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A culture-based model for strategic implementation of virtual education delivery

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ABSTRACT

This study was designed to examine the critical success factors for implementing Virtual Education Delivery (VED) in Thailand, and to identify ways to facilitate such adoption and lead to effective outcomes. The study incorporated an analysis of three specific factors related to Thai culture: high power distance "Bhun Khun", uncertainty avoidance "Kreng Jai" and, collectivism "Kam Lang Jai". This paper reviews the development of the research model, describes the conceptual underpinning of the cultural model and presents the findings of the study. A strategic framework for successful VED implementation is proposed and can be modified for any cultural environment. In addition an audit instrument was developed for evaluation and review of VED outcomes on an ongoing basis.

Keywords*: Virtual education delivery; cultural impacts on IT; ICT in Thailand; implementing virtual education*

INTRODUCTION

An accelerating demand for mass higher education is driving universities to change from their traditional classroom setting to long distance delivery models (West and Hore 1989; Sherry 1996; Davies 1998; Peraya 2001). However, long distance has obvious limitations particularly with regard to on-going student engagement and has led Universities to embrace more interactive instruction models through on-line delivery (Bates 1993). This has led to widespread adoption and diffusion of Information and Communication Technologies (ICT) within the education sector and a new globalised vision for education delivery.

Over the last decade, many organisations have adopted the strategic concept of the 'virtual organisation' as an alternative business model to gain competitive advantage (Goldman et al 1995; Graenier and Metes 1995; Mowshowitz 1997; Venkatraman and Henderson 1998; Leimeister et al 2001; Burn et al 2002; Walters 2004). Increasingly, this is a model being considered by Universities to allow them to extend their markets across widely distributed populations and reap the benefits of economies of scale (Castells 1996; McFadzean and McKenzie 2001; Clarke and Hermens 2001). Thailand is a case in point where this model is under development.

In 2004 the estimated population in Thailand was 65 million (Nationbynation 2005) Of these there are approximately 7 million who have accessed the Internet (an increase of 100% from the estimates for 2003) (Internetworldstats 2005). This growing number of Internet users may have an enormous impact on Thai society and, as the Internet becomes more socially significant, on Thai education (Tao 2001). There are a number of Thai universities such as Chulalongkorn

University, Ramkhamhaeng University etc., which have begun to investigate virtual education delivery systems and moved to an instructional model which allows the instructors, learners, and content to be located in different non-centralised locations by using ICT networks. However, there are some major issues related to the management of the system as an educational tool and these critically influence success in implementing Virtual Education Delivery (VED) in Thai universities.

This study aimed to determine the factors leading to success in establishing a Thai VED and examines the implementation in four universities. Critical success factors are evaluated and inhibitors identified. The specific questions addressed are:

- What are the factors influencing effective implementation of VEDs in Thailand?
- How do these factors facilitate successful implementation?
- How can these be incorporated into strategies for implementation in the context of Thai culture?

The paper reviews the development of the research model, outlines the research approach adopted and summarises the results from both stages of the study. Finally, a model for future implementations and ongoing evaluation of VED effectiveness is proposed and an audit checklist designed as an integral part of a new strategic planning cycle.

REVIEW OF SUCCESS FACTORS

According to Alexander and Mckenzie (1998), VED success factors can be classified under 3 categories: improved quality and productivity of learning, and enhanced student perception of learning. Table 1 summarises the indicators used to determine levels of success within this study.

Table 1: Indicators used to determine the success of VEDs

Characteristics of successful VEDs	**Indicators used to determine the success**
Quality of learning	A variety of learning styles that meet students' needs (Borthick and Jones, 2000). Ability to move through learning materials that meets students' needs (Borthick and Jones, 2000). Adequate information and contents that meet students' needs (Dulworth, 1996). Accessibility to learning.
Productivity of learning	Creation and sharing of new knowledge (Alexander and McKenzie, 1998). Provide collaborative technologies to share knowledge. Encourage lecturers and students to share ideas and insights.
Positive Lecturer and student attitudes to teaching and learning	Perceptions of lecturers and students in an interactive VED courses (Alexander and McKenzie, 1998).

These factors were evaluated against a theoretical framework developed by Hiltz (1994) identifying four major approaches which could lead to success in the implementation of VED: technological determinism, the social psychology of users, human relations in organisation and the cultural context (Figure 1).

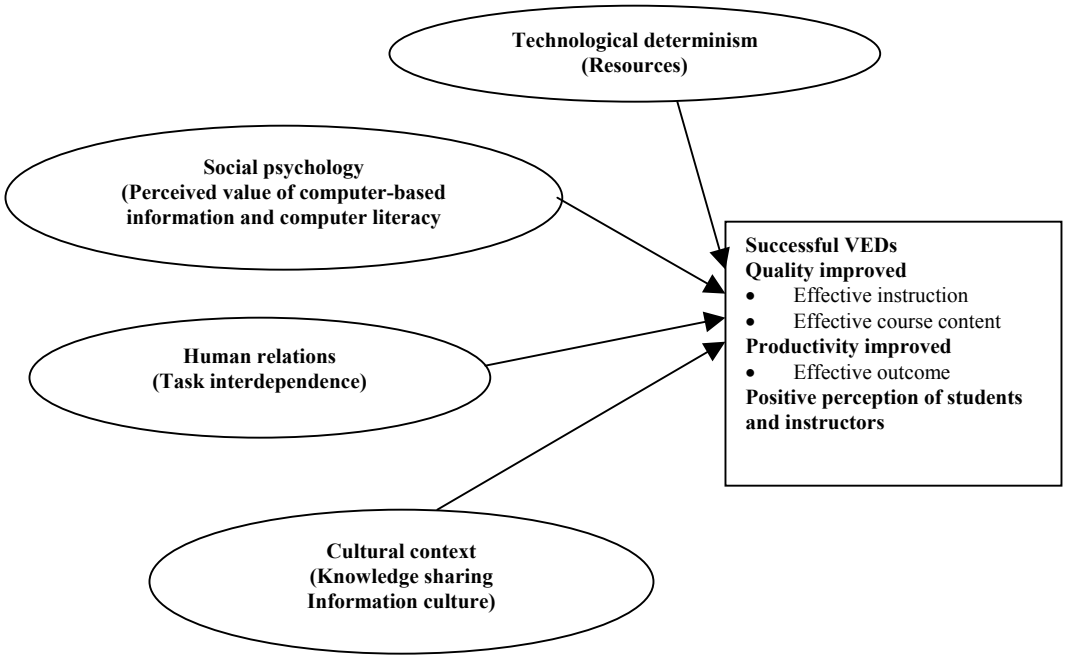

Figure 1: Evaluating Success Factors

These factors are summarised below and those implicit to the Thai context are further expanded.

FACTORS AFFECTING VED DEVELOPMENT AND IMPLEMENTATION IN THAILAND

Resources

The resources include all hardware and software but also the efficiency and effectiveness of system design and implementation (Mowshowitz 1997).
Computer literacy and Perceived value of computer-based information
This affects both students and lecturers with respect to their expectations from ICT enabled information but further impacts on their abilities to use ICT (Larson and Bruning, 1996; McCollum 1997; Jarvenpaa and Staples 2000).

Size of market

Significant market size is needed to provide sufficient financial return to maintain and upgrade the quality of VED courses (Bodain and Robert 2001; Green 2000).

Task Interdependence

A successful VED requires agreement of members including academics in each major unit. They must perceive its usefulness and collaborate to provide alternative learning styles. Members in

Universities must be comfortable with discussion and open decision making to provide education on the Internet (Rada 1997).

Information culture

Information culture refers to values and attitudes about information processing, publishing, and communication. Staff and students characteristics and environments such as the institutional context influence information values and attitudes in many ways (Davenport 1997). A VED can utilise various types of information media such as electronic mail, discussion board, videoconference, web-based learning and etc., but student's preferences will be different (Jarvenpaa and Staples 2000).

Shared knowledge and competence of administrators, students and lecturers

Knowledge sharing is an interpersonal interaction involving two actions: representation, which refers to the ability of an individual to introduce their knowledge and subordination which, is the ability to accept or absorb another's knowledge (Davenport and Pruzak 1998; Erich and Williams 1998). Representation and subordination in VEDs, will have an affect on administrators, lecturers and students in their approach to knowledge sharing (Shore and Venkatachalam 1996). In particular, Thai culture will impact on this interaction. According to Hofstede (2001), Thai cultural issues, which can be viewed, as barriers to knowledge sharing are high power distance, high uncertainty avoidance and collectivism.

High power distance

High power distance is the first cultural barrier to knowledge sharing for Thai people (Komin 1990; Mckenna 1995; Rohitratana 1998). This refers to the acceptance of a hierarchical authority system with an emphasis on status differentiation and unequal power distribution. Thai subordinates usually accord respect and feel obligations to their superiors as a father figure in their family (Mckenna 1995). This kind of relationship between those who are in higher positions and their subordinates is called " Bhun Khun" (Holmes and Tangtongtavy 1995). This might obstruct the process of transferring knowledge through university networks, such as e-mail or discussion board since students are not encouraged to express their ideas to solve problems and lecturers are unlikely to oppose any ideas or opinions expressed by senior administrators.

High uncertainty avoidance

Thai people are characterised as having high uncertainty avoidance (Hofstede 2001). This refers to being threatened by ambiguous situations and trying to avoid challenging experiences. Thais seek certainty in their relationships and are normally reluctant to be the cause of discomfort to others. This trait can be expressed by the Thai word " Kreng jai" (Rohitratana 1998). Kreng jai refers to "an attitude whereby an individual tries to restrain his own interest or desire, in situations where there is the potential for discomfort or conflict, and where there is a need to maintain a pleasant relationship" (Holmes and Tangtongtavy 1995). Subordinates in Thai organisations accept that their superiors make correct decisions and carry these out unquestioningly (Thanasankit and Corbit 2000). Kreng jai can be a serious impediment to knowledge sharing where a conflict situation may be implied (Trompenaars and Hampden-Turner 1998).

Collectivism

Thai culture is recognised as collectivist rather than individualist. The sense of collectivism in Thai people is strong as a consequence of their living in extended families (Hofstede 2001). Thus, the dependency relationship between the person and in-groups is stronger than in out-groups. They

usually hold views and opinions respecting the group and this plays a vital role in their learning styles (Hallinger and Kantamara 2001). This is expressed in Thai as “Kam lang jai” and refers to the spirit and moral support in-group members provide to encourage self-confidence in students and promote knowledge sharing (Hallinger and Kantamara 2001).

THE RESEARCH MODEL

A theoretical research model, which incorporates the factors that facilitate the success of establishing an implementing of Thai VEDs, is shown in figure 2. The main focus of this study was to investigate the factors that have a critical impact and how these factors can facilitate the establishment and implementation of Thai VEDs.

Research Methodology

A multi-method research approach including quantitative and qualitative methods was chosen because of the nature of the participants and the scope of the problem. The study used both a survey and case studies conducted through a series of interviews. The survey and interviews were conducted in the Thai language with professional translators validating the instruments and responses. Students completed the surveys whereas the interviews were conducted with instructors, administrators and IT support in each of four Thai Universities.

The survey was developed from relevant research and based on the theoretical framework. This was administered to 240 students in four Rajabhat Institutes. 167 valid responses were received giving a response rate of 69.5%. Multiple regression analysis was used to test the relationships between dependant and independent variables. The dependant variable was the success of VED interpreted in terms of the effectiveness of quality, productivity and student perception of their courses. Independent variables were resources, computer literacy, perceived value of computer-based information, culture and information culture.

Multiple case studies through structured interviews were utilised in four Rajabhat Institutes and involved lecturers, administrators and IT support in each. These were analysed through conceptual cluster matrices and then by cross-case analysis to address similarities and differences across the group. Finally the results from the survey stage were analysed against the results from the case studies and an integrated cross-case comparison developed. The results from these several stages were used to refine a new model of VED success and to create an audit tool for use in evaluation of VEDs.

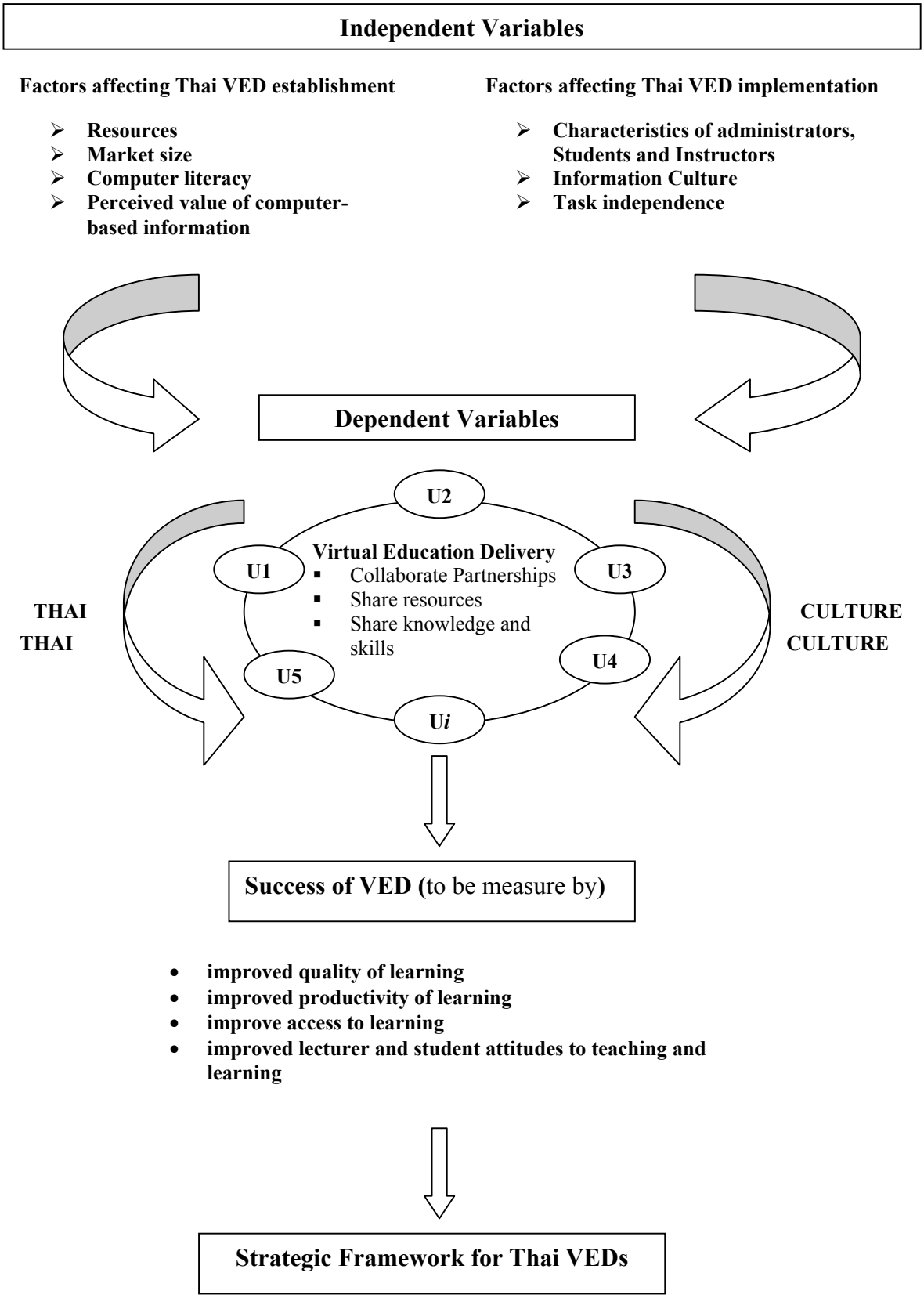

Figure 2. The research model of factors affecting Thai Virtual education

The Research Hypotheses

Hypothesis A: The five factors: resources, computer literacy, perceived value of computer-based information, characteristics of students'culture and information culture will significantly influence the perception of Thai VEDs;

Hypothesis B: The five factors: resources, computer literacy, perceived value of computer-based information, characteristics of students'culture and information culture will significantly influence the effectiveness of instruction of Thai VEDs;

Hypothesis C: The five factors: resources, computer literacy, perceived value of computer-based information, characteristics of students'culture and information culture will significantly influence the effectiveness of course content of Thai VEDs;

Hypothesis D: The five factors: resources, computer literacy, perceived value of computer-based information, characteristics of students'culture and information culture will significantly influence the effectiveness of outcome of Thai VEDs.

DATA ANALYSIS AND DISCUSSION OF FINDINGS

Cronbach-Alpha was used to test the degree to which items were independent measures of the same concept and correlated with one another (Cavana et al 2001). The reliability coefficient of all research variables averaged 0.9083 implying that the research variables were reliable (Bryman and Cramer 1999). Construct validity was obtained through a thorough grounding of all questionnaire items within the existing literature (Cavana et al 2001; Creswell 1994; Yin 1994). Pearson's Correlation Matrix was used to test discriminant validity. The data showed low multi-collinearity (<0.5). This implied that all questions were valid and loaded more highly on their intended concept than on other concepts (Taq 1997).

Table 2 Characteristics of student participants

Characteristics	Percent
Gender	
Male	56.3
Female	43.0
Age	
18-24 years	82.8
25-34 years	13.9
35-44 years	1.3
Mode	
Normal	62.9
Weekend	35.8
Faculty	
Education	0.7
Management Sciences	11.3
Technology & Industrial Science	25.2
Humanities and Social Science	4.0
Science and Technology	57.6

Multiple regression analysis was used to test the hypotheses and the following results obtained.

Student perception of VED

Table 3: Results of Regression Analysis-Student Perception of VED

Model	B	F	R	R^2	Adjusted R^2	Std. Error	Standardized coefficient of Beta	p-value
(Constant)	3.246	3.290	0.372	0.139	.097	.953		
Resources						.033	.020	.829
Computer literacy						.159	-.038	.673
Perceived value of computer-based information						.036	.180	.042*
Culture								
- high power distance						.096	-.106	.213
- high uncertainty avoidance						.085	-.089	.323
- collectivism						.131	.053	.517
Information culture						.065	.325	.000**

Dependent Variable: Perception of VEDs

The outputs in Table 3 show the seven independent variables that were entered into the regression model, the R (0.372) which was the correlation of the seven independent variables: resources, computer literacy, perceived computer-based information, high power distance, high uncertainty avoidance, collectivism and information culture. The dependent variable in this section was the student perception of VEDs. The interrelation of the seven independent variables was taken into account, and the R square (0.139) was significant at the 0.003 level (F value = 3.290). That means that 13.9 percent of the variance (R square) in student perception of VEDs was significantly explained by the independent variables. Among seven independent variables, information culture is the most important in explaining the variance in the perception of VEDs as the highest beta (β) value was 0.325. The second-ranked variable was perceived value of computer-based information with a beta (β) of 0.180. The positive beta weight indicated that if student perception was to be increased enhancing information culture by supporting useful material content on-line, e-mail discussion and supportive university contexts and perceived value of computer-based information would be necessary.

Effectiveness of instruction

Table 4: Results of Regression Analysis-Effectiveness of instruction

Model	B	F	R	R^2	Adjusted R^2	Std. Error	Standardized coefficient of Beta	p-value
(Constant)	2.341	5.787	0.470	0.221	.182	1.176		
Resources						.041	.169	.054
Computer literacy						.196	-.097	.259
Perceived value of computer-based information						.044	.105	.210
Culture								
- high power distance						.118	-.125	.122
- high uncertainty avoidance						.104	-.295	.001**
- Collectivism						.161	.025	.745
Information culture						.080	.211	.008**

Dependent Variable: Effectiveness of instruction

The outputs in Tables 4 show the seven independent variables that were entered into the regression model, the R (0.470), which was the correlation of the seven independent variables with the dependent variables: the effectiveness of instruction. The interrelation of the seven independent variables was taken into account, and the R square (0.221) was significant at the 0.000 level (F value = 5.787).

That means that 22.1 percent of the variance (R square) in the effectiveness of instruction can be significantly explained by five independent variables. Thus, hypothesis P21-H_0 was substantiated (the null hypothesis was rejected).

Among seven independent variables only culture: high uncertainty avoidance and information culture was significant at the 0.001 and .008 level respectively. The results mean that culture: high uncertainty avoidance was the most important in explaining the variance in the effectiveness of instruction (β= 0.295). The second most important variable was information culture with a beta (β) value of 0.211. The positive beta weight of uncertainty avoidance indicated that students preferred their learning to be controlled by instructors rather than learning by themselves. In addition if the effectiveness of VEDs instruction were to be increased, enhancing information culture by supporting useful material content on-line, e-mail discussion and supportive university contexts would be necessary.

Effectiveness of course content

Table 5: Results of Regression Analysis-Effectiveness of course content

Model	B	F	R	R^2	Adjusted R^2	Std. Error	Standardized coefficient of Beta	p-value
(Constant)	-.009	8.751	0.548	.300	.266	.474		
Resources						.016	.281	.001**
Computer literacy						.079	.036	.655
Perceived value of computer-based information						.018	.167	.036**
Culture								
- high power distance						.048	-.213	.006**
- high uncertainty avoidance						.042	-.064	.432
- Collectivism						.065	.156	.034**
Information culture						.032	.269	.000**

Dependent Variable: Effectiveness of course content

The outputs in Tables 5 show the seven independent variables that were entered into the regression model, the R (0.548) which was the correlation of the seven independent variables with the dependent variables: the effectiveness of course contents. The interrelation of the seven independent variables was taken into account, and the R square (0.300) was significant at the 0.000 level (F value = 8.751). That means that 30 percent of the variance (R square) in the effectiveness of course contents can be significantly explained by resources, perceived value of computer-based information, culture which composed of high power distance and collectivism and information culture.

Regarding independent variables, resources were the most important in explaining the variance in the effectiveness of course content as the highest beta (β) was 0.281. The beta (β) value of information culture was 0.269 and 0.167 for perceived value of computer-based information. The positive beta weight indicated that if the effectiveness of course contents were to be increased, enhancing resources, information culture and also perceived value of computer-base information would be necessary.

On the other hand, the negative beta weight of high power distance was -0.213 indicating that if the effectiveness of course contents was to be increased, a decrease in the degree of power distance had to be experienced. However, the positive beta weight of collectivism was .156 indicating that students working in a group-based orientation enhanced the effectiveness of course content.

Effectiveness of outcome

Table 6: Results of Regression Analysis-Effectiveness of outcome

Model	B	F	R	R^2	Adjusted R^2	Std. Error	Standardized coefficient of Beta	p-value
(Constant)	1.325	8.681	.546	.298	.264	.809		
Resources						.028	.155	.099
Computer literacy						.135	-.193	.094
Perceived value of computer-based information						.030	.270	.002**
Culture								
- high power distance						.081	-.032	.576
- high uncertainty avoidance						.072	-.009	.758
- Collectivism						.111	-.004	.834
Information culture						.055	.413	.000**

Dependent Variable: Effectiveness of outcome

The outputs in Table 6 show the seven independent variables that were entered into the regression model, the R (0.546) which showed the correlation of the two independent variables: information culture and perceived value of computer-based information with the dependent variables: the effectiveness of outcome. The interrelation of the two independent variables was taken into account, and the R square (0.298) was significant at the 0.000 level (F value = 8.681). That means that 29.8 percent of the variance (R square) in the effectiveness of outcome can be significantly explained by information culture and perceived value of computer-based information. Among the two independent variables, information culture was the most important in explaining the variance in the effectiveness of construction as the highest beta (β) was 0.413. The second-most important variable was perceived value of computer-based information with a beta (β) value of 0.270. The positive beta weights indicated that if the effectiveness of outcome was to be increased, enhancing information culture and perceived value of computer-based information would be necessary.

SUMMARY OF SURVEY FINDINGS AND COMPARISON WITH INTERVIEW RESULTS

Information culture and perceived value of computer-based information were significant influencers on the perception of VEDs. The greater the levels of IT comfort the greater the appreciation of VEDs.

The following independent variables: resources, perceived value of computer-based information, culture: high power distance, high uncertainty avoidance, collectivism and information culture were all significant influencers on the quality and productivity of learning in VEDs. Only high power distance – “Bhun Khun” showed a negative beta weight.

Computer literacy was not identified as an influence.

These results represent the views of the students and need to be considered against the views of the staff obtained through in-depth interviews. Table 7 presents a comparison.

Table 7: Comparison of findings from questionnaire survey and interview data

Quality, Productivity and Perception of Learning in VED		
Factors	**Facilitate/Inhibit**	
	Student	**Administrator & instructors**
Technological determinism Resources	Facilitate	Facilitate
Social-psychological approach Computer literacy	No influence	Inhibit
Perceived value of computer-based information	Facilitate	Inhibit
Size of market	N/A	No influence
Human relation approach Task interdependence	N/A	Facilitate
Culture context Information culture	Facilitate	Inhibit
Cultural aspects of knowledge sharing High power distance	Inhibit	Inhibit
High uncertainty avoidance	Facilitate	Inhibit
Collectivism	Facilitate	Inhibit

As can be seen the findings show some interesting contradictions. The staff identifies only two facilitators: resources and task interdependence (not evaluated by students). All other factors were seen as inhibitors apart from size of market. These conflicting views are briefly discussed below.

Social-psychological approach

Students did not believe that computer literacy was an inhibiting factor and may well refect the fact that students overestimate their own abilities in this regard. However, more interestingly, while staff found the level of literacy in students to be an inhibitor they also found their own levels of literacy to be inadequate and were quite frank about their perception of this as a major problem. This is also reflected in their perception of the value of computer-based information where it was found that students placed far greater value on ICT delivered information compared to staff. The instructors cited four reasons for their low ratings of VED:

- VED did not reduce teaching hours

- English language barriers on the web
- Overload of teaching hours
- Too little time to become proficient in using ICT

Cultural context

Students were comfortable with their information culture and found this a facilitator towards using VED effectively. Staff, however, found that students used the VED system in an unprofitable manner – playing games and visiting chat rooms. Further they themselves felt inhibited by the system and within the universities very little effort was made to develop an information culture with little or no electronic communication between staff.

Both students and staff found "Bhun Khun' to be a significant inhibitor to knowledge sharing in an online environment with a teacher centred approach being far preferred as a learning style. This extended even further within the university relationships between instructors and administrators with instructors stating that would not dare question any decisions made by the hierarchy and similarly would not admit to any problems with ICT usage.

Students believed that VED environments could provide them with a more certain environment and precise and detailed instructions for learning and so saw 'Kreng Jai' as a facilitator. Staff perceived this again as a major inhibitor since students did not adopt a self-learning, self-paced approach as allowed by VED and wanted structure and control – specifically being told what to think. Staff also felt less comfortable with not being in control and found the VED threatening.

Finally, students found that their preferences for group activity facilitated learning online whereas staff found this again a major inhibitor. This has to be understood within the Thai context where students attended study centres to access the VED system since they did not have computer access at home so in this way students met within their own study groups and worked together online. Staff found that their collectivist approach exemplified by 'Kam Lan Jai' prevented them from pursuing individual learning styles, raising questions or presenting novel ideas.

Staff and students views on the success of VED were also collected and measured on a four point scale. These are compared in Table 8.

Table 8: The evaluation of VED in four Rajabhat Institutes

	RIPN		RISD		RIRC		RIPV	
	Student	Admin & Instructor	Student	Admin & Instructor	Student	Admin & Instructor	Student	Admin & Instructor
Improved quality & productivity	2.9	2.7	2.7	2.6	2.9	2.1	2.8	2.6
Perception of usefulness	3	3.2	2.7	3	2.9	2.2	2.8	3.2

Students were generally more enthusiastic about quality and productivity improvements compared to staff views and had similar views about the perceived usefulness as a teaching and learning tool. Staff actually perceived that VED could be a more useful tool than was merited by current quality and productivity gains. The one institute where staff had very low rankings was the only one where the VED system had been outsourced and it was clear within this university that little attempt had been made to develop an information culture with no internal training and very

few ICT aware personnel. Nonetheless, overall VED was felt to be moderately successful and the interviews provided many pointers on how to improve future success.

IMPLICATIONS FOR THEORY AND COPING STRATEGIES

During the interviews members of staff were asked to identify the coping strategies they used or could envisage to overcome the inhibitors to VED success. They identified four major areas:

- improving technologies and providing technical support;
- increasing IT/IS competency and skills of students and instructors;
- changing instructors' attitudes and motivating them to adopt VED as an interactive teaching style;
- enhancing all members' cooperation and commitment.

This led to the refinement of the strategic framework as shown in Figure 3.

The research outcomes of this study showed several factors influencing the success of VED implementation in Thailand. These factors are resources, computer literacy of instructors and students, perceived value of computer-based information, culture of knowledge sharing, information culture and task interdependence.

Resources are seen to be the most important factor that can enhance or inhibit the learning outcome. Two issues are involved: the first is the quality and reliability of the IT/IS infrastructure, and the second is the way VED is implemented and serviced. Computer literacy of students and instructors involves an ability to use the computer and its facilities to enhance studying and teaching on VED. The perceived value of computer-based information by the participants is also accepted as being critical to the success and further, administrators, instructors and students must realise that using ICT provides them with value and usefulness.

Task interdependence and collaboration of members in an organisation is also essential.

Three aspects of culture in relation to knowledge sharing are found to influence the success of collaborative learning in VED. Firstly, there is high power distance between students and instructors and between instructors and administrators. Secondly, high uncertainty avoidance is found to be characteristic of Thai students, and thirdly, Thai students tend to be collectivist rather than individualist. Information culture is the final influencing factor found from the study. This refers to students and instructors' attitudes to use information processing, publishing and communication to perform knowledge sharing in VED learning environment.

Coping strategies for overcoming numerous barriers to successful VED are established and added to the model. These are improving technologies and providing technical support, increasing IT/IS competency and skills of students and instructors, changing students and instructors' attitude to accept VED usefulness, and enhancing the members' cooperation and commitment.

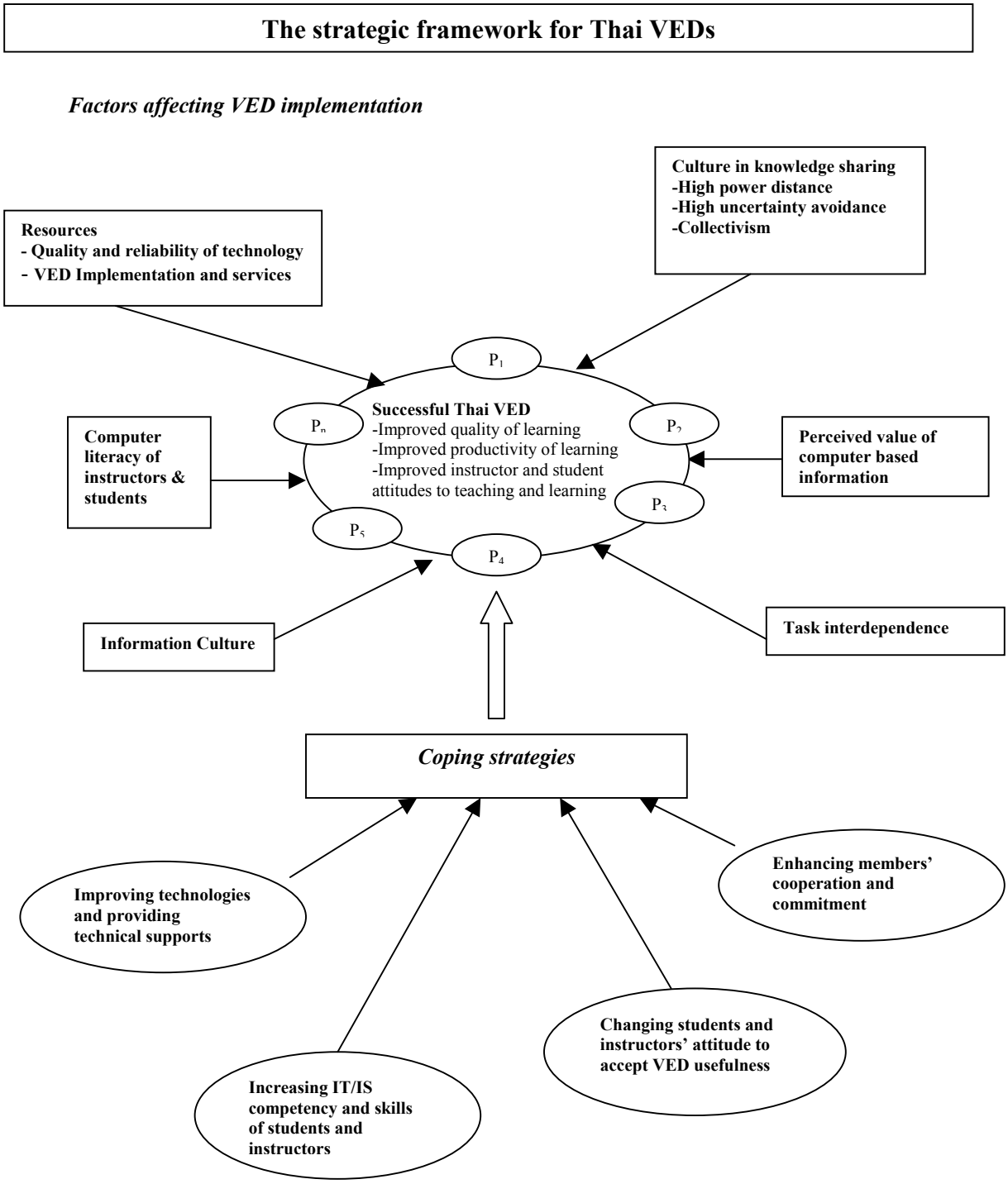

Figure 3: The strategic framework for Thai VED

NEW STRATEGIC PROCESS

In order to implement such a strategy, a new strategic process including audit checklists for staff and students was developed as shown in Figure 4.

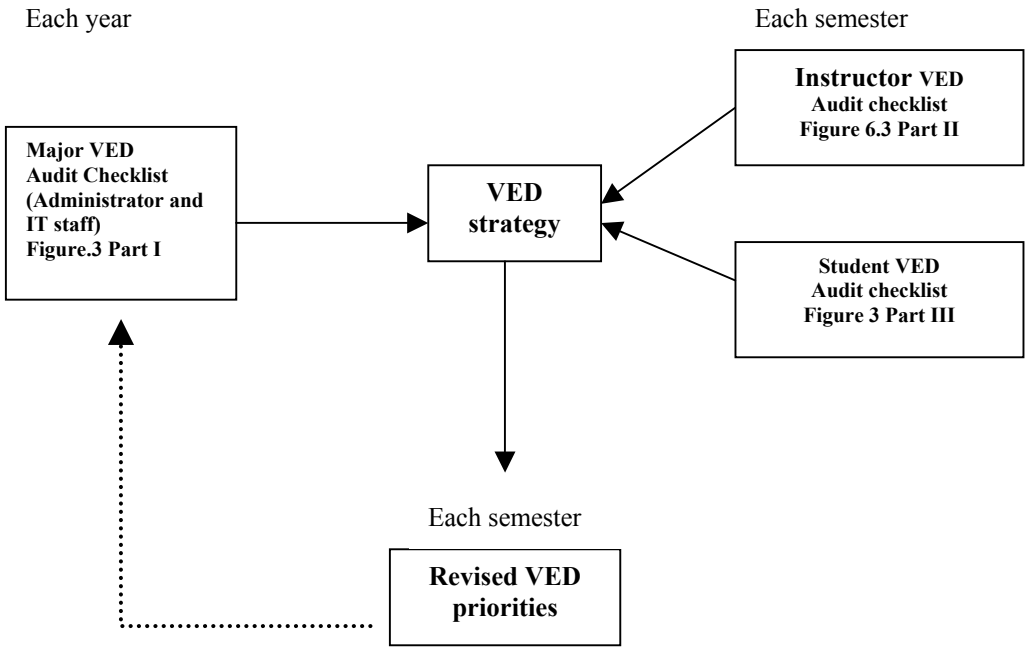

Figure 4 VED Strategic Planing Cycle

Each checklist uses a five-point scale - a ***student checklist*** administered every semester is shown below.

The ***staff checklist*** cover resources, skills, attitudes and commitment as well as effectiveness measurement and will provide a yearly monitor on progress and guidance for improvement.

If the total is below 30 (average), your institute needs to take immediate action to improve VED tools and establish a team to mandate information and course content. There is also a need to motivate instructors to provide a more collaborative learning environment through VED.

Table 9: Checklist for students

Accessibility, collaborative learning and perception of VED?	1	2	3	4	5
How much access do you have to the Web (anytime, anywhere)?					
What is the level of your VED system in terms of user-friendliness?					
What is the level of your VED system in terms of up-to-date content?					
How useful is VED in providing relevant content?					
How valuable do you find VED in assisting you to learn?					
How effective is VED in enabling you to discuss questions or share ideas with other students?					
How effective is VED in enabling you to discuss questions or share ideas with your instructors?					
Are your instructors enthusiastic in providing a VED learning environment?					
How well do your instructors use VED to provide stimulating and challenging instruction?					
How highly do you rank your VED courses compared to standard teaching mode?					

Total points_____

CONCLUSION

The main purpose of this study was to examine the strategies used by Thai universities to adopt the concept of "virtual education delivery" as an education tool. The study attempted to determine the critical factors that influence success in implementing Thai VEDs, and identified the ways to facilitate such adoption. These factors were synthesised with Thai environmental and cultural factors to develop a strategic framework which can be used to assist universities in Thailand to achieve more effective implementation of VEDs.

The conceptual research framework was derived from knowledge gleaned from a review of previous research studies. The literature suggested some understanding of the "what" and "how" factors influencing VEDs, but contributed generally rather than specifically to the Thai cultural environment. This framework enabled the researchers to contextualise issues and to determine factors influencing Thai VEDs. This was used to develop the domains of the research questions which were examined through case study analysis of four Thai universities.

A multi-method research approach including quantitative and qualitative methods was chosen because of its suitability to this problem. The contexts in determining critical factors influencing the success of Thai VEDs were examined through a survey and interviews. The questionnaire survey was developed from relevant research and based on the theoretical framework. This was administered to 240 students in four Rajabhat Institutes. One hundred and sixty seven (167) valid responses were received which was a response rate of 69.5 percent. Multiple regression analysis was used to test the relationships between the dependent variable and the independent variables. The dependent variable was the success of VED interpreted in terms of the effectiveness of quality, productivity and the student perception of their VED courses. The independent variables were resources, computer literacy, perceived value of computer-based information, culture and information culture. It was discovered that resources, perceived value of computer-based information, culture and information culture were significant influences on the success of Thai VED.

In order to identify recurring themes that could enable the interpretation of another setting, multiple case studies through structured interviews were utilised. This was examined through analysis of four Rajabhat Institutes utilising VEDs. The results from interviewing instructors, IT officers and administrators who were involved in VED were analysed by using a conceptual cluster matrix and cross case analysis to address the similarities and differences across cases. The results of this stage of analysis concluded that poor computer literacy, negative perceived value of computer-based information and information culture (of both students and instructors) were inhibitors to the success of VED. Further, some characteristics of Thai culture: high power distance, high uncertainty avoidance, and collectivism were founded to be critical barriers to knowledge sharing, essential for collaborative learning in VEDs.

Finally, the results have significant implications for administering and implementing VED. These suggested that there are four coping strategies to enhance VED implementation:
1) improving technologies and providing technical support;
2) increasing IT/IS competency and skills of students and instructors;
3) changing students and instructors' attitude to accept usefulness of VED; and
4) enhancing the members' cooperation and commitment.

In order to apply these findings in a practical setting an Audit instrument has been developed to allow continuous self-evaluation of the effectiveness of VED in Thai institutes.

Whilst these findings are applicable to Thailand the implementation models and audit evaluation should be equally applicable elsewhere and researchers are encouraged to apply these to determine the specific factors which influence online learning environments in their own cultural context.

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