Multi perspective Integrations Information and Communication Technologies (ICTs) at Island School in Developing Country: *Case study Adang Island School Group, Southwest Thailand.*

Aumnat Tongkaw, Trevor Wood-Harper, Bob Wood and Sasalak Tongkaw

Abstract

In recent years there has been an increased emphasis on the use of technology to address developmental concerns throughout the world. The education sector has attracted a large part of this attention, which is centred on the use of Information and Communication Technologies (ICTs) to address teaching, learning and administrative needs. Thailand generally has an inappropriately high class size in schools and gross teacher shortage and some parts of Thailand also have huge limitations in education resources. Island schools, especially are located very far away from the mainland. The Urak Lawai are an indigenous people on the Adang Archipelago in the Indian sea, off South West Thailand. They are grouped together with the Moken and Moklen, Sea Gypsies or Sea Nomads. These people have distinctively different origins, cultures and languages. This paper explores multi perspective integrations of Information Communication Technology in the island schools of developing countries. Data was collected by interviewing the director of The Office of Satun Educational Service Area, the head teacher, teachers, parents and students in the Adang Island school group. The findings of the study are put in the context of the indigenous of ICT in island schools as an instrument to bring entire reform. Outcomes of study are in the form of recommendations to assist the process of implementing ICT in the island school environment of a developing country.

Keywords: *Information and communication technology, island school, developing country, multi perspective*

1. Introduction

Thailand generally has an inappropriately high class size in schools and gross teacher shortage and some parts of Thailand also have huge limitations in education resources.Therefore, the whole picture of education in Thailand is similar to incomplete jigsaw. Island schools, especially, are located very far away from the mainland. Local people in the islands have never met adequate facilities for everyday life. They are, on average, poor and have different a religion from other area in Thailand. The research tries to investigate how to integrate ICTs into island school following the national master plan. Several factors are relevant to the development progress of ICTs in rural area such as the people: education managers, teachers, students but limitation of infrastructure is the main factor that is bringing about slow developing ICTs in the island schools. The study also focuses on a group of island schools who have been provided with information and communication infrastructure and services and this research investigates the improvement of performance of ICTs that have been used in the island schools for few years.

There are twelve schools from fifty-one islands in the Andaman sea. Most of them are under government support and they are managed by the Satun Education Service Area Office, Satun province. The Office of the Satun Education Service Area is responsible for all schools in which 208 schools located. The island schools provide

basic education such as nursery, primary school and secondary schools that are compulsory in Thailand. Almost all students in the island schools come from island families and most of them not have adequate resources to support studying in higher education. The basic career pattern after finishing school is to following their parents in fishing or general employment. Most of all island schools are located very far from the mainland so that the most important obstacle of development is the limitation of transportation because in some seasons the sea is closed.

1.1 ICT in developing country

Several studies investigating strategies that use of ICTs in the public sector in developed countries have been carried out on several problems. A low level of economic development, poor infrastructure and political unrest are the main factors obstructing the ICTs progress. Access by individual or organizations to ICT tools and IT in the education field is necessary for building the meta-databased in national level. (Thajchayapong, Reinermann et al. 1997; Imran and Gregor 2005) There is a perception that technology leadership plays an important role to successful ICT development. (Hanna 2003) To develop new ICT strategies, the government must set up policy by consultation or advisory committee. This policy should have an appropriate way to follow the national lead to go or development goal. Generally, to set up the national ICTs policy, a basic infrastructure of services such as electric power, telephone, broadcasting, and internet are needed. (Adeyeye and Iweha 2005)

Most ICT policies in developing countries seem to be mismatched with the country's context and culture. Furthermore, the native policy makers in the developing countries do not effectively use media technologies. They do not take into account nor consider the 'macro-level contextual dimensions' of their societies. In developing countries in which access to new technology denied for political or economical reason. Moreover, lack of knowledge prevails, poverty is encouraged and progress is condemned. (Joham and Hobson 2003) Developing countries need to learn within their own environment the way in which IT policy can be created and applied to serve their own country's needs. (Pradhan 2002) There were some studies which contributed to increased understanding of the various components of alignment between ICT and business strategies, they have had a macro focus; alignment in regards to structure of the ICT organization, information systems, ICT architecture or overall ICT strategy. (Fardal 2007) The previous research has been investigated in the social dimension of strategic alignment, and their results indicated that the individual level should be included when studying ICT strategic phenomena. Including the ICT user perspective in this research domain will strengthen our knowledge on the mechanisms that gives better use of ICTs as well as identifying factors leading to alignment between ICT users and ICT managers. (Reich and Benbasat 2000) The linkage between ICT strategy, ICT projects and ICT use requires that the technologies and information system organizations should be implemented or used in a proper way. Despite the different perspectives of macro and micro level, a clear socio-technical tension helps for exploring new technological opportunities and only afterwards do they consider the social context in which the technologies might be used. However, there is only a small amount of research in social computing that acknowledges the importance of considering social dynamics and socio-cultural contexts before planning new technological interventions (Wood-Harper and Wood 2006) From a socio-technical view for a system to be effective the technology must fit closely with

social and organisational factors. (Avison 1991) Generally, there is no single technique could deal with all IT investment projects. However, considering the context is an important aspect in every implementation. (Wild 1996) One research paper showed how these perspectives differ on a variety of dimensions, such as the technical and the social. (Rob 1980; Markus 1983)

In a multiple perspectives approach, we see the pattern of information technologies policymaking being influenced by a complex and dynamic interaction of factors, social, political, technological and cultural. (Mitroff and Linstone 1993) Building on the above professional experiences and examples this research will explore the argument that developing countries, like Thailand, would benefit from a systemic IT policy which includes all factors such as social, political, technical and cultural. The reiteration of Checkland's (1981) Systems Thinking model may highlight some of the key policy implications of IT acquisition which Thailand will need to address in order to participate in the global arena. As such, there is a need for a framework to incorporate the analysis and in-depth study as these factors arises. In this study, a systemic approach is proposed which includes the interactions between the different factors of a country's policy network and stakeholder groups. (Ackoff 1971; Checkland 1981) In order to obtain a variety of perspectives and identify the issues surrounding a country's operation in the global area, it was our intention to explore key stakeholders' concerns. In this research, the key stakeholders included director of The Office of Satun Educational Service Area, head teachers, teachers, parents and students in island schools.

1.2 ICT in education

The fastest challenge in different forms of ICTs development in developing countries is to adapt the people in those countries in many ways. While ICTs are used in education, it has made an impact on education systems. The study explored what organisational factors affected perception, how to use ICTs and how to use a new learning management system. Previous study shows that three factors affect the use and perception; the user characteristics and leader perceptions, technology training, and management approach. (Grainger and Tolhurst 2005) Where some ICTs application and integration in education are well established, success in national ICTs strategies occurred. However, some research argues about the obstructive factors that occurred during the implementation process. Some papers deal with the integration of technology in any organization, including schools requiring leadership. The School management should ensure that the processes involving technology in schools are managed effectively, the role of teacher training, the associated readership challenge and the any obstacles in the way of achieving success integration ICT in schools. It is clear that the focus in the development of any technology strategy should be on the augmentation of the ability of school administrator, head teacher and in order to be foremost among integrate ICT into school curriculum. The school administrators not only update their skills and knowledge, but they also work towards the transformation of their roles an ICT educational leader. (Mentz and Mentz 2003) The question is how to effectively develop a strategy for the successful management of Information and communication technology in the term of managing, teaching and learning in under-resourced of island schools in developing countries, such as Thailand. It deals with the requirements of the technological society on the island to increase the tourism industrial. A research paper found that the new communication technologies have made travel systems more efficient, many hotels now have the web

sites in the Internet to advertise their products and services. (Cheong 1995) But this preliminary research on ICT adoption in Africa and the Asia-Pacific suggests that there are serious barriers to their use in educational and socioeconomic development. If proper architecture, technologies and policy are devised and adopted, the nations and educators can make a beginning with better training of teachers through ICTs that fit their culture or mindsets. (Obijiofor, Inayatullah et al. 2000) In 2001, Thai Learning Technologies 2010 Master plan was set up. (Ainley, Authur et al. 2003) The ICTs in education established at the same period implemented an infrastructure for all schools around Thailand. However, broadcasting and telecommunications systems in Thailand have long been controlled by the government under state monopoly policy. (Anantho 2001) In fact, the real situation of island schools is different from mainland schools and the implementation ICTs in island schools has not been successful. (Chareonrit, Polpok et al. 2005) The successful application of ICT is highly dependent upon the unique circumstances or context of the school and there is a need for awareness of the problems that make a negative impact integration ICT into schools in developing country can have on effective teaching and learning. (Elaine Van, Luigia et al. 2003) They have promoted the education technology community to start thinking with a difference perspective and approach to implement information and communication technology in schools.

In Thailand: the integration of ICT in the schools is encouraged and driven by several projects and initiatives in line with national ICT policies, for example, EdNet, SchoolNet, ICT Master Plan (2002-2006) and Thai Learning Technologies 2010. At the same time, an Island Schools kick starting project has run by various government organizations. Previous research in ICT in education has been done in several levels of institutions. For this paper the researcher has focused case studies on the basic education level on the remote islands, The research findings included investigating general factors and the current status and impact of integration ICTs at island schools.

A basic assumption implicit in this study is that the multi perspective Integrations Information and Communication Technologies (ICTs) at island school all are significance. This research employed Multi Perspective Model provided by Linstone in 1994 which specified three systems that are crucial to determine including: Technical (T), Organizational (O) and Personal (P). The T system includes hardware, software, networking and basic infrastructure. The O system includes policies, procedure. The P system includes political and individual behaviour key players. (Linstone 1994)

To describe the complex situation, the following figure (figure 1.1) shows the Multi perspective model of integration ICT at island school. The figure drew from different perspective views of all stakeholders.

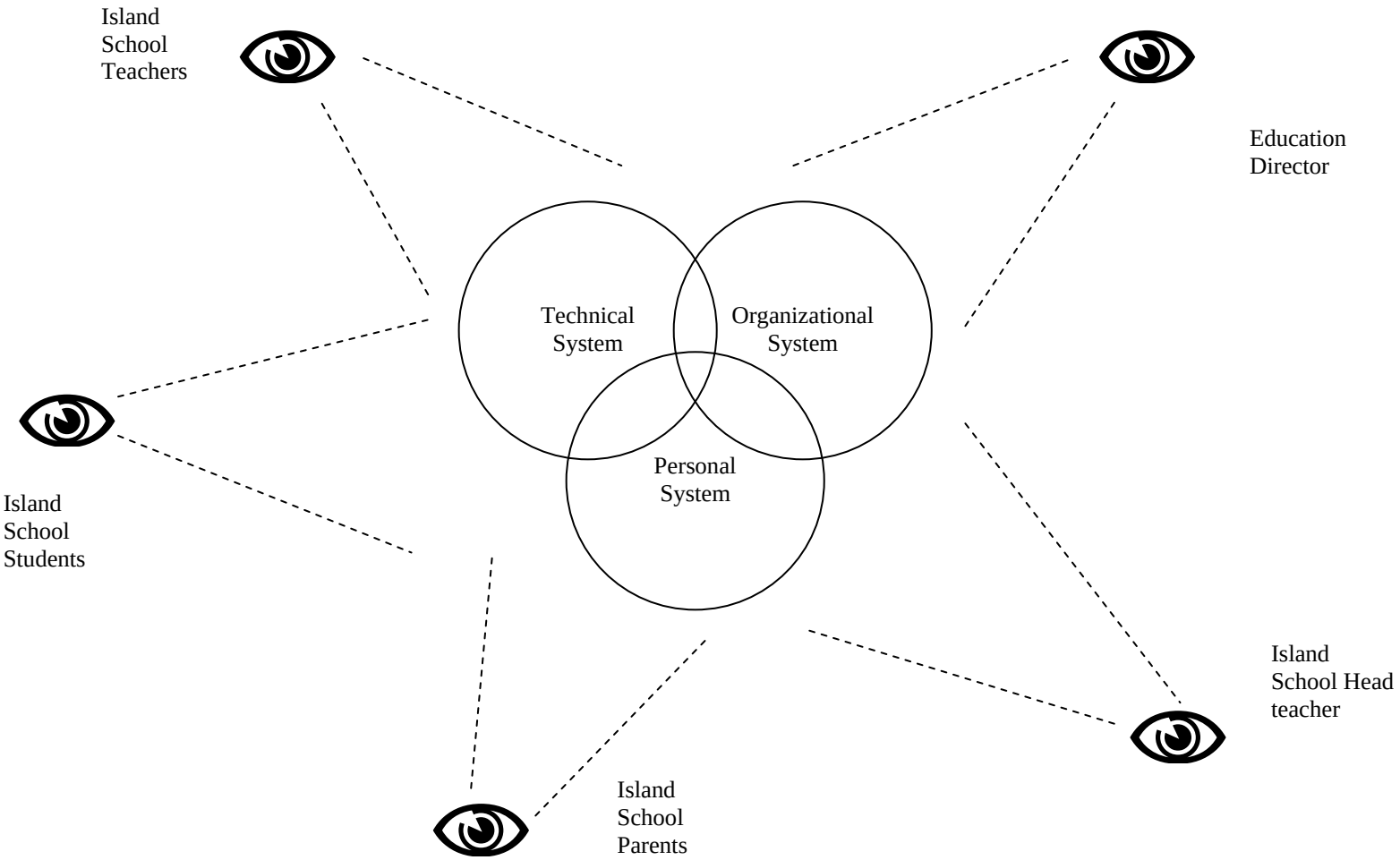

Figure 1.1 Multi perspective model of integration ICT at island school

2. Methods

The following section describes the selection of schools, data collection, data analysis, results, discussion and conclusions.

2.1 Selection of schools

In December 2006, this researcher wrote a letter of invitation describing the nature of this study to the Stun Education Service Area office. The Director of Stun Education Service Area office gave information of all island schools chosen for case studies. The case studies were randomly selected from the Adang Island school group and included: Adang Island school, Tun Yong Ka Boy school, and Koh Sa-Rai school, Participating island schools were selected from 12 schools.

2.2 Data collection

During March 2007, the principal researcher interviewed 5 groups of stakeholders who included the education director, head teachers, teachers, students and parents in three island schools. The data for the study were gathered through interviews with technology planners and were systematically analysed. The study took its foundation from qualitative research to develop case studies to answer the research question. The researcher did fieldwork in this group of three island schools for one month, staying all day and all night studying the daily lives of teachers and students in the field of study. Additional, observations included watching all activities that occurred in schools during the term time among participants. A formal digital recording machine contained audible history interviews of key informants which provided the opportunity to ask opened-ended questions and also provided for more probing with specific questions.

2.3 Data analysis

The process of data analysis was sequenced into five procedures: (a) organizing the data; (b) generating categories, themes, and patterns; (c) searching for alternative linkages and relationships; (d) alternative integration of data; and (e) writing the narrative report. (Marshall and Rossman 1998) The transcripts of the interviews, field notes, or observations were identified according to date of collection and the participants. The researcher recorded his impressions of the director of Stun Education Service Area and local stakeholders' interviews. The interview data were analyzed by using qualitative content analysis to derive patterns or perceptions of integrations Information and Communication Technologies (ICTs) in island school.

3. Results

The research data was organized into a table of categories; technical, organisational and personal perspectives for each of the five stakeholders; Director, Head teachers, Teachers, students and parents followed the TOP diagram. Linkages and relationships were formed by studying the table. Positive reasons creating opportunities for implementing ICT were underlined. Limitations and problems preventing effective implementation of ICT were *italicised.*

Stakeholders	Technical(T)	Organisational(O)	Personal(P)
Director	The development goal for basic education is to provide every school with at least one computer per school for accessing the internet. The main advantage of integrating ICT in island schools, from the Education director's perspective is that electronic documents that provide fast communication between basic education sector and island school. The island schools have many related technical problems. These include lack of continuous electric power, unsuitable building for housing delicate hardware, inadequate telephone lines and internet connections, inferior hardware and software, low technical support and maintenance and inadequate financial support. *This problem added to the scarcity of resources and infrastructure compounds the failure to implement ICT successfully*.	The education director perspective believes *that integration ICT into island schools is less important than the basic needs for example building, food, education tools, teacher.* Therefore most of the budget for developing schools tends to serve basic needs first before implementing technology. For this reason, *the island schools have no coherent ICT strategies.* The plans for implementing ICT runs are short term and do not relate to each other.	A developing country requires human resources, knowledge and skills associated with technology. In terms of adequate skills, the education sectors have tried to provide basic competence in the use of word processing, spread sheets, database, e-mail and Web browser applications. *However, teachers with technology skills will not travel far away from the mainland to teach in island schools which lack convenient facilities. Head teachers said that in 2007, the island schools did not have any teachers who have IT or related knowledge.* The school management scheme tries to ensure that the learners benefit by the teachers becoming skilled in technology. Throughout the process, the island schools send existing teachers to get basic information technology
Stakeholders	**Technical(T)**	**Organisational(O)**	**Personal(P)**
Head Teacher	…children play all day on computers. This is seen positively. The school head teacher said that their children spend time learning technology more than children on mainland. Head teachers in the island schools also said that an ICT electronic document system is very useful for communicating The most appropriate technologies at Island Schools were seen as the ones that enable the communities and organisations to communicate	Head Teachers believe highly in the ability of ICT to increase the simplicity and speed of social communication and reduce the need for transportation. ICT can help solve socio-economic problems and increase income from tourism and fishing markets	If the integrating e-learning into island schools is successful, everybody will have the opportunity to gain as much knowledge as the mainland schools. E-learning changes the social perspectives just as the Internet changed the world. E-learning not only provides a learning experience for students but also creates a learning society.

	more efficiently eg. e-mail, E-document However, even though school staff and pupils want to use *computers, the limited energy supply during school time* and lacking of up to date computer are the cause of problem.	Long term purchasing process of ICT equipment, In brief, *delays in purchasing ICT equipment are caused by a lack of finance, complex government regulatory policies, expansive ICT equipments for island school and under-service island area.* The Education Service Area could allow the school to contact providers directly but there are many problems. Financial resource or budgets for school ICT integration should be allocated to the schools for resolving the problems in the integration process and the budget should be under the control of an ICT school board.	*Insufficient training of school staff about ICT is a problem for integration of ICT.* The Education service area needs to train staff in ICT support and the Education Service area will concern about teacher knowledge background or requirements before embarking on training programmes. *However, the courses calendars on mainland do not always match the island schools term.* *- The Education Ministry need to interest and drive the Education service area directorship* to implement ICT - ICT helps teachers to keep up to date with developments in their subject area. Tourism industries always provided high salary position for graduated student who know basic computer skills. Every year the island schools rely on tourist volunteers teaching their students in their schools and those volunteers have integrated ICT in their curriculum. That example is a good challenge for pupils and local staff teachers. -It is a basic education need to provide funding for teachers doing research about ICT in school and to pay overworked teachers who want to develop in their fields.

Stakeholders	Technical(T)	Organisational(O)	Personal(P)
Teachers	Teachers in island school have inspiration and enthusiasm for learning ICT. Some teachers spend their own money to buy computer accessories for school when they were broken down. Contact with the mainland through computers makes the teachers feel happy and they will stay for longer teaching contracts. ICT provides e-learning opportunities for students who travel nomadically with their families between the islands. Teachers also need new technology together reliable technical systems. The island school should have easy access digital library to support general library which is lacking of books. -The *scarcity of hardware and software in the schools* is due to shortfalls in the budget and *lack of interest of Education Service Area in the quality of the ICT delivered,-limited number of computers, systems out of date and slowness of system* - *Poor maintenance and repair culture* in which spare parts and technical 'experts' from the manufacturers are imported whenever the technologies break down; this leads to waste of resources, time and money; - *poor infrastructural support base;* examples include inefficient electricity and telephone systems;	Teachers thought that just following a good, distinctive strategy will ensure that school will succeed. *However, first solutions must be found for hardware, software and human resources including:- infrastructure, reliable systems, and training human resources.* Schools should concentrate on ICT leadership and to improve ICT skills to train teachers to be ICT leaders or champions *In the teacher's perspective the Ministry of education is responsible planning ICT strategies which teachers have never seen or known the goal.* - *The budget for ICT integration in schools should be allocated to the schools and the budget should be under the control of an ICT school board.* - Education Service area *need to provide alternative technologies when the internet down, CD-Rom course, off-line internet.*	*The Ministry of education is responsible for producing a new planning ICT strategy which teachers have never seen or known it's goals.* Teachers thought that following a good, distinctive strategy will ensure that school will receive a good success. The first requirement [of a strategy] is to solve hardware, software and human resources problems which include:- infrastructure, reliable system, training human resources. Schools should also concentrate on ICT leadership and try to improve ICT skills for trained teachers to lead. The education directors should provide the extra cost for training teachers in island schools. Limited of cost for transport and accommodation on mainland affect the training attendance.

	- *lack of support from the government leading to underfunding* of science and technology programmes in tertiary institutions; - *illiteracy and lack of basic computing skills on the islands*.		
Stakeholders	**Technical(T)**	**Organisational(O)**	**Personal(P)**
Students	*Students suggested that the school should increase computers numbers. They should have enough computers in a classroom and they can access Internet at least one a week.* Students agree that new technologies bring about interesting resources from Internet which are very useful in classroom.	*It is clear that the root obstacles are teachers leaving the island schools When a teacher leaves the students often lose their ICT class in which they are interested.* Students suggested that schools should have a policy about exchanging students because some time they are following their parents travel other islands.	Most teachers lack IT skills. However, the research found that students required that the teachers should have good IT skills whatever subject they are teaching. *They are also fear that the internet could corrupt the morals of their society through easy access to pornography and other culturally.* Island schools students spend time in schools more than mainland students. The pupils want to learn more computer skills ICT is useful for job searching and finding places for study in higher education. In depth, computer skills provide them with a good opportunity of studying higher education

Stakeholders	Technical(T)	Organisational(O)	Personal(P)
Parents	Parents also have a perspective focusing on new technology and agreed with combining ICT into schools curriculum. Parents thought that integrating ICT into island schools creates the best opportunities for their children to learn as well as in mainland schools. ICT is the only way for connecting island people to mainland people. ICT media is essential for knowledge sharing from old island professional to the next generation eg. songs, music, fishing skills, language preservation and weather prediction.	Head teachers and teachers in island schools are occasionally changed. That changed affected things from teaching problems to policy developing problem. Parents said that when the head master or teacher left the island school, it creates a problem for continuous learning. Some families in island schools move nomadically around between islands in Andaman sea. They thought that the island schools should concentrate on cooperating or join the resources together especially teachers. In the current trend of ICT at Adang Island, we found that ICT growth and development are being driven by private businesses tourism. The schools therefore need to drive very fast for teaching and training ICTs skill for their pupils to gain employment from the private sector.	One way to eliminate the problem of education insufficiency of the teachers or principles in the school, parents agreed that island school should have head teacher or leader in a contract for long time period. It is very important that the leaders who develop ICT into the island schools should run those projects continuously. Today, island schools are the centre of learning and studying ICT in island because people believe that the schools should provide knowledge for society. However, we must develop human resources which play a vital role to successful in implementing ICT in to island school. *Parents worry if pupils immersed in the internet might be they lose their traditions and absorb fashions and trends from other parts of the world.* They want their children to familiar with new technology because they believe that ICT skills might help their children to apply for high salary jobs.

4. Discussion

This paper aims to identify potential benefits or challenges of implementing ICTs into island school by using TOP diagram explaining the complex data. The following section shows the discussion of opportunities and limitations in achieving of implementation ICTs into island schools.

4.1 Opportunities

The integration of ICT in the island schools is viewed by the stakeholders to have social benefits and government agencies benefits as follows.

Social benefits. First, integrating ICT into island schools creates the best opportunities for their children to learn as well as in mainland schools and is essential for knowledge sharing of island professions to the next generation eg. songs, music, fishing skills, language preservation and weather prediction. Second, ICT provides E-learning opportunities for students who travel nomadically with their families between the islands. Third, ICT can help solve socio-economic problems and increase income from tourism and fishing markets. Fourth, E-learning changes the social perspectives just as the Internet changed the world and E-learning not only provides a learning experience for students but also creates a learning society. Fifth, the people on island believe the island schools are the centre of knowledge transfer for their society.

Government agencies benefits First, integrating ICT into island schools help provide fast communication of electronic documents systems between the education sector and the island schools. Second, an ICT system which enables communication for teachers to keep contact their family on the mainland through computers makes the teachers feel happy so that they will stay for longer teaching. Most of them spend own money to buy computer equipments. Third, ICT in school helps teachers to keep up to date with developments in their subject area.

4.2 Limitation of ICT

The integration ICT in the island schools is viewed by the stakeholders to be limited by human resources, infrastructure and ICT strategies/policies.

Human resource. First, most of the island school staff are not very literate and lack basic computing skills. Second, the root obstacles are teachers leaving the island schools. When a teacher leaves the students often lose their ICT class in which they are interested. Third, the teachers with technology skills will not travel far away from the mainland to teach in island schools which lack convenient facilities. Head teachers said that in 2007, the island schools did not have any teachers who have IT or related knowledge. Fourth, insufficient training of school staff in ICT is a problem for the integration of ICT. Moreover, the courses calendars provide by Satun Education service area on mainland do not always match the island schools term.

Infrastructure. First, the lack of infrastructure in hardware and software in the schools is due to shortfalls in the budget and a lack of interest of the Education Service Area in the quality of the ICT delivered leading to a limited number of computers, systems out of date and slowness of the system, a poor maintenance and repair culture, a poor infrastructural support base, a lack of support from the

government leading to under funding. Second, complex Education Ministry regulatory policies budget for purchasing or repair ICT equipment introduce delays.

Strategies/policies. The island schools lack ICT strategies at the school level and the education public sector level also lack an internet safety policy. The students perceive that the internet could corrupt the morals of their society through easy access to pornography and exposure to negative cultures and parents worry that if pupils become immersed in the internet, they might lose their traditions and absorb unwelcome fashions and trends from other parts of the world.

5. Conclusion

The Multi Perspective Model was carried out, offering a structure for the research data. While the perspectives of five groups of stakeholders have point of view differences, they all see both opportunities and limitations for implementing ICT in to the island schools. The Director of Education Service Area views ICT in a less positive light than the group of stakeholders who live in the actual situation. There are strong social benefits for implementing ICT into the island school. It would make the island schools the centre of knowledge acquisition. The whole community can benefit from this in socio-economic ways. Nomadic families could improve the community of the education process. Traditional skills and experience could be more widely preserved and made available. Over all ICT will change the social perspectives of the islands. The government agency benefits are much narrower than the social benefit and may not alone justify the use of ICT. The limitations and problems will need more than money to solve them. Problems such as literacy, low technical skills, poor maintenance and repair culture, lack of support from government are deep seated and will need strong and consistent advocacy to bring about change.

6. References

Ackoff, R. L. (1971). "Towards a System of Systems Concepts*." Management Science **17**(11): 661-671.

Adeyeye, M. and C. C. Iweha (2005). "Towards an Effective National Policy on Information and Communication Technologies for Nigeria." Information Development **21**(3): 202-208.

Ainley, J., P. Authur, et al. (2003). "Thai learning technologies 2010. Capacity building of Thai education reform (CABTER) Learning technologies." Retrieved 1 November 2007, from http://www.onec.go.th/publication/a_tech/a_tech.pdf.

Anantho, S. (2001). Changing telecommunications policies to promote access to education in Thailand: An analysis of the policy-making process. School of Telecommunications. Athens, Ohio, OHIO University USA. . **Ph.D. dissertation**.

Avison, D. (1991). "Information Systems Development Research: A Pragmatic View." Computer Journal: 98-112.

Chareonrit, S., P. Polpok, et al. (2005). Research and Development of Remote Island Schools: A Case Study of Ban Koh Adang School in Satun. Songkhla, Thailand, Songkhla Rajabhat University.

Checkland, P. (1981). Systems thinking, systems practice, J Wiley, New York.

Cheong, R. (1995). "The virtual threat to travel and tourism." Tourism Management **16**(6): 417-422.
Elaine Van, M., C. Luigia, et al. (2003). "A Dynamic Framework to Guide the Implementation and Evaluation of Educational Technologies." Education and Information Technologies **8**(3): 267-285.
Fardal, H. (2007). ICT Strategy in an ICT User Perspective: Exploring Alignment between ICT Users and Managers. Informing Science and Information Technology Conference 2007, Ljubljana, Slovenia.
Grainger, R. and D. Tolhurst (2005). "Organisational Factors Affecting Teachers's Use and Perception of Informaton & Communications Technology." Australian Computer Society **46**.
Hanna, N. K. (2003). "Why National Strategies are needed for ICT-enabled Development." Information Solutions Group(3).
Imran, A. and S. Gregor (2005). "Strategies for ICT Use in the Public Sector in the Least Developed Countries: A Cross-Country Analysis." UNPAN.
Joham, C. and E. Hobson (2003). A Systemic Approach to IT Policy: A new perspective for developing countries. European Conference in Information Systems Conference. Naples, Italy.
Linstone, H. A. (1994). Multiple Perspectives for Decision Making: Bridging the Gap Between Analysis & Action, New York : North-Holland.
Markus, M. L. (1983). Power, politics, and MIS implementation, ACM. **26:** 430-444.
Marshall, C. and G. B. Rossman (1998). Designing Qualitative Research. Thousand Oaks, CA,. Sage.
Mentz, E. and K. Mentz (2003). "Managing technology integration into schools: A South African perspective." Journal of Educational Administration **41**(2): 186-200.
Mitroff, I. and H. A. Linstone (1993). The Unbounded Mind: Breaking the Chains of Traditional Business Thinking, Oxford University Press, New York.
Obijiofor, L., S. Inayatullah, et al. (2000). "Impact of New Information and Communication Technologies (ICTs) on Socio-economic and Educational Development of Africa and the Asia-Pacifice." Journal of Futures Studies **4**(2): 21-66.
Pradhan, J. (2002). "Information technology in Nepal: what role for the government?" The Electronic Journal of Information System in Developing Countries **8**(3): 1-11.
Reich, B. H. and I. Benbasat (2000). "Factors that influence the social dimension of alignment between business and information technology objectives." MIS Q. **24**(1): 81-113.
Rob, K. (1980). Social Analyses of Computing: Theoretical Perspectives in Recent Empirical Research, ACM. **12:** 61-110.
Thajchayapong, P., H. Reinermann, et al. (1997). "Social Equity and Prosperity: Thailand Information Technology Policy into the 21st Century." The Information Society **13**: 265-268.
Wild, P. (1996). "An assessment of strategies for information system evaluation: Lessons for education." International Journal of Educational Research **25**(4): 361-371.
Wood-Harper, T. and B. Wood (2006). Enid Mumford:Your Way and our Way for the Future. , Manchester: University of Manchester.