college managers, one manager from university administration, four academic heads, and six lecturers who had either adopted or resisted the implementation of e-learning within their instructional contexts; and seventeen students. The purpose of the interviews was to elicit subjects' understandings of the process of implementing e-learning within the university, and the factors impinging on this process and its outcomes, both organizationally and for learning purposes. All interviewees were also encouraged to express their own perspectives by identifying issues they felt were related to the discussion topics. *Data analysis method.* Analysis of the data proceeded into two steps: data preparation and data analysis. A thematic network analysis (TNA) of the data from the interviews was conducted (Attride-Stirling, 2001). The TNA procedure incorporates six steps. These steps start with the concrete data and gradually move to abstraction. First, all the issues discussed in the interview transcripts were assigned to a two dimensional matrix, with one dimension presenting the pre-implementation, implementation and sustainable aspects of the implementation process; with the other dimension illustrating the factors of organization, teaching and learning, and technology. Second, emerging *basic themes* were identified by deriving meaning, ideas and implications from the data. As a result, all interview transcripts were converted into 208 basic themes. Third, an analysis of the meaning of each basic theme, the issues discussed, and its relationship with other basic themes was conducted; following which the basic themes were merged, arranged, and modified to represent a higher level of meaning, called *organized themes*. The study identified 72 organized themes relevant to the process of implementation and its contextual factors. Fourth, the organized themes were arranged and organized into global themes. These global themes broadly cover and represent the main points of the organized themes, which result in the

construction of networks. Wherever possible, the global themes were further arranged and organized at the highest abstract level, called super global themes. Fifth, thematic networks were constructed, looking for further patterns in the data to determine that the themes were comprehensive. Finally, the networks' global themes and patterns were summarized and interpreted in light of the research's aims and questions. Attride-Stirling (2001) points out that TNA is only a tool for data analysis, not analysis in itself. In effect it is a versatile data preparation tool. Therefore for the purposes of case analysis the study drew on a further method called configurational analysis in order to bind together the individual thematic networks. The study adopts an organizational configuration with which to incorporate all individual thematic networks into an holistic stance (Meyer et al. 1993). This approach is operationalized by seeking "any multidimensional constellations of conceptually distinct characteristics that commonly occur together" from research "imperatives" and the implementation process (Miller 1987; Meyer et al., 1993). The three research imperatives were those associated with the thematic networks of organization, teaching and learning, and technology; each of which played a central role in organizing the process of E-learning implementation within the university. (Miller, 1987). In this sense, a configuration can be identified as the degree to which the process of E-learning implementation is orchestrated and connected by a single theme that can be found within or across the imperatives (Miller, 1996). In light of this, the study will examine the configurations between the imperatives and the process of implementation. The degree of configuration will be identified by the closeness of the alignment between the imperatives and implementation process so as to reinforce their relationships and interactions (Miller, 1996). Whenever the alignment between elements of imperatives and the nature of implementation process has been recognized, their interaction and relationships have been configured for the purposes of interpreting the pattern of implementation.

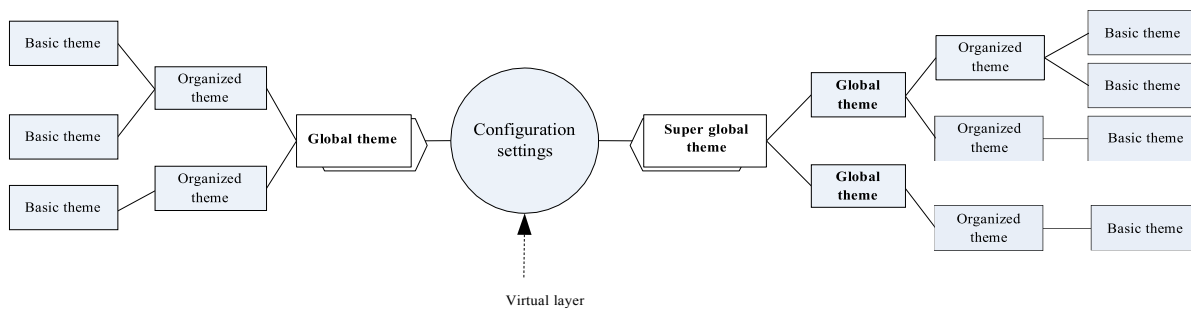


Figure 2: Configuration settings

This approach extends the TNA method by applying configurational analysis to a single case. In doing so an extra 'virtual layer' is added where the relationships and interactions between the elements of each individual thematic network are capable of from further integration and exploration from the viewpoint of a virtual configuration. To enable patterns in the text to emerge, the individual networks of imperatives and the implementation process are connected via a layer where the configuration will be identified depending on the alignment of elements of thematic networks. Figure 2 illustrates how the individual thematic networks integrate with a virtual configuration layer. The configuration enables the thematic network to be organized into a pattern in which the individual elements of the pattern can work together to represent conceptual knowledge and allow for unbiased exploration of knowledge. From a TNA perspective, configuration settings allow the individual web-like-thematic network to connect together, depending on how closely aligned the relationships and interactions are. Therefore, both thematic networks of the implementation process, and its contexts can be integrated on a virtual layer in order to answer the research questions.

5 Data analysis

The analysis is organised as follows. The process-based and factor-based themes are presented and briefly described first before providing a configurational interpretation of the interaction between these sets of themes. In the context of E-learning implementation, the themes were the main points of interaction and interrelation that significantly contributed and impacted on the process and outcome of E-learning implementation at the University. The outcome of a thematic network analysis is a web-like thematic network at different levels of detail, from the specific to the most general.

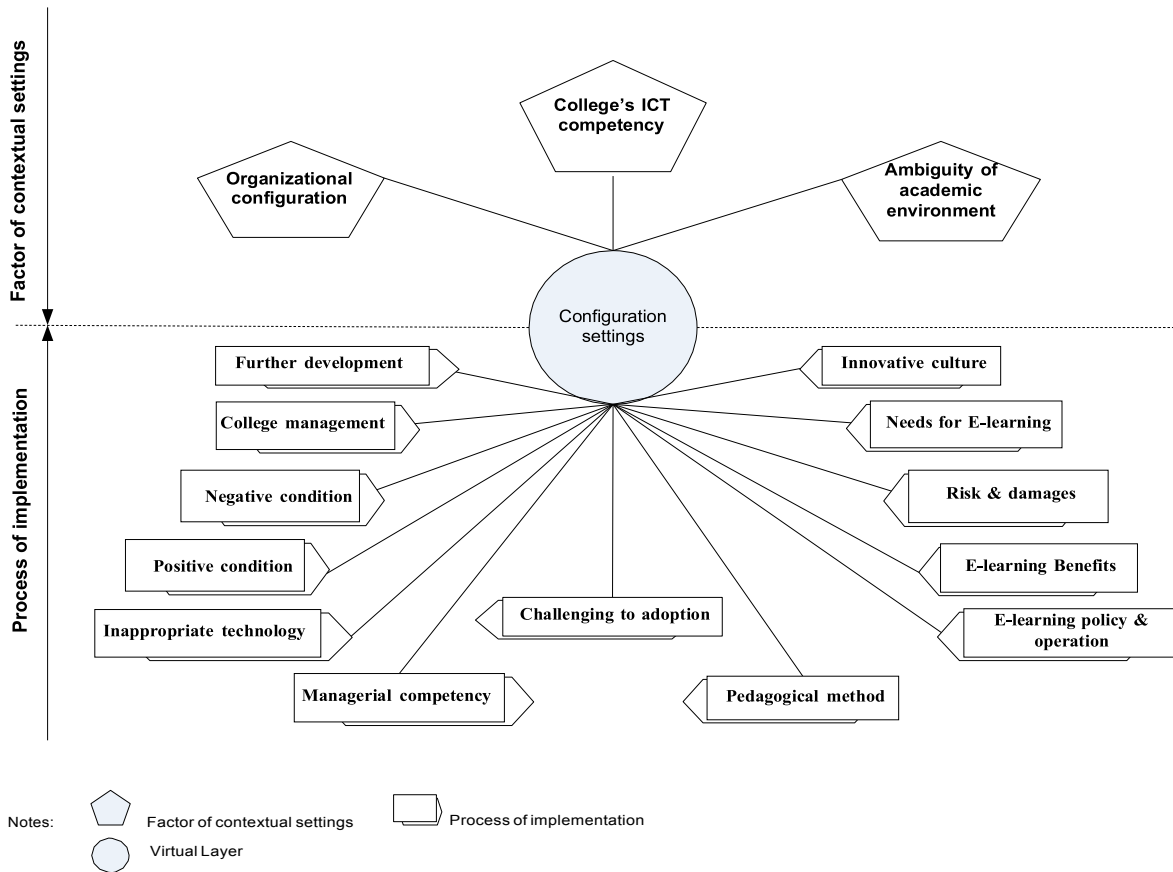


Figure 3: Thematic network of E-learning implementation, University of Danang

The most general level of this thematic network for the university’s implementation of e-Learning is presented in Figure 3. At the center of the thematic network is the virtual layer where the global and super-global themes relating to the process of implementation and its contextual factors configurationally integrate together at different abstract layers. Interactions and interrelationships among the individual thematic networks can be defined by acting mechanisms to shape the nature of E-learning implementation on this virtual layer. The general thematic network highlights the primary themes that address the nature of E-learning implementation at the College of Economics (COE), University of Danang.

Table 1: Organization Themes

Themes	Organized	Global	Super Global
Organization	<ul style="list-style-type: none"> Academic services Limited facilities Losing control of policy Work overload Challenges in administration College management UD management College culture Working conditions Salary motivation Job retention Job satisfaction 	<ul style="list-style-type: none"> Capacity and oversize Managerial settings College culture Working environment 	<ul style="list-style-type: none"> Organizational configuration

A more detailed data preparation analysis would present thematic networks for each stage of the implementation process, along with the three main contextual factors of organization, technology,

pedagogy and learning, at different abstract layers; although limitations of space prevent us from doing so. A sample however of the development of themes that informed the initial building of the network for the organizational configuration is provided in *Table 1*. It should be noted as well however that the development of the organized themes are informed by the 72 basic themes that are too numerous to list here.

5.1 Configuration-based Interpretation

Our configurational approach proposes that an adequate understanding and managing of the process of implementing e-Learning should incorporate and interact with the relevant contextual factors of organization, pedagogy and learning, and technology; and that how e-learning is implemented will derive from (i) a configuration of the issues that occur during the process of implementing e-Learning, and that can lead implementation from one stage of the implementation process to the next (ii) a configuration of the issues that occur within each major contextual factor i.e. organization, pedagogy and learning, and technology and (iii) a configuration of the interaction between the issues that occur during the implementation process, and the issues that occur within each major contextual factor.

5.1.1 Process-configured implementation

At the initiation stage of the implementation process, it was the innovative culture of the Department of Business and Administration (DBA) that promoted the creative idea that faculty members could discover new ways to improve their work. A sharing culture also played a key role in that almost all faculty members had adopted E-learning. At the initiation stage therefore it appears that cultural factors promoted E-learning adoption as a starting point for implementing e-Learning adoption across the whole College of Economics. At the implementation stage, serious technical problems, poor support services and a lack of management commitment have radically affected the uptake of e-Learning. The collective culture of DBA, where there existed peer support in designing e-Learning content and solving technical issues played a key role in overcoming these obstacles. Therefore it is likely that cultural factors also facilitated the adoption of e-Learning at the implementation stage. In addition, although the performance of the e-Learning system at the College of Economics as a whole has contributed to damaging their organizational reputation, individual e-Learning adopters have taken the risk since e-Learning has brought a number of benefits to its users. This suggests that within such favorable conditions only those adopters who have a very positive view of ICTs will actively participate in implementing virtual learning environments. At the same time resistant staff drew on arguments for unsupportive conditions in policy, management, time resource and technology as a way of avoiding the technology being implemented.

5.1.2 Factor-configured implementation

Viewed as a macro-environment for the process of implementing e-Learning, the contextual factors of organization, technology, and pedagogy and learning potentially impact on one or more stages of the implementation process. From the organizational point of view it appears that a lack of financing and income acted as a disincentive for staff to dedicate further time and effort to developing Moodle. Furthermore it is likely that a bureaucratic culture of performance and appraisal also did not motivate staff towards COE's objectives. From a pedagogical point of view staff the capacity of COE was unable to bear existing enrolment. On the one hand, the increasing number of students enrolling challenged led to an increase in work for academic and support staff, which led to tensions in the resources being allocated to teaching and learning services. This led to concerns about quality assurance and that the academic discipline was not being respected. From a technological perspective, decentralizing governance of ICT by the university to each College member coupled with an inflexible centralized bureaucratic structure may also act as barriers to inter-departmental cooperation on ICT management. In the case 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.

5.1.3 Configuration of process and factors

The data analysis identified several issues that taken together influence the process of E-learning implementation at COE. These issues include the role of local culture in technological innovation; a 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 liabilities of adoption. Their relationship and interaction is depicted in *Figure 4*. The findings

indicate that, stemming from an innovative idea, E-learning has been widely adopted from the 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 the e-Learning system was operated by COE, although adopters faced serious obstacles from technical problems and support services, the departmental culture continuously nurtured E-learning adoption at DBA. It is clear that such a local culture paved the way for technological adoption and innovation at the departmental level. In other words, the case data suggest that E-learning implementation from the bottom-up was promoted by a local culture which was sustainably facilitated at all stages of implementation, regardless of what happened at higher levels of the organizational structure (*Figure 4, 1*).

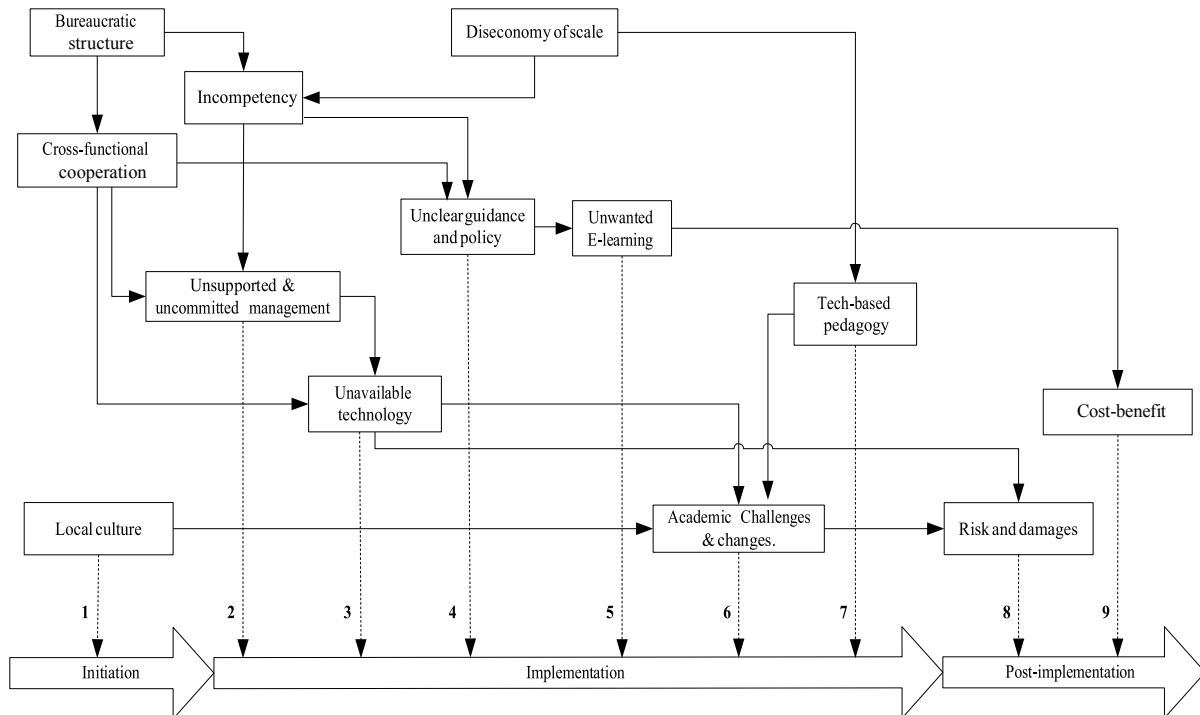


Figure 4: Configuration of process and factors of E-learning implementation

UD's the bureaucratic organizational structure was intrinsically limited in effectively promoting cross-functional departmental cooperation. In addition, the increasing number of students exceeded the COE's capacity to bear the load 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 to within COE at this stage of implementation (*Figure 2, 8*). E-learning implementation, like other ICT projects, needs to be supported and committed to by top management. Without commitment and support, an ICT project can fail during this stage of implementation. In the bureaucratic structure, cross-functional cooperation was limited so that e-Learning was not supported and committed to through services or resources, but also technology was not appropriately developed to adopt technological innovation (*Figure 4,3*). Cross-functional cooperation and the incompetency of management caused ambiguity about the policy (*Figure 4, 8*). In these circumstances, e-Learning implementers require 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 as a strategic development. This policy could indicate that COE actually do not need to apply E-learning to its academic environment (*Figure 4, 5*). An increase in the student population also meant that COE's resources were exhausted; and staff were under pressure due to the increased volume of teaching and institutional work. E-learning adoption needs time to be learnt and used effectively, but constraints on staff time meant that this was unlikely to happen; and more likely lead to resistance to the adoption of e-Learning in teaching. On the other hand, to cover all teaching and institutional work, an e-Learning system can be used as an automated teacher. By using available tools designed on the system, automatic academic activities can

be accomplished without requiring attention. Therefore, technology-based pedagogy is logically applicable in the case of COE's implementation rather than e-Learning pedagogy (*Figure 4: 7*). As a consequence of inappropriate technology and an unreliable system, implementers can be taking a risk when adopting e-Learning in practice. In the meantime, COE has proposed a distance learning program as a further extension of e-Learning. Unlike blended e-Learning, which has been used to support learning on campus, this distance learning program, if offered, can generate revenue for COE. While blended e-learning currently does not make any marginal revenue, distance learning based on e-Learning can. It is clear that cost benefit analysis has a vital role in informing decisions surrounding further applications of e-Learning at COE (*Figure 4, 8*). In short, E-learning implementation at COE when explored from multiple perspectives indicates that local culture is the most important factor nurturing implementation at all stages of the process of implementation. It is likely that, when implementing from the bottom-up, e-Learning is sustainably adopted, although it is faced with several obstacles related to organization including management, and technology. During this stage of implementation, e-Learning did not receive support and commitment from top management since there was actually not a real need for e-Learning adoption within the wider campus of which COE is a part. In such unfavorable conditions, e-learning adopters were liable to harm their reputations. However, they also took a risk in implementing e-Learning to solve several problems in their academic activities and institutional work. It is likely that implementing e-Learning at COE can proceed on a sustainable basis if only COE will invest in it based on cost-benefit decisions.

5.1.4 Pattern of e-Learning implementation

Integrating all the themes provides a holistic picture of e-Learning implementation at COE, where the global themes and issues relating to the process of e-Learning implementation have been dynamically configured with the super-global themes and issues of organization, pedagogy and learning, and technology; and it is this dynamic configuration of process and contextual factors which has shaped the implementation of e-Learning at COE over time. The pattern that has emerged from a configuration of the case themes can be seen to converge within the virtual layer as an acting mechanism defined by the attributes of *e-Learning need, e-Learning demand, e-Learning capacity and e-Learning competency* (see *Figure 5*).

E-learning need

Under-capacity and over-enrolment can explain the relatively strong connection between needs for e-Learning and constraints on e-Learning. Meanwhile, the COE's culture of ICT seems likely to have played a key role in facilitating e-Learning adoption. In addition, the data has also indicated that management really wanted to further the adoption of e-Learning in the future by promoting a distance learning degree program where e-Learning technology can deliver the curriculum to for example in-service students. In the case of COE, needs for e-Learning needs, can directly result from an innovative culture, future development, along with positive and negative conditions impinging on its implementation.

E-learning demand

Interplay between the global themes mainly appears at the implementation stage. In the case of COE, innovative culture is viewed as the starting point of the E-learning process. Beside the endeavor 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. In its current state, the risks and liabilities for adopters comes mainly from technical problems and network services. However adopters still want to apply e-Learning in teaching activities because they recognized the benefits to be derived 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. In fact the findings indicate that the demand for e-Learning within the College has been determined by end-users who took a risk in adopting the technology.

E-learning capacity

By using the tools embedded within the e-Learning system, faculty can automate teaching activities in order to reduce the amount of work. For this reason, 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 greater power to dominate in the classroom.

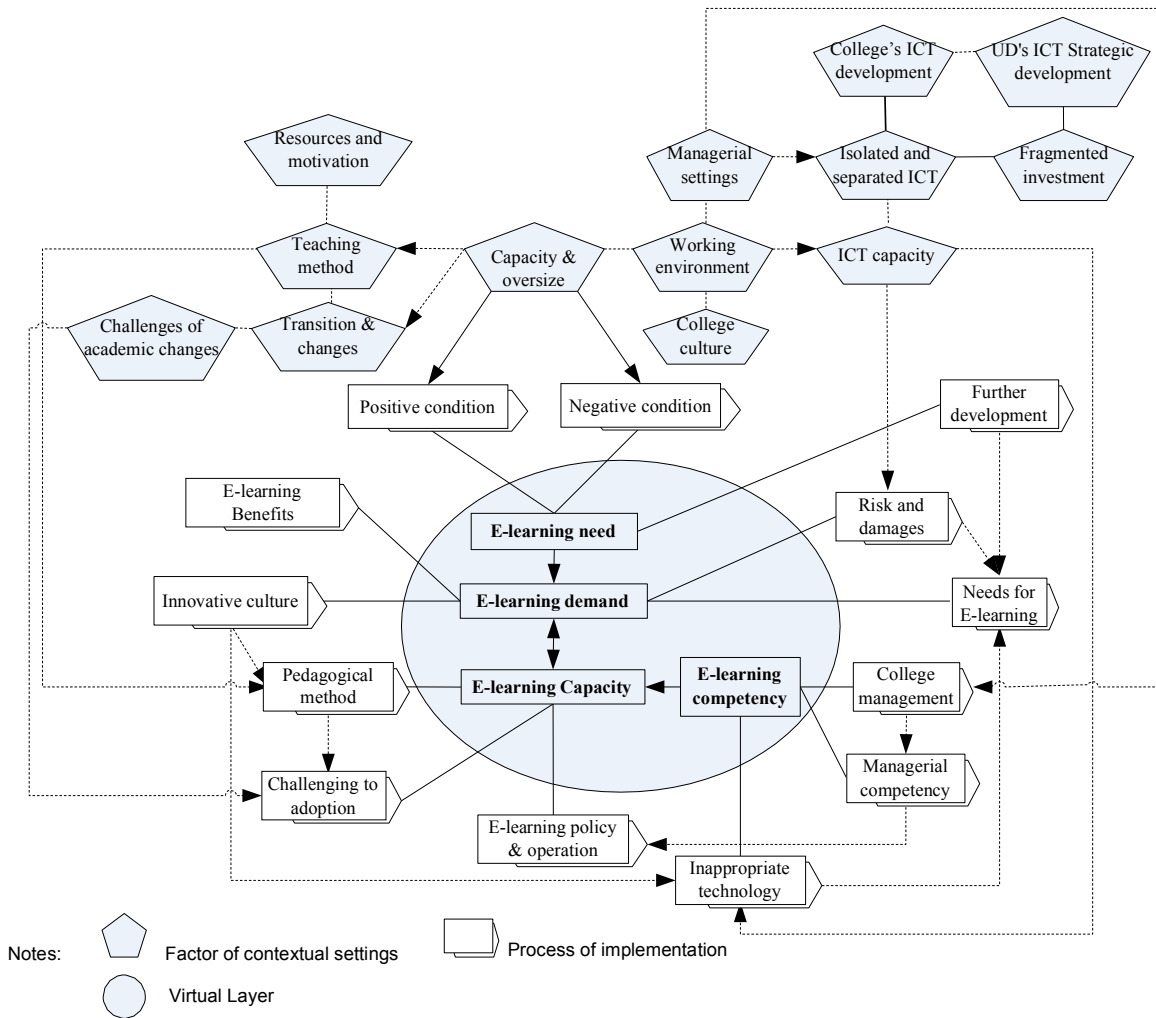


Figure 5: Configuration-based pattern of E-learning implementation

An inappropriate pedagogy used to harness the E-learning system, lack of time and matters of academic discipline related reputation limit the use of E-learning. Given such conditions and academic environment, a voluntary adoption policy may be the most suitable and motivating choice for College members. Such a policy may avoid risks and not commit to allocating limited resources for implementation. At the implementation stage, teaching staff and students actually have not received enough support from COE in training and professional development, or to solve technical problems associated with a poor network service.

E-learning competency

Strong commitment and support for e-Learning adoption at COE from management has not been forthcoming and the e-Learning policy has not been executed as planned. While financial incentives have been provided but not monitored. The College management’s lack of commitment, consideration of and support for e-Learning implementation on campus is clear. 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.

6 Conclusion

The general research question guided the case study: how had e-Learning been implemented within the university? A thematic network analysis of the process of implementing e-Learning within the College of Economics has reconstructed a picture of the themes and issues relevant to the process used to implement e-Learning; along with the main factors impinging on this process i.e. organization, pedagogy and learning, and technology. In thematic terms it can be seen it is the contextual factors that are of greater significance in explaining the lack of sustainable e-Learning implementation, with organizational factors and issues, rather than pedagogy and learning, or technology, viewed as the most influential imperative. Further analysis combined the process-based and factor-based themes into a set of configurations constituted by issues that interrelate on a virtual layer. Analysis of the interrelationships that occurred led to an understanding of the mechanism and its attributes that enables an explanation to be developed as to how e-Learning had been implemented. This explanation relates to the interaction between e-Learning needs, demand, capacity and competency. In providing this descriptive and explanatory approach we can also better understand in what areas and how COE and the University can improve its implementation process.

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