

Implementation of information and communication technology in Islamic University of Indonesia

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ABSTRACT: This paper was aimed to analyze the implementation of information and communication technology in Islamic University of Indonesia, Yogyakarta. This paper analyzes the initiation, development, and adoption of such technology in the Islamic University of Indonesia as a case study. Literature review was conducted to historically analyze the university's attempt in integrating technology to the academic sphere, its achievements, and the challenges it faced ahead and the ways it can overcome it. The result indicates that the university was among the pioneering institution in technology adoption in Indonesia. Its investment in information system since late 1990s has created many advantages for its students, lecturers, employees, and parents to engage in academic activities. Although, being pioneering in many aspects of technological application, the university's capacity in maintaining its technology up grading is in need of improvement. This improvement requires further investment in software and human resource.

1 INTRODUCTION

Islamic University of Indonesia (or Universitas Islam Indonesia and abbreviated UII in Bahasa) was established in July 8, 1945 as the first national higher education institution with Sekolah Tinggi Islam (or Islamic Higher Education) abbreviated STI as its original name. The term national refers to the fact that the university was planned, prepared and finally launched by Indonesian founding fathers, not by colonialists as many other institutions before. Among Indonesian founding fathers were Moh. Hatta, Abdul Kahar Muzakir, Abdul Wahid Hasyim, Mas Mansyur, Muh. Roem, Moh. Natsir, and others were also university founders (Abdullah, 2006, pp. 9–12) (Khozin, 2006, pp. 137–138) (Andriansyah, 2012) (Harjono & Hakiem, 2013, pp. 4–12).

The University had given its contributions to national higher education in early stage of its development by giving its Faculty of Religion and Faculty of Education to governments. The two faculties were then transformed into PTAIN (Perguruan Tinggi Agama Islam Negeri in Bahasa or State-Owned Islamic Higher Education Institution) and IKIP (Institut Keguruan dan Ilmu Pendidikan in Bahasa or Institut of Teaching and Education), which became pioneering in Islamic and educational teaching in higher education level (Abdullah, 2006, pp. 12–15) (Andriansyah, 2012) (Khozin, 2006, pp. 139–140). Although, it was a pioneer in higher education in Indonesia, the university stayed in its non-governmental institution

status since its establishment was based on national and religious mission.

Being the oldest private and pioneering institution, the university was and will always be challenged to take the first step forward in recent developments for higher education compared to others. So far, such a challenge seems to be met mainly in terms of quality assurance and information technology. The university was known nationally for its pioneering preparation and implementation of quality assurance, in late 1990s, even before government mandated through higher education regulation. It has also marked massive investment in technology infrastructures that allow it to be competitive and innovative.

This paper was then aimed to analyze how information and communication technology was adopted and implemented in Islamic University of Indonesia as one of its powerful resource in advancing higher education challenge in Indonesia. To do so, this paper will review the university's involvement in applying technology for academic, human resources, admission and other purposes. The main purpose of this paper is to describe the university's achievement and its potential improvement with a simple hope that it can be created as model for other institution.

2 METHODOLOGY

The research can be categorized as qualitative research which according to Fairbrother (2014,

p. 75) can be characterized as inductive and exploratory. The method used is case study focusing on a bounded system (VanderStoep & Johnston, 2009, p. 201 & 209), which for this research is an educational organization. To do so the research gathers data on the initiation and development of information and communication technology adoption in Islamic University of Indonesia. The data was available in university book of history, annual report in anniversary and other sources. The data was then historically described to oversee the way used by university to adopt information and communication technology and improve it in academic environment. The research then compiles another data from national authority on higher education to analyze the relevance of the adoption by the university.

3 RESULTS AND DISCUSSION

The initial moment for adoption of information and communication technology in Islamic University of Indonesia was the establishment of Computer and Statistics Center (or Pusat Komputer dan Statistik in Bahasa) in September 7, 1982. The establishment was legalized under Rector Decree No. 59/B.VI/1982 as part of University Senate's decision in its meeting in July 18, 1981. The establishment of the center was aimed to serve fast development in university which brings a challenge in students' academic necessities as well as in workers and society having concern on university matter. In its initial body, the center was led by director with his/her vice along with three chambers: research, development, and maintenance; analysis system; and operation and production (Thaib & Mahfud MD, 1984, p. 139, Pamudji, et al., 2004, p. 357, & Muhsin, et al., 2005, pp. 171–172).

Computer and Statistics Center of Islamic University of Indonesia was equipped with a Shack TRS-80 Model II radio computer in its launch. Some efforts were then made to improve both quantity and quality of the equipment the center used. The center was also granted many new computers from several sources. Some computers and equipment such as AT&T microcomputer with five Oveletti terminal units, a LQ-1500 printer, and an UPS 1 KVA unit were granted by generous donor to the center. Sri Sultan Hamengku Buwono X, Governor of Yogyakarta Special Region, also granted Mini Multi User Computer with 4 users or terminals with Unit Unix in its operating system and a NCR printer (Pamudji, et al., 2004, pp. 357–358 & Muhsin, et al., 2005, p. 253).

As for 2002, the center was then transformed and its name was changed to Computer Center (or Pusat Komputer and abbreviated to Puskom

in Bahasa). The center launched an innovative internet-based academic service named Academic Information Service of Islamic University of Indonesia (or Universitas Islam Indonesia-Layanan Informasi Akademik and abbreviated to UII-LIA in Bahasa) (Pamudji, et al., 2004, p. 358 & Muhsin, et al., 2005, p. 253). UII-LIA provided information about student academic activities, registration data, academic study results, library activities, and history of payments. The service was available for students, parents, and lecturers which allow them to interact and communicate to manage students' academic for better results (Pamudji, et al., 2004, p. 358 & Muhsin, et al., 2005, p. 254).

To optimize UII-LIA's benefits, Computer Center provided 60 units of computers in main campus of Islamic University of Indonesia that can be accessed without any charge by students and employees. Using this facility, parents could monitor their children's study developments from library activities, course schedule, GPA, etc. As for students, the facility made it easier to manage the class they want to attend for each semester, when and how to pay tuition fee as well as to ask a book to borrow from library. For lecturers, such technological advances allow them to be more precise in delivering lectures and to evaluate it because they had access to student's background and academic developments (Muhsin, et al., 2005, p. 254).

Computer Center was then renamed to Center for Information System (or Pusat Sistem Informasi and abbreviated Pusinfo in Bahasa). As part of university reorganization, in 2006 Center for Information System was then transformed and renamed to Board of Information System (or Badan Sistem Informasi and abbreviated BSI in Bahasa). It was functioned in some students' services such as online key-in for each new semester, database development, and preparing facilities and infrastructures for e-learning. These tasks were aimed not only as supporting tools for university capacity building but also as strategic ones (Hamid, 2006, p. 15).

The board was then holding responsibility to integrate information systems available into one platform named UNISYS. UNISYS enables all of its users from students, parents, lecturers, employees, and managers to access all data available previously in the UII-LIA. However, some development, especially, in bandwidth capacity was indeed needed to be improved. E-learning was at this time available in several faculties such as Faculty of Industrial Technology and Faculty of Medicine along with its different characteristics. The board was also responsible to make an integrating platform for e-learning which was for the first time aiming religion teaching (or Mata Kuliah Umum Agama abbreviated MKU Agama in Bahasa) in university level (Hamid, 2007, p. 7).

As for 2007, Management Information System has covered Human Resources (or Sistem Informasi Manajemen Sumber Data Manusia and abbreviated SIM SDM in Bahasa), Academic Activities (or Sistem Informasi Akademik and abbreviated SIMAK in Bahasa), Center (or Sistem Informasi Pusat and abbreviated SIMPUS in Bahasa), Inventory (or Sistem Informasi Manajemen Inventaris and abbreviated SIM INVENTARIS in Bahasa), Finance and Bank (or Sistem Informasi Manajemen Keuangan dan Bank and abbreviated SIMKEUBANK in Bahasa), Finance (or Sistem Informasi Manajemen Keuangan and abbreviated SIMKEU in Bahasa), Webmaster (or Sistem Informasi Manajemen Webmaster and abbreviated SIM WEBMASTER UII in Bahasa), and Self-Grading System for Lecturer (or Modul Nilai Mandiri Dosen in Bahasa). These systems were accessible through intranet in campuses. While for systems available throughout internet included UII-LIA, UII-Perpus (or Management Information System for Library), UII-RAS (or Management Information System for Academic Planning of Students), UII-Alumni (or Management Information System for Alumnae), UII-SIE, UII-PMB (or Management Information System for Students Admission), UII-MHS (or Management Information System for Active Students) and UII-SMS (or Management Information System for Complaining Based on Short Message Service) (Hamid, 2007, pp. 7–8).

Some development and maintenance were also conducted to Management Information System. The systems were to be implemented such as Management Information System for Payroll, for Human Resources, and for Accrual. English version for university official website was also under development to maintain its accessibility by foreigners both partners and potential students as the university networks started to expand (Hamid, 2007, pp. 7–8).

Next development in information and communication technology adoption comprise of university intensive network with national banks to provide online payment system for potential and active students as well as alumnae. Network was also developed to cover education support licensing and training with international provider such as Apple and Microsoft. To widen website visibility, Board of Information System started domain and sub-domain enhancement, which allows each unit to have and to handle their own websites with sub-domain under university domain. Besides creating sub-domain policy, the board also initiate specific domain for e-learning (<http://klasiber.uui.ac.id>), library (<http://library.uui.ac.id>), campus news (<http://news.uui.ac.id>), national educational grand (<http://inherent.uui.ac.id>), repository and

archive (<http://rac.uui.ac.id>), and e-journals (<http://journal.uui.ac.id>) (Hamid, 2009, pp. 32–33).

Website development for units was also implemented with different stages of achievements. To ensure access quality, hot spot around main campus has improved its capacity significantly along with storage upgrade for official staff mails up to 100 megabytes. Another facility enhanced to improve visibility of websites was weblog for staff including lecturers and employees. To integrate infrastructures between campuses, back bone network with 7 gigahertz microwave and 32 mbps capacity was installed to connect two other campuses to main campus. With improvement in Wi-Fi, the board introduces one account policy for several internet protocol services with each account having bandwidth capacity up to 32 kbps. To protect users from accessing virus and irrelevant contents from internet, the board also used barracuda web filter, which was also an effort to fulfill national law on internet technology (Hamid, 2009, pp. 33–34).

After decentralizing sub-domain management and responsibility to each units, Board of Information System was functioned as sub-domain provider, content map coordinator, and training facilitator. While each unit became responsible for information and news provided in their sub-domains, such a differentiation was a requirement in a client-based website, the board served that time which should always be accompanied with information system culture. To build such a culture, some efforts had been conducted such as increasing bandwidth up to 51 mbps, familiarizing mail and blog for staffs in rectorate, faculties, and programs, creating awareness to websites through the blog competition, etc. (Hamid, 2011, pp. 23–34).

Available information system services with each function until this time could be summarized in [Table 1](#).

Recent achievement in information and communication technology adoption can be classified in two aspects: infrastructure and system. Infrastructure achievements comprise (1) integration of main library and medical laboratory along its Wi-Fi system in main campus networks; (2) increasing bandwidth from 51 mbps to 100 mbps for faster internet access for lecturers, students, and employees; (3) improvement in supporting hardware required for implementing information and communication technology adoption (Hamid, 2013, p. 11 & Harsoyo, 2014, p. 17).

System achievements contain for example integration of Management Information System for Internal Quality Audit (or Sistem Informasi Manajemen Audit Mutu Internal and abbreviated SIM AMI in Bahasa) with another system available in the university. This management information system will be very useful for the auditor and auditee

Table 1. Management information system available in Islamic University of Indonesia.

No	System name	Description
1	SIMAK	SIM Akademik is used for academic administrative process such as curricula, scheduling, class attendance, grade etc. The system also covers self-grading facility (Program Nilai Mandiri) which allow lecturers to grade students' exam results automatically throughout internet.
2	SIMPus	SIM Perpustakaan is used for recording and circulating library collection including facilities for searching, borrowing, re-borrowing, charge for returning late, etc. SIMPus uses RFID (Radio Frequency Identifier) technology as book identifier. Borrowing and returning book can be conducted by self-check and book drop. SIMPus data for public can be accessed through internet in the address http://simpus.uui.ac.id .
3	SIMSDM	SIM Sumber Daya Manusia is used for employees' administration including promotion, further study and payroll. It also covers Beban Kinerja Dosen or lecturer's performance indicators to be reported autonomously.
4	SIMKEUBANK	SIM Keuangan dan Bank is used for interface by bank partners to pay several academic expenses via bank and then automatically registered in university system (registration form, tuition fee, building maintenance expense, etc.).
5	ERP—SAP	Software ERP (Enterprise Resource Planning) is used as <i>back office</i> for good financial planning and controlling. University uses a world-class <i>software</i> used by most of international and multinational corporations: SAP (<i>System Application and Product</i>).
6	SIMIN	SIM Inventaris is used for recording all university's inventory activities along with its status and location. The system was integrated with SIAT.
7	SIMPMB	SIM Penerimaan Mahasiswa Baru is used for administration of students' admissions starting from registration, test, and acceptance.
8	CBT	<i>Computer Based Test</i> is integrated with SIMPMB to conduct admission process based on computer. The test results can be viewed directly after it finish. The system is also used in several senior high schools partner around Indonesia to give more access for prospective students.
9	SIMREG	SIM Registrasi is integrated with SIMPMB and SIMAK to support administrative functions in registering new students as active ones and can join further academic process.
10	SIMAWAL	SIM Mahasiswa dan Alumni is used for recording students and alumnae data as base data for SIMAK and other systems.
11	UNISYS	UNISYS is functioned as service portal that provide many data from different systems through internet. UNISYS can be accessed from unisys.uui.ac.id .

Source: Hamid (2011, pp. 23–24) & Islamic University of Indonesia (2012, pp. 6.29–6.30).

because the availability of data required in audit process in main database. Another achievement is in Management Information System for Library which is supportive to Radio Frequency Identification (RFID) as a tool to identify library collections (Hamid, 2013, p. 11 & Harsoyo, 2014, p. 18).

Until recently, university has been developing Management Information System for Final Academic Writing Task (or Sistem Informasi Manajemen Tugas Akhir and abbreviated SIM TA in Bahasa) and for Journal (or Sistem Informasi Manajemen Jurnal and abbreviated SIM Jurnal in Bahasa). These two systems will enable students and lecturers to access latest academic final writing tasks, journals, and another academic works. Besides these systems, the university is also working on improvement of its Academic Management Information System for E-Learning (or Sistem Informasi Manajemen Akademik E-Learning

and abbreviated SIMAK E-Learning in Bahasa) (Hamid, 2013, p. 11 & Harsoyo, 2014, p. 18).

Previous explanations on the initiation and development of information and communication technology in Islamic university of Indonesia imply university capacity in pioneering ideas in relation between technology and higher education. This pioneering character can be viewed from some policies nationally ordered by General Directorate of Higher Education of Ministry of Education and Culture by which Islamic University of Indonesia was one step forward or at least was in line. The university, for example, has been investing to develop and maintenance its quality especially in information and communication technology since late 1990s. Such policy in resources investment was then nationally ordered by the directorate in its Higher Education Long Term Strategy (HELTS) 2003–2010. Besides technology investment, the

university also pioneered quality assurance policy ordered in this directorate program (General Directorate of Higher Education, Ministry of National Education, 2004).

The university's implemented UII-LIA for academic purposes was also among its innovative policy on how to manage technological advancement to meet students need. Since early 2000s, students of Islamic University of Indonesia have been enjoying an internet-based academic system, which allows them to decide what class to take at what time they like it most. At the same time their counterparts in other universities including the state-owned ones still had to stand in long queue to get a class or had to wait approval from their academic guidance lecturer on subjects they were trying to take. This innovative way was also accompanied with the possibility of parents to be more active in monitoring their children during the years of study.

In the admission process, university innovative system also helps improving study opportunity for many prospective students. Computer-based test enables students around Indonesia to join university by taking a test from their or the closest schools having partnership with university to conduct the test. It allowed students to join university without visiting it which was very useful considering Indonesia's large area. As for nowadays such system is still an innovative one because many universities are still conducting classical paper-based test in many schools around Indonesia for their admissions.

Another example is that in the end of 2011, the directorate released policy on uploading academic papers and journals to official websites as well as directorate's portal (General Directorate of Higher Education, Ministry of Education and Culture, 2011). As for Islamic University of Indonesia, such policy on uploading academic contents has been implemented in 2007. The policy itself along with other policies also resulted in improvement of website quality as viewed from Webometrics ranking. Webometrics ranked the university website for the first time in 2008 as number 21 in national level. After that, the rank fluctuated as shown in Figure 1. Considering Indonesia has more than two thousand higher education institution with hundreds of them are state-owned ones, the Islamic University of Indonesia achievement in Webometrics ranking was appreciated and well respected.

As many other institutions implementing information and communication technology, Islamic University of Indonesia has faced also many challenges from inside and outside. Inside challenges were mainly manifested in the form of adaptation capabilities and lack of knowledge as Peng,

Jiang, & Zhang (2013) showed in their paper. As for 2010, the usage of technology for e-learning was only covered 39 lecturers or about 8.6 per cent of all lecturers (Islamic University of Indonesia, 2010, p. 17).

Despite university efforts ranging from socializing policy, conducting training, and awarding active lecturers, the limited concern in e-learning indicates lack of human capacity, which needs to be addressed more seriously. One reason of this limited usage might due to relatively technical and complicated system used, which in this case was Moodle. It then made some lecturers try another alternative such as online social media to provide students with e-learning experience rather than use university e-learning system. Cook, Ley, Crawford, & Warner's (2009) remark on combination internal and external motivation to enhance lecturers in e-learning may become an option for solution as well as usefulness and ease of use by lecturers (Agbonlahor, 2006) needed to be improved.

For outside challenges, government policies over higher education both in national or regional level can be viewed as university problem. As the decentralization grows further, many local governments take more concerns about higher education in their area. Such concerns can also be seen in national policy in making some private universities state-owned or improving its status from institute to university. These policies imply that other universities, previously less competitive to Islamic University of Indonesia, are now in the same level or even in higher one. In the context of information and communication technology, especially website, the university achievement in Webometrics ranking can also be viewed for this argument.

In beginning of its inclusion in the ranking, Islamic University of Indonesia was able to significantly increase its website capacity so that it reach's a peak rank by number 11 in the country for July 2010 ranking announcement. After that,



Figure 1. Islamic University of Indonesia's Webometrics national ranking 2008–2015.

Source: Webometrics, several editions, compiled by authors.

this rank can never have been reached again and university competitiveness in the rank seems to be less improved. As for the latest rank in January 2015, there are five Islamic universities having better ranks than Islamic University of Indonesia: Syarif Hidayatullah State Islamic University Jakarta by number 20, Universitas Muhammadiyah Yogyakarta (22), Universitas Muhammadiyah Surakarta (26), Universitas Islam Negeri Maulana Malik Ibrahim Malang (27), and Institut Agama Islam Negeri Walisongo Semarang (28) (Webometrics, 2015). Although, being number 29 among 401 of total listed universities in Webometrics (2015) is still a good achievement, such position has never been thought to have come so, at least in the early 2010s. Islamic University of Indonesia was in its very high confidence for its capacity at some point at that time.

From this discussion, it is clear that the adoption and implementation of information and communication of technology in context of Islamic University of Indonesia have been one of its acclaimed and respected achievements mainly because of its pioneering initiative. However, to maintain its capacity as oldest national higher education institution, the continuous improvement will always be required by the university, especially, in both software and human ware investment. Without this, university will find it difficult to compete in national level because technology although is not the only tool, will play significant role in higher education competition.

4 CONCLUSION

This paper investigates Islamic University of Indonesian efforts in implementing information and communication technology in its daily operation as the older national higher education. It shows that the university has started a large endeavor in terms of technological investment earlier than many institutions. This investment pays off in the form of university achievement in implementing services for its stakeholders with internet as main basis. Furthermore, the services have also increased the university's reputation as one of frontier universities in national context.

However, Islamic University of Indonesia has also some works to do in its willingness and commitment to be pioneer in higher education innovations. As the last few years have shown, university needs more maintenance in its technology infrastructure as well as human resources. Such an effort will be very important and may be the determining factor in the university's future competitiveness in facing challenges from other institutions as well as fulfilling national requirements.

This research has many limitations mainly in its focus on information and communication technology implementation, which is a relatively new field in context of Indonesia higher education. However, this research opens wider option for other research. Further research can be conducted with the results above as starting point. The usage of Unisys from different perspectives such as lecturers, students, parents, and employees can be explored in a more sophisticated way as consumer satisfaction research. Website capacity in the context of ranking challenge along with its possible improvement may also be another subject of research in fields such as cyber metrics and web studies.

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