E-Learning Readiness in the Hinterland of Batam

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Abstract

E-learning has been a subject in the very fast research area with different point of view, from psychological in the social field to telecommunication network in the technical field. While e-learning has been adapted in many education institutions, little is written about e-learning implementation in rural area. However, many believe that e-learning will be a shortcut for providing equal education quality throughout the world. Therefore, this research aims to answer the core question: to what extent rural area are ready for e-learning. This research is carried in Batam, a municipality consists of thousands island surround it.

E-learning readiness is measured with four aspects, namely student readiness, teacher readiness, technology readiness, and management support. The students and the teachers are ready to use e-learning, but the school facilities to support e-learning are very limited. They need to be upgraded. Most students and teachers have mobile phone that can connect to internet, so their schools can implement e-learning with asynchronous method using mobile device (m-learning). The support from school management and local government also need to be improved, especially to provide facilities to support e-learning implementation.

Keywords : e-learning, readiness, rural area, m-learning.

1. INTRODUCTION

Education management in border areas and islands like Batam, requires creative efforts to decrease the gap with neighbor countries and achieve equalization of good education. Batam population is concentrated in main island, Batam, therefore building school in the hinterland becomes expensive (Brajawidagda, 2002). On the other hand, the implementation of information technology in education has been done and has been believed to extend education access (Santiputri, 2002). Information technology can be implemented in hinterland of Batam.

The problem formulation of the research is '*what model of information technology in education is appropriate for the islands area?*' The purpose of this research is to improve access and quality of education in the islands. The goal of this research is to propose good e-learning system for the islands area.

Batam municipality consists of 339 islands with a land area is 1035.30 km^2 (62%) and the vast ocean is 612.3 km^2 (38%). There are 12 districts in Batam, 3 districts can be categorized as hinterlands and are habited 4.53% of Batam population (BPS, 2011). This research is conducted to answer the research question: how ready the school, the students, and the teachers in hinterland of Batam to receive the same educational facilities to the urban areas through e-learning are. We survey at four high schools in the hinterland. The readiness is measured at four aspects, namely student readiness, teacher readiness, technology readiness, and management support.

Another section of this paper will be presented as follow : the first we will present literature review about e-learning and hinterland education. After that we will present about research methodology, result and discussion, and conclusion.

2. LITERATURE REVIEW

2.1 E-learning

E-learning is a type of learning which delivers teaching materials to students by internet, intranet or other computer network media(Wahono, 2007). The advantages of e-learning are flexible because students can study any time, any where, and with different types of learning, saves teaching and learning time, reduces travel cost, saves overall cost of education, for example infrastructure, equipment, and books, reachs learners in wide geographic area, and trains learners to be more independent.

While disadvantages of e-learning are, it will require expensive investment to build e-learning for certain schools particularly those in the rural area, students who do not have high motivation to learn usually fail, limit access to the internet or intranet in the students environment and in the school will hamper the implementation of e-learning, this system is difficult to implement for students who are technology illiterate.

E-learning has been initiated or implemented by some colleges with various progress. In general, there are two types of e-learning, namely e-learning with asynchronous method and e-learning with synchronous method.

2.1.1 E-Learning with Asynchronous Method

In this type of e-learning, teachers provide some lesson materials in file or video format. The lesson materials are uploaded to the website for downloading by students. Learning activity can be held in different time and locations by teachers and students. They can learn anytime they need. Interaction between teachers and students can be recorded as other students reference. (Soo and Bonk, 1998; Williams et. Al 1999).

In asynchronous method, communication through discussion forums is usually performed as means of interaction between teachers and students. This type of communication needs communication strategy and depends upon teacher's skill for leading the communication process.

According to Liu (2003), the example of communication strategies are give praise and fast responses to student questions, and transformation from student role to teacher role. Other factors affecting learning method are the variation of media, system reliability, the interaction intensity, and mastery of information technology. (Williams et. Al, 1999).

2.1.2 E-Learning with Synchronous Method

Teachers and students are subjects of learning interaction. Both of them communicate and make interaction through high speed internet, an audio-video device, and supported software. This learning environment enables teachers and students to interact from different locations. Teachers can make face-to-face interaction with students like in regular class interaction. (Soo and Bonk, 1998; Williams et. Al 1999).

According to Huang and Huang (2002), the use of audio-video through the internet connection becomes a leap of text-based learning today. Moreover, Huang (2002) adds that the interaction needs long time to make communication and it is difficult to release the expressions. Therefore, the fear will reduce the desire for having online learning.

2.2 Education in Hinterland

Access to the islands in the hinterland is limited. For example Air Raja island in Galang district. This island have wide approximately 5 km^2 and is inhabited by 767 residents. Access to Air Raja island can be reached by boat, with irreguler schedule. We can use 3G connection on island. The school and the number of student on the island are, SDN 014 has 80 students, SMPN 15 has 68 students, and SMAN 6 has 75 students (BPS, 2011). The main obstacle faced by schools is the limited number of teachers.

Batam municipality established one roof schools on other islands. The schools offer basic education up to secondary education that are managed by single management.

Other common problems found in hinterland are the lack of qualified teachers who want to teach (Collins, 1999), the lack of financial support, and the lack of community support. In urban areas, the schools usually get support from surrounding communities. However, the schools in hinterland that are dominated by low income group population, and the attention to the schools is not as big as the attention to survive. (Chen, 2007; Collins 1999; Tsai, 2004; Tsai, 2007)

Issues about proper education is related to economic activity, in which the growth is generally in favor of the economic centers. Whereas based on the concept of equal education opportunity, the government must ensure all students get the same education facilities, regardless of social status, racial, economic and geographic barriers. (Tsai, 2004; Tsai, 2007).

3 RESEARCH METHODOLOGY

3.1 Research Location

The research was conducted in the hinterlands of Batam, which are scattered in islands around the Batam Island, namely Belakang Padang island, Air Raja island, Bulang island, and Galang island. The islands have less transport facilities, telecommunication, electricity, teachers, and other learning support facilities than Batam island.

3.2 The Population

In this research, the population is entire high schools in hinterlands, which are categorized in several groups of respondents, namely students, teachers, headmaster, and information technology facilities in each school. You can see the high schools data in hinterland in table 1.

Table 1 High school population in the hinterland

No	High School	Location
1	SMAN 2 Batam	Belakang Padang island
2	SMAN 6 Batam	Air Raja island
3	SMAN 7 Batam	Kasu island
4	SMAN 9 Batam	Karas island
5	SMAN 10 Batam	Galang island
6	SMAN 11 Batam	Buluh island
7	SMAN 13 Batam	Terong island

3.3 The Sample

The research uses purposive sampling and quota sampling, where the research does not perform on the entire population, but focuses on a number of target determined at the beginning of research. The sample determination considers certain criteria that have made against the objectives of the research object. Quota sampling is chosen because it is difficult to reach hinterlands, it

is difficult to obtain accurate data about the number of students and teachers population in hinterlands, and it is difficult to contact schools and request permit to study. You can see the samples in table 2. Criteria for determining the high school are:

1. The government high school
2. The geographical position is near to the Batam island
3. It is easy access and communication with the high school.

Table 2 A Sample Table

Sample	Number of Student	Number of teacher
SMAN 11 Batam	36	8
SMAN 2 Batam	40	15
SMAN 9 Batam	39	8
SMAN 6 Batam	15	6
Total	130	37

Data collection technique :

1. Distributing questionnaires to the respondents, namely students and teachers at sampled high schools.
2. Observation is used as a complement to determine the condition and situation of the facilities and the readiness of information technology at each sampled school.
3. Interview with the laboratory manager or person in charge of information technology management, and headmaster who determines the policy of information technology development at each school. This technique is used to obtain in-depth information about the plan and policy of information technology-based learning development.

4. RESULT AND DISCUSSION

4.1 Student and Teacher Readiness

Frequency of Computer Use

The survey results show that most students can use computer (92%). The frequency of using computer is dominated by student group that use computer once or twice/week (58%). The students mostly use the computer during 1-2 hours/day.

All teachers have used computer regularly. Most teachers use computers 7 times or more a week (55%). The duration of computer use is dominated by usage 2 hours/day. You can see the detail data in figure 1 and 2.

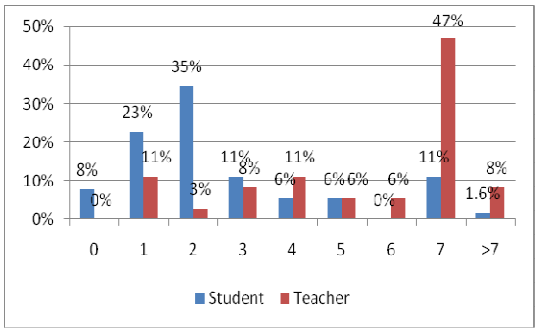

Figure 1 Frequency of Using Computer (time/week)

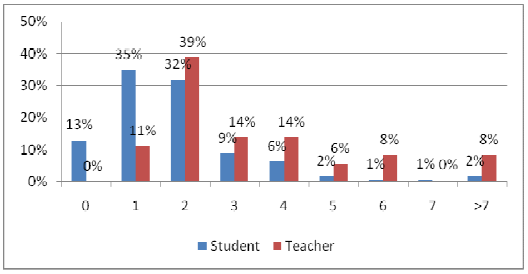

Figure 2 Duration of Computer Use (hour/day)

The Ability to Access Internet

In term of the ability to access internet as one of the basic skills of e-learning, there are 77% students have accessed internet regularly. The frequency of accessing internet is dominated by students group that access it once/week and 7 times/week. The students mostly access internet for 1-2 hours/day (57%).

All teachers can access internet. Most teachers access internet 7 times a week (57%). The duration of accessing internet is about 1-2 hours/day. You can see the detail data in figure 3 and 4.

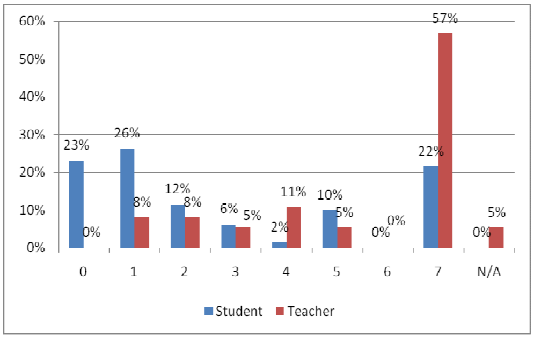

Figure 3 Frequency of Internet Access (time/week)

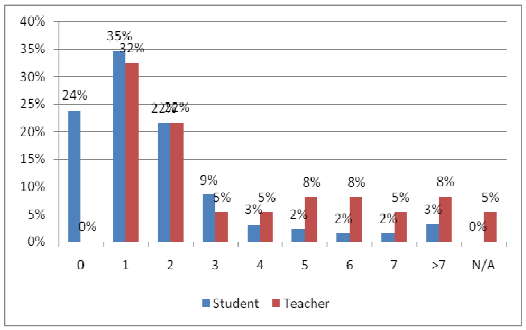

Figure 4 Duration of Internet Access (hour/day)

How to Access Internet

The students prefer to use mobile phone to access internet, while the teachers prefer to use modem. Both students and teachers have mobile phone which they can use to access internet. The mobile phone budget of students is dominated for the need of purchasing the mobile account. Some students spend spend less than Rp 50.000 (42%), and other students spend Rp 50.000-Rp 100.000 (36%). The mobile phone budget of teachers is more than Rp 100.000/month. You can see the detail data in figure 5, 6, 7.

Most students (92%) have already used internet for learning or searching lesson material, although the frequency is dominated by the group who are using internet if necessary. There are 94% teachers use internet for supporting learning activities. The frequency of using internet are dominated by the group who use the internet for 3 times/week and 7 times/week. You can see the detail data in figure 8.

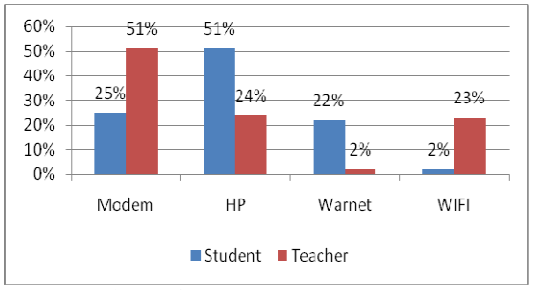

Figure 5 How to Access Internet

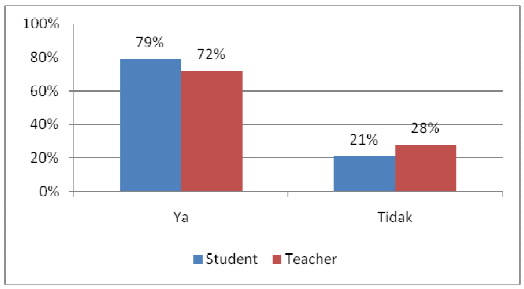

Figure 6 Total Mobile Phone Ownership to Access Internet

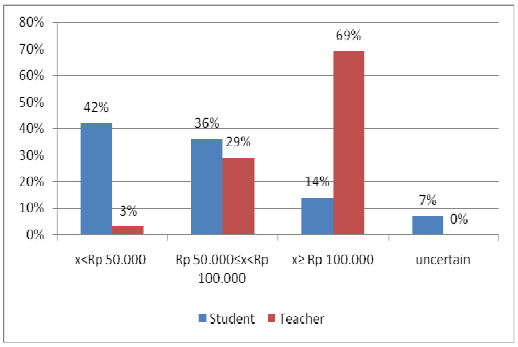

Figure 7 Mobile Phone Budget in a Month

Using Internet for Learning Activities

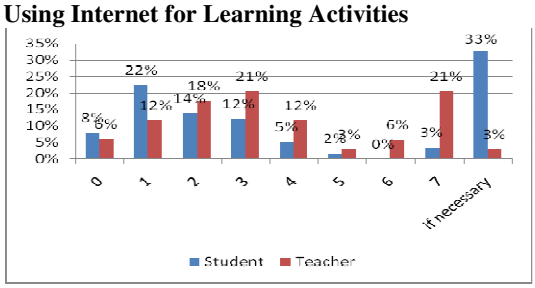

Figure 8 Frequency of Using Internet for Learning Activities (time/week)

The Availability of Lessons Material in Digital Form

Teachers' habits, using computer and accessing the internet in their daily activities, especially learning activities, have increased the number of teachers that have lesson material in digital form, as a raw material for e-learning process. 78.4% teachers have lesson material in digital form, with a wide variety of file types and courses.

Student Statements about Readiness

We ask two open questions to the students :

1. Are you interesting to study using e-learning? Why?
2. Are you ready with e-learning method? Why?

The answers of that questions are, 92% of students are interesting to study using e-learning. The reason are "they can study at house and do not need to go to school", "they want to know about e-learning and do not want to be outdate", "they want to learn with better tool, "they think e-learning will help them to find information", "e-learning is easy, good, and fun", "e-learning has comprehensive materials", "delivery lesson materials to students using e-learning is easy", "e-learning is effective and efficient for time and place usage". The reasons why some students are not interesting to study using e-learning are "they do not know how to use e-learning", and "they want to use internet only for hobby".

92% of students are ready with e-learning method. The reason are "using e-learning will increase knowledge", "curiosity", "in order to

compete with other students", "e-learning is new teaching methods, more exciting, effective, quick, and not waste time", "it is easy to find material using e-learning", and "they want to advance their island". The reasons why some students are not ready to study using e-learning are "they are not familiar with e-learning", "they use internet rarely", "they need introduction about e-learning", and "the lack of facilities".

Teacher Statements about Readiness

We ask five open questions to the teachers :

1. Do you want to implement e-learning? Why?
2. Are your students ready to use e-learning? Why?
3. Is your school ready to use e-learning? Why?
4. Are you interesting to make lesson material in digital form?
5. Is there equipment to produce content and is there enough equipment?

The answers of that questions are, 94% of the teachers want to implement e-learning. The reasons are "they want to find more information with e-learning", "they think the students can more easily understand with picture materials, slides, and animations", "e-learning makes teaching and learning become attractive, easy to understand, fun, and fast", E-learning makes learning resource become unlimited", "it is easy to deliver the lesson material", "e-learning makes teachers and students creative and innovative", "using e-learning is easy", "e-learning can support teaching and learning activities". The reason why the teachers do not want to implement e-learning is "the facilities do not support e-learning"

86% of teachers say that their students are ready to use e-learning. The reasons are, "the students prefer to learn by audio visual media", "the students have known and understood how to use the technology", "most students can operate computer and internet", "the students prefer to use e-learning system", "many students have already got a laptop or desktop computer", "the students are enthusiastic about e-learning", "the students want to follow the development of science and technology", "the students need other references besides information from books and teachers", "most students have mobile phone that can access internet". The reasons why the teachers claim students are not ready to use e-learning are "there is inadequate facilities in some schools", and "some students are not familiar with internet"

67% of teachers say that their schools are ready to use e-learning. The reasons are "there are sufficient computer in some schools", "the human resources are ready", "and some schools have projectors, computers, and laptops".

The reasons why teachers claim that their schools are not ready to use e-learning are "the electricity and fund are limited", "some schools still have no access to internet", "and there is inadequate facilities in some schools".

94% of teachers are interested in making lesson material in digital form. They are interested in making tutorial video and presentation file, recording songs and teaching activities. 31% of teachers say there is enough equipment to produce e-learning content, 31% of teachers say there is insufficient equipment, and 39% say there is no equipment to produce e-learning.

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4.2 Technology Readiness

All schools have computer laboratory. Only two schools have enough computers in their laboratory. All schools also have projector, sound system, VCD/DVD player in limited number. All schools do not have servers, web server service, database server service, mail server service, and data centre. The availability of electricity in school hours is 80%-100%. Most students (79%) and most teachers (72%) have mobile phone that can connect to internet.

4.3 School Management and Government Support

Based on the interview with the manager of information systems at each school, all schools have a plan to develop e-learning. They conduct some activities to guide the development of e-learning through a variety of ways, such as build the Information Technology Centre (IT Centre) to support infrastructure, procure IT equipments, prepare lesson material, and increase the participation of teachers to write in school blog. Two schools declare they have been supported by local government for the development of information systems and e-learning.

4.4 E-learning Readiness Discussions

There are four questions to know e-learning readiness, namely :

1. Are the students ready to use e-learning?

The answer : the students are ready to use e-learning. We know that from their answers when answer these questions "*Are you interesting to study using e-learning? Why?*" and *"Are you ready with e-learning method? Why?"* 92% of students are interesting to study using e-learning and ready with e-learning method. They have positif mind about e-learning. 8% of students that do not ready use e-learning, actually do not refuse e-learning, because their reasons are related their skills, they do not know how to use e-learning. This group can be upgraded become ready to use e-learning.

The students must know two important things when use e-learning. They are *how to use computer* and *how to access internet*. Survey results show 92% of students can use computer and 77% of

students have accessed internet regularly. 79% of students have mobile phone to acess internet. Most of them have used internet for learning purpose. Their teachers also say that their students are ready to use e-learning.

2. Are the teachers ready to use e-learning?

The answer : the teachers are ready to use e-learning. We know it from questionare results, 94% of them want to implement e-learning. They want to get some e-learning advantages. They are also interesting to make lesson material in digital format to use in e-learning system, although their equipment to produce content are not enough.

All teachers also use computer regularly. More than 50% teachers have used computer and have accessed internet 7 times or more in a week. 72% of the teachers have mobile phone to access internet and they allocate more than Rp 100.000 each month for their mobile phone, so they can access internet regularly and fluently. 94% of the teachers also use internet to support their learning activities.64% of them say that their school are ready to implement e-learning.This group works on schools that have enough computers.

3. Are there ready technology to implement e-learning?

The answer : All school do not have server. They have local area network (LAN) in limited number. Their computer fasilities are limited too. There is a solution to implement e-learning. Some schools can invest a server together or make partnership with other institution, for example with Information Technology Centre (IT Centre).

Actually, since inception of *Batam Intelligent Island* (BII) program in 2001, Batam continue to improve its information technology infrastructure to attract foreign investment. One of the leading infrastructure is IT Centre, under Batam Indonesia Free Zone Authority (BIFZA). IT Centre provide data centre service. They have big capacity data centre, can support e-learning activities on a large scale.

After they make partnership, the schools can install e-learning application, web server, and database server, then upload lesson materials there. Their students can access the lesson materials use their computers or their mobile phones. The suitable method to be applied is asynchronous method.

There are several good quality schools in mainland, Batam island. The hinterland school also can make cooperation with that school. The teacher from mainland school can develop the lesson materials, then upload to server, and share to the hinterland schools. You can see the e-learning model in figure 9.

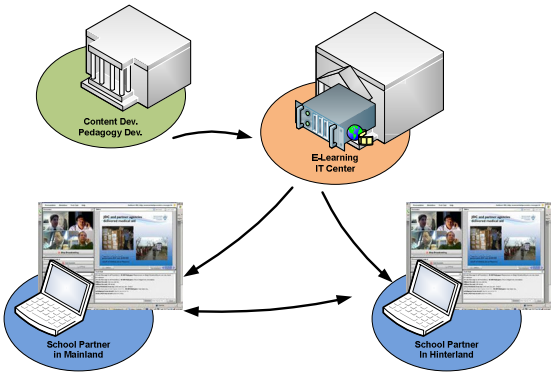

Figure 9 E-learning Model in Island Area

4. Are there supporting from school management and government to implement e-learning?

The answer : there are few support from school management and government. Their support must be increased.

5. CONCLUSION

This research has mapped the e-learning readiness in hinterlands of Batam. The students and the teachers are interested in and ready to use e-learning. Even though schools' infrastructure to implement e-learning is very limited, but most students and teachers have got mobile phone which can connect to internet. So it is very possible for schools to implement e-learning with asynchronous method using mobile device (m-learning)

The support from schools' management and local government needs to be improved, especially in providing infrastructure for e-learning.

There are limitations of this research is the measurement of schools' readiness in urban areas as e-learning partner is not done. Next research direction is measured the perceptions of satisfaction of using e-learning.

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