Enhancing Learning Support System through the Use of Information and Communication Technology: a Case at Universitas Terbuka

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Abstract

The revolution of information and communication technology (ICT) has brought the new millennium into an information era. The advancement of ICT revolution has also raised a lot of expectations among distance education practitioners. The ability of ICT to facilitate more interactive learning process within the distance education system has driven many distance education providers to exploit ICT for enhancing the quality of their instructional processes, especially of their learning support systems. Providing learning supports to students has also been the most challenging issue for Universitas Terbuka (UT) since most students live in rural areas within which qualified tutors are hard to find. Attending face-to-face meetings within regular scheduled times is not feasible for most working students and who live in rural areas. Similarly, disseminating academic administration and information on time has also been very difficult to do since students are scattered throughout the country. These unresolved problems are believed to have resulted in low course completion. The recent development of ICT as well as its infrastructure in Indonesia has opened up a possibility for UT to provide its students with a fast, reliable, and affordable two-way communication channel. In accordance with this, UT conducted a pilot project dedicated to see the effectiveness of ICT-based (i.e. Internet) online learning supports in enhancing students' learning satisfaction and achievement. This paper shares the findings of that pilot project.

Introduction

The revolution of information and communication technology (ICT) has brought the new millennium into an information era. The general consensus is that we have entered the information age and that we will not be exempted from the current forces of technological development and globalization (Taylor, 1998), have been acknowledged and realized. Nevertheless, in less advantaged countries, it has also raised a lot of worries. As with other countries, the Indonesian government is determined to harness the use of information and communication technology (ICT) for increasing the country's national competitiveness. The initial step was done through the establishment of the Indonesian Telematics Coordinating Team (known as TKTI) in 2000, consisting of all cabinet ministers and chaired by the Vice President of Indonesia at the time, Megawati Soekarnoputri. In 2001, the ICT national plan was formulated by Presidential Decree No. 6/2001 ("*Guidelines for the Development and Implementation of ICT in Indonesia*"), which states the government's general policy towards ICT and calls on TKTI to take an active role to drive ICT implementation in Indonesia (International Telecommunication Union, 2002)

Indonesia is one the largest countries within ASEAN with a population of over 215 million. The country is mostly water (81%) with five big islands and about 14 thousands of small islands. Despite the economic crisis, which started in 1997, Indonesia has progressively increased its telecommunication network over the last decade. Nowadays, Indonesia ranks number 13 within the top 20 countries with highest number of Internet users (Internet World Stats, 2006). However, the percentage of Internet users to the total population is only about 8.1 %. This is slightly lower than the Internet penetration in China (8.5%) and much lower than that in other ASEAN countries such as Malaysia (36.7%) and Singapore (67.2%). According to Internet World Stats (2006), the growth of ICT users in Indonesia within the last five years was phenomenal (800%), increasing the number from around 2 million (in 2000) to about 18 million (in 2005). Nevertheless, only about 8% or only around 1.5 million of those users are Internet subscribers (APJII, 2006).

The increase in user number was initially due to the expansion of Internet access points provided by Internet Kiosks (known as WARNET), which are mostly owned by private individual business enterprise. A survey conducted by APJII in 2002 showed that about 43% of users accessed Internet from WARNET (APJII cited in International Telecommunication Union, 2002). The rest accessed Internet from offices (41%), homes (12%), and schools/universities (4%). The growth of WARNET gave a lot of hopes to Indonesians who can not afford to have computers and Internet access in their personal

homes and work places; and had helped increase the Internet penetration in Indonesia significantly.

However, the later survey in 2004 showed a significant decrease in the number of Internet users surfing from the WARNETs. Nugroho (in Purbo, 2005) reported that this was caused by the reduced number of WARNET from approximately around 2,500 in 2002 to about only 1,724 in early 2004. Discussion in various mailing lists blamed the high telecommunication tariffs for the decreased number of those Indonesian WARNETs. "*Other explanations included the conversion of WARNETs into gaming centers, illegal tariffs imposed by local governments, and some local governments requiring WARNETs to apply for a license to operate as entertainment center"* (Purbo, 2005, p. 103)

The Use of ICT in Indonesian Higher Education System

With regard to ICT use for education, it is estimated that about 5000 educational institutions in Indonesia are connected to the Internet, and counted for more than 32% of the estimated total Internet users in Indonesia (Nugroho in Purbo, 2005). Nevertheless, most educational institutions are having the Internet connection more for getting the link to the borderless world of information and references' sources. The use of ICT for teaching and learning purposes are still in initial stages, even much less of it for a more integrated blended learning system.

The use of ICT in education has always been related to the phenomenon of e-learning or e-education. Many institutions in Indonesia, especially those of higher education, have developed and or adopted some kind of e-learning management system (known as LMS) and conducted some initiatives to provide e-learning activities as supplements to their classroom lectures. Several big universities have also used ICT for academic administrative purposes such as for online registration and student record system. And as the government regulation does not allow universities to offer e-learning without being supplemented by pre-packaged self-instructional printed learning materials, there is no university in Indonesia that has full e-learning programs. In addition, a few Indonesian university's' initiatives on offering degree programs entirely through e-learning system in early 2000 (when e-learning phenomenon was just entered Indonesia) has shown no significant development and could not attract significant number of students.

Nevertheless, as Internet is borderless, Indonesia is also open to global market. Many foreign higher education institutions try to market their e-learning programs to Indonesians. Even though there is no specific survey that can show the exact number of Indonesian students in those foreign e-learning programs, there is no doubt that they have attracted some Indonesians to enroll. Those e-learning programs however are believed to be, mostly, within the line of professional continuing education.

Universitas Terbuka (UT), which is a state university and the only university in Indonesia that is entirely using distance education mode of learning, was one among the first higher education institutions in Indonesia that use ICT extensively for its instructional processes. However, the limited access of UT's students who mostly live in rural areas makes it impossible for UT to adopt ICT-based distance education method as its main delivery method. It was with the expectation on the WARNETs that UT started to provide Internet-based learning supports to its students.

The use of ICT at UT has been designed to address the issue of quality, which is still questionable to some people in Indonesia. Although UT has been acknowledged to have addressed the concern for access to higher education, its quality is still questionable to some people. Can UT, which employs distance education method of instruction, deliver the same quality of education as "good teachers" in the classroom? Can interactions between teacher and students be fully accommodated? Can it provide satisfying feedback to the students?

Providing high quality and timely learning support to students has also been a struggle for UT. Most students live in rural areas within which qualified tutors are hard to find. Furthermore, since most UT students are working full time, they have difficulties in attending face-to-face meetings within regular scheduled times so that face-to-face tutorial provision is not feasible in most cases. Nevertheless, the importance of tutorials are significant as data on student academic performance show that students needs for learning support services are real. Low academic achievement as shown by the average individual passing rates suggests that students faced difficulties in their studies. In accordance with that, despite the knowledge of students' limited access to ICT infrastructure, the potential use of ICT to facilitate the expected interactions within the learning process drove UT to seriously consider it as one of its instructional media. The availability of WARNETs was one of the significant aspects expected to ensure the

effectiveness of the ICT-based learning support system in enhancing the quality of the distance learning process at UT.

In this opportunity, I would like to share with you our experience in trying to take advantage of ICT to improve our learning support system for the students. I hope that our experience would somehow be beneficial to some of you who share the same situations as ours in Indonesia. However, it would be beneficial to start the paper with some background about the university.

About the University

Universitas Terbuka (UT) is located in Indonesia, which is the largest archipelago in the world stretching more than 3,500 miles (81% of which is water) and consisting of over 14,000 islands. Indonesia is the fifth most populous country in the world with over 60.36 percent of its 210 million people living on the densely populated islands of Java, Bali, and Madura (Balai Pusat Statistik, 2000).

Universitas Terbuka is a state university and the only university in Indonesia that is entirely using distance education mode of teaching. It was established in 1984 with missions to widen access to higher education and to upgrade primary and secondary school teachers who graduated from the short-term programs to enable them to obtain the full-teacher training degree. UT was intended to be a flexible and inexpensive university focusing on serving people who do not have the opportunity to attend conventional face-to-face higher education institutions for various reasons, including lack of funding, living in isolated and rural areas, and working full-time.

UT is now one of the mega universities in the world with about 280 thousand active students scattered all over the country. With that kind of student body, UT needs a strong management system that will ensure the smooth operation of the daily activities. With its central office located in the capital city of Jakarta, UT has 37 regional offices throughout the country.

UT offers more than 900 courses within 34 study programs under four faculties, namely: the Faculty of Teacher Training and Educational Sciences (EDUC), the Faculty of Economics (ECON), the Faculty of Social and Political Sciences (SOCIAL), and the Faculty of Mathematics and Natural Sciences (SCIENCE). While the other three faculties are open for high school graduates as well as working adults, the Faculty of Teacher

Training and Educational Sciences offers only in-service training programs for practicing primary and secondary school teachers. Starting in 1990 when UT was appointed by the Indonesian government to up grade primary teacher qualification, the study program of Primary School Teacher Training (for classroom teachers) has been the biggest program with an average of 50 thousand students per intake.

Development and Implementation of UT-Online System

UT started its online service with a simple website. In the first year (1997), the website contained mainly general information on study programs as well as general regulations for registration and credit transfer. In the subsequent years, the information was expanded to include publication of research findings (1998), online academic journals (1998), announcement of examination results (1999), mailing-list based tutorials and counseling (1999), as well as distribution of down-loadable take home examination sets (2001).

The mailing-list based tutorials (known as electronic tutorial or Tutel) were conducted on course basis, i.e. each course was offered through a specific mailing-list account. The mailing-list application was used for about three years, and in 2001 as a more advance software was available, the system was moved into a web-based application using an open source learning management system called “Manhattan Virtual Classroom” (MVC). At the time, UT offers approximately online tutorials for about 170 courses. Despite its strengths for accommodating interaction between students and tutors both synchronously and asynchronously, the MVC system was not easy to integrate into the university’s existing student record system (SRS). As a result, there was no mechanism to check whether a tutorial participant was actually a UT’s student. To improve this system, in 2004, UT adopted another open source software called Moodle, which uses an open source relational database management system MySQL that makes it easier to integrate to UT-SRS. With this system, only students who have already registered for the courses can participate in the online tutorials for the respective courses.

In line with the more intensive use of online tutorials, the website has also been enriched and became a comprehensive portal of the university (www.ut.ac.id). It is now containing all necessary information for both students and general public. The students’ web pages include also facilities for online registration, online materials (both text-based and multimedia), online tutorials, online counseling, online journals, online self-tests, as well as online examinations. Students can also now check their study progresses through their

online transcripts at any time. The portal is also linked to other relevant sites including the university's digital library and research databases. Nevertheless, to maintain the flexibility and openness of the distance education system, UT designs its Internet-based support system as an asynchronous system. The real-time interaction feature of the platform (such as for chatting and online discussion board) are used only for informal communication among students and between students and tutors.

Lessons Learnt

UT has been intensively monitoring the effectiveness of its online services both in the robustness of the system itself and in facilitating students' independent learning process. During 2002-2003, UT specifically conducted a special project aimed at determining the effectiveness of the use of ICT (i.e. Internet) within the UT system to address problems related to student course completion rates and achievement, as well as their learning satisfaction[1].

a. Access Points and Participation Rates

Based on APJII's 2002 survey result, which reveals that over 40% of Internet users in Indonesia was accessing the net through WARNET, UT signed Memorandum of Understandings (MOU) with the top three Internet Access Providers (which have Internet WARNETs all over the country) to enhance students' access points to the Internet. UT also conducted a series of campaign and promotion to the students about the benefit of Internet for their studies, including distributing leaflets and posters on UT-WARNET communication network information. UT and the three Internet Access Providers also conducted seminars and provided free training for students in 14 cities.

Initially, UT targeted to reach about 10 percent of registered students to use the Internet-based (online service). However, based on participation rates, the average participation rate (of semester 2002.2 and 2003.1) is only about 3.5% of the registered students. There are several possible explanation for this low participation rate. Firstly, it seems that the initial expectation was too high considering that the percentage of the total number of Internet users to the total population of Indonesia was only less than

[1] This section is taken from the UT-Online Project Report by Belawati, T., Hardhono, A.P., and Toha, M. (2004), which has been published previously. The project was carried out with the aid of a grant from the International Development and Research Centre (IDRC), Ottawa, Canada.

2% (Internet World Stats, 2003). Secondly, the spread of WARNET's location is not as widely as it initially looks. In addition, as shown by the latter APJJI's survey in 2004, there was a decrease in the number of operating WARNETs from about 2,500 to less than 1,750.

b. Access and Quality of Connection

In order to gather information about the access and perception of students about the online academic services, a set of questionnaires were distributed through both mail and online. The questions on this category was intended to see the source of information from where students heard about the online (hereafter termed as UT-Online) service, students' access points, the quality of Internet access, the cost, and the time students usually accessing the UT Online.

Based on data from 755 returned questionnaires, it was revealed that with regard to access point, 38.49% of respondents claimed to access UT Online through Internet Kiosks (WARNET, Warintek, or Warposnet), 47.8% from computer facilities at their work places, and 13.71% from their homes. As expected, the quality of connection students have from their access points varies depends on the quality of the Internet facilities available. Responses show that only 101 students (13.38%) claimed that the Internet speed in their access points were considerably fast, the majority of them (41.06%) said that the connection was just moderate (310 students), and 107 students (14.17%) even said it was very slow (> 5 minutes for opening the website only).

With regard to access point, 38.49% of respondents claimed to access UT Online through Internet Kiosks (WARNET, Warintek, or Warposnet), 47.8% from computer facilities at their work places, and 13.71% from their homes. This data show that only a small portion of UT students accessing the online services from their homes, which is understandable since computer and Internet connection is still very much considered expensive for personal expenses. This profile of access points seems to be different from that in other Asian countries. A survey conducted by Zhang, Perris, and Poon (2002) revealed that in China and Korea, the majority of students of the Guangzhou Radio & Television University (GZTRVU), Shanghai Radio & Television University (SHTVU), and the Korea National Open University (KNOU) accessed the online services from their homes (each respectively 73%, 54%, and 66%). Nevertheless, like in Indonesia, the survey also found that many students in various surveyed countries

often use computer facilities in their work places to access online distance learning services.

c. Frequency and Participation Pattern

As an illustration to see how frequent and how students are studying in e-learning environment, a separate set of questionnaire was distributed to the online course participants. About 325 of students who returned the questionnaire claimed that they were participating in the online course, which is the element of the UT online services that most represents a comprehensive e-learning program. Based on their responses, it was revealed that students did not yet visit the e-learning sites too frequently. Only about 28 out of the 325 students (8.62%) said that they visited and logged-in into the e-learning sites everyday. While the rest claimed to log-in once in every 2-3 days (22.15%), once a week (23.69%), once in two weeks (10.77%), and even only once in several weeks (16.62%). Similarly, with regard to the duration of studying, 104 out of the 325 students (32%) said that they only spent less than one hour in each visit.

This profile of pattern and frequency of access in UT is different from for example, that in Universitas Tun Abdul Razak (UNITAR), Malaysia. Silong and Ibrahim (2002) reported that UNITAR students on average visit their e-learning sites and courses 1-5 times a week with the total duration of 4.8 hours per week. This difference is of course related also to the fact that UNITAR is a virtual university and that Internet access rate in Malaysia (24%) is higher than that in Indonesia.

When we look further on the learning activity students do in their online courses, data show about 40% of students were still studying passively such as browsing the materials only. The data also reveal that the main learning activities done by students were still passive in nature such as reading the announcement, and reading and downloading the materials; and only 115 students (35.38%) claimed that they were actively posting messages and conducting discussion. Interestingly, this passive learning behavior seems to be not exclusive to UT students. For example, Tsang, Choi, and Tam (2002) reported that the same situation also the case in the Open University of Hong Kong.

d. Impact on Course Completion Rates and Student Achievement

With regard to the effectiveness of the online tutorials in increasing students' course completion rates and student achievement, the project found that students who participated in the online tutorials have higher course completion rates and higher achievement (which was measured by average of GPA) than their peers who did not participated. Although there would be other factors affecting students' course completion rates that are not considered in the analysis, random selection of the comparison group would statistically "validate" the findings.

Furthermore, gender wise, data show that male participants were almost twice as many as the female ones. However, despite the lower number of female participants, data analysis revealed that the significant differences of course completion rates and GPAs between male and female students were regardless of their gender differences. The project tries to dig out the reasons behind this through an open question so that students could freely write their experience including barriers to access the provided online services. However, the responses of female students did not reveal any specific or peculiar points that are different from what were written by male students. As claimed by students, personal barriers for accessing the Internet are mostly related to time constraints, the lack of computer facilities, the unavailability of WARNET in their nearest area, and cost. Although, of course, the number of female students who returned the questionnaire and specifically shared about their barriers in their responses is less than male students who did.

e. Learning Satisfaction

A set of questionnaire, closed and open ended questions, was distributed to students to gather information about their learning experiences using the online learning services better known as UT-Online, especially the online tutorials. Based on responses submitted by 755 students, it was revealed that students' still find a lot of difficulties in accessing UT-Online and have some dissatisfaction on several aspects of the UT-Online. Those aspects mostly mentioned are related to two main categories namely technical and content. The technical problems seem to be the most significant difficulty. The technical problems mostly faced by the students were related to the low speed of Internet connection (to UT website), connection stability (sometimes of sometimes on), and system reliability (high frequency of 'error' when opening and navigating within the website and complexity of the application used). It seems that all

the problems were basically related to the national communication infrastructure, UT services, and students' basic skill in dealing with web-based applications.

The problems related to the speed of internet connection complained by the students are beyond UT's and students' control. As data show, most students access the Internet from either their work places (256 students) or the WARNET (179 students). Although there is no empirical data on the average speed of offices' Internet connection, most WARNET would have the average real internet connection at no more than 5 Kbps. Across the country, this number could be smaller due to differences in hardware and software sophistication of the computer they used. Further investigation also found that a lot of WARNET banned connection to personal website (PHP-based website) such as the UT-Online website. The action was done to save the bandwidth as a PHP-based website is dynamic in nature so that they can not make a 'cache' of the website in their local servers. As a result, a lot of students also complained that they were able to visit UT's website but failed to log-in to their personal page of the online tutorial.

The other sources of student' dissatisfaction are rooted in UT's internal system and services such as lack of tutor responsiveness, poor appearance of the website, lack of information on how to navigate the applications, lack of standardization in the format of materials presented in the online tutorials, and the limited number of courses being supplemented by the online services. Among these, tutor responsiveness seems the most serious aspect noticed by students. This is considered very serious by UT because tutors' responsiveness is the key to the promptness and effectiveness of the UT-Online in facilitating student independent learning process. This is also disappointing for UT because all tutors have gone through a training on e-tutoring (technical and communication skill or online or web-based tutoring), and have been provided with a technical as well as academic guidelines for e-tutoring. This shows that tutors were not yet fully aware of the importance of being prompt and responsive in e-tutoring.

Being an e-tutor is not an easy job since the tutor has to have "online competencies". In this case, Salmon (2000) provides a matrix as perspectives for e-moderators or whoever who deals with online learning and acts as online tutors. This matrix consists of a combination of quality and characteristics aspect of e-tutor online competencies. She breaks downs the quality aspects into six components such as confident,

constructive, developmental, facilitating, knowledge base, and creative. On characteristic aspects, she mentions about five components such as understanding online process, adequate technical skill, online communication skills, content expertise, and personal characters. Therefore, there are 30 elements of competencies that e-tutors should have in dealing with the students. The low tutors' responsiveness found in this study, from Salmon's matrix perspective, falls into a category that reflects the combination of facilitating (quality) and understanding of online process (characteristic). In this category, the tutors are supposed to have online competencies such as: know when to control groups or students, when to let go, how to bring non participants, and know how to pace discussion and use time online.

Concluding Remarks

This paper has illustrated the implementation of ICT for education, especially for distance education, in Indonesia. As parts of the effort to improve the quality of learning support services to the students, UT has been trying to explore the potential use of ICT regardless of the limited ICT infrastructure within the country. The most challenging circumstances for UT are the fact that students' access to the Internet relies very much on the public Internet Kiosks (WARNETs), which also depend on the poor external ICT infrastructure.

Nevertheless, regardless of that problematic infrastructure, the findings of UT Online Project show that students expressed their appreciation and satisfaction of the online services, which was considered as an innovation, appropriate for the characteristics of working students, and useful. Furthermore, findings also show that students' participation in the online tutorials significantly increases their course completion rates and achievements. Based on this, UT continuously improves and provides online services to its students. Such an improvement is emphasized in the further development of the human resources' (i.e. tutors') capacity in conducting the online tutorials. Improvement has also been focused on strengthening the existing collaboration with the Internet Access Providers so that students will have higher opportunity to take advantage of the provided online services. Last but not least, UT keep developing its online system to be more users friendly, yet has an attractive appearance.

In summary, based on UT's experience, it is shown that ICT can be effective to enhance the quality of distance learning process. However, it is also apparent that for ICT to significantly increase the actual students' learning successes and satisfactions in

conducting their studies at a distance, it requires necessary infrastructure to ensure access. Without the availability of secured access for everyone, the potential benefit of ICT for education can only be enjoyed by a small percentage of more privileged students. This in turn, could create a new concern of inequality to quality distance education, a phenomenon for which distance education was initially aimed to bridge.

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