

Information Technology Utilization in Environmentally Friendly Higher Education

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Abstract: The awareness of an environmentally friendly learning process has been of concern lately. IT offers some applications that are able to provide better green education environments in higher education sectors. This research involves top social information technology applications, DropBox and WordPress. DropBox is the most popular cloud storage in the world. Meanwhile, WordPress is a top content management systems at the moment. This research examines the utilization of those two applications in student assignments and presentations. The study observed 150 sophomore students in computer science faculty. The results show that the use of DropBox and WordPress in higher education learning activities is able to significantly reduce paper and ink usage. The combination of those two applications create a very handy and comfortable environment for students in higher education. This strategy reduces the consumption of papers and inks and is accepted well by most of the students.

1 INTRODUCTION

The development of information technology (IT) can be used for various purposes. In the field of government, IT has been used to cut bureaucracy and complicated procedures. In the business field, IT has been widely used as a virtual media for sellers and buyers to conduct online transactions or online shopping. The trend of using information technology such as the internet has also experienced a significant increase in transportation sector, such as online ride sharing. From those examples, the authors would like to define the term of "IT utilization" as involving IT applications in daily activities. In this article, we involved some IT applications for education field.

According to the Internet World Stats, Asia continent is a region that has the biggest number of internet users (Internet World Stats, 2018b) followed by Europe, Africa, Latin America/Caribbean, North America, Middle East, and Oceania/Australia. In Asia, 48.7% of the population are internet users (Table 1) or almost half of the population.

From those data, Indonesia ranks number 5 after China, India, the United States, and Brazil. Indonesian internet users per December 2017 (Table

2) are 143,260,000 users (Internet World Stats, 2018a).

Table 1: World Internet Usage and Population Statistics.

World Regions	Internet Users	Internet Users %
Africa	453,329,534	10.9 %
Asia	2,023,630,194	48.7 %
Europe	704,833,752	17.0 %
Latin America / Caribbean	437,001,277	10.5 %
Middle East	164,037,259	3.9 %
North America	345,660,847	8.3 %
Oceania / Australia	28,439,277	0.7 %
WORLD TOTAL	4,156,932,140	100.0 %

In the early 2018 period, it was known that internet users in all over the world reached more than 4 (four) billion people (Kemp, 2018) or equal to 53% (more than half world population). The number of university students enrolled in Kemenristekdikti in 2017 totaled 6,924,511 students (Ristekdikti, 2018). Learning activities at college campus that have been carried out conventionally involve the provision of teaching materials, daily examinations, midterms,

semester exams, and work assignments (both individual and group assignments). With that number of students, a significant amount of paper and ink are used for the printing needs of these student assignments.

Table 2: Top 20 Countries With Highest Number of Internet Users - December 31, 2017.

No	Country or Region	Internet Users 31 Dec 2017
1	China	772,000,000
2	India	462,124,989
3	United States	312,322,257
4	Brazil	149,057,635
5	Indonesia	143,260,000
6	Japan	118,626,672
7	Russia	109,552,842
8	Nigeria	98,391,456
9	Mexico	85,000,000
10	Bangladesh	80,483,000
11	Germany	79,127,551
12	Philippines	67,000,000
13	Vietnam	64,000,000
14	United Kingdom	63,061,419
15	France	60,421,689
16	Thailand	57,000,000
17	Iran	56,700,000
18	Turkey	56,000,000
19	Italy	54,798,299
20	Egypt	48,211,493

Furthermore, people will continue the trend of reducing their need to rely on costly hardware and infrastructure by placing files and applications in the cloud (Drake, 2018). Cloud storage will reduce the cost for investment in hardware and infrastructure. Cloud computing is viewed as a method for achieving efficiency and cost saving through the use of IT infrastructures (Waddington et al., 2013).

This paper discusses the role of IT in supporting environmentally friendly higher education. Environmentally friendly higher education is everyday behavior that is applied or carried out at a university that has a positive impact on the environment and does not damage the environment.

The involvement of popular social information technology in lectures gained a very good response from the learners (Abdillah et al., 2018). The researcher involved 2 (two) famous applications. Those applications are DropBox and WordPress.

One of the most popular cloud repository is DropBox. Research showed that DropBox is currently the most popular provider (Drago et al., 2012) of cloud-based storage systems. The second application is WordPress. WordPress is a free

installation resource which has many useful plug-ins, comment spam-fighting features, and user-friendly interface (Hong, 2008). Furthermore, bloggers can customize WordPress template and script according to their interest.

The combination of those two applications creates a very handy and comfortable environment for students in higher education. With the use of no cost, high level of popularity, and ease of use, the two top applications can represent the use of IT or "IT utilization", especially in higher education.

Some previous studies have been reported in the fields of IT and higher education, such as: 1) Social network in blended learning (de Jorge Moreno, 2012, Abdillah, 2016a), 2) Students learning center and course management system (Dougiamas and Taylor, 2003, Abdillah, 2013), 3) Managing information and knowledge sharing (Abdillah, 2014), 3) Enriching course materials by using innovative learning resource for college students (Burke and Snyder, 2008, Abdillah, 2017).

The next section of this paper is research method (section II) followed by results and discussions (section III). The last section is conclusion, which is section IV.

2 RESEARCH METHODS

In the research method section, the authors describe the college students participants, the course subject, and the learning activities.

2.1 College Students Respondents

The respondents of this study were students at level 3 (three), fifth and sixth semester students. Those students were those who have taken elective courses. The elective courses taken will be the basic material for student research activities which then become the main theme or topic of their thesis. Total students participating in the study were 150 students who took three courses.

From a number of elective courses available, the subjects that get the highest grades will be prioritized as the student thesis research theme. If there are several elective courses that get the same grades, then the students will consult more closely with their academic advisers.

2.2 Course Subjects

The author involved 3 (tree) subjects in information systems study program. Those course subjects are: 1)

Customer Relationship Management (CRM), 2) Supply Chain Management (SCM), and 3) Systems Analysis and Design (SA&D). All courses are taught for 16 (sixteen) meetings in about 4 (four) months. CRM and SCM courses have a weight of 2 (two) credits while SA&D courses have a weight of 4 (four) credits.

The content of CRM (Anderson and Kerr, 2002, Lindstrand et al., 2006, Buttle, 2009, Abdillah, 2018a) is as follows: 1) Introduction, 2) Basic Concept of CRM, 3) The Customer Service/Sales Profile, 4) Managing Your Customer Service/Sales Profile, 5) Choosing Your CRM Strategy, 6) Managing and Sharing Customer Data, 7) Tools for Capturing Customer Information, 8) Service-Level Agreements, 9) E-Commerce: Customer Relationships on the Internet, 10) Managing Relationships Through Conflict, 11) Fighting Complacency: The “Seven-Year Itch” in Customer Relationships, 12) Resetting Your CRM Strategy, 13) Presentations, and 14) Final Exam.

SCM course consists of (Simchi-Levi et al., 1999, Firdaus et al., 2015, Abdillah, 2018b): 1) Introduction, 2) Basic Concepts, 3) The Role of Purchasing in an Organization, 4) Creating & Managing Supplier Relationships, 5) Strategic Sourcing For Successful SCM, 6) Demand Forecasting & Collaborative Planning, Forecasting, & Replenishment, 7) Inventory Management, 8) Transportation Management, 9) Vendor Management, 10) Warehouse Management, 11) Cross Docking, 12) Third Party Logistics (3PLs), 13) IT in Supply Chain, 14) Presentations, and 15) Final Exam.

Meanwhile, for SA&D (Whitten and Bentley, 2007, Kendall and Kendall, 2011, Dennis et al., 2012a, Dennis et al., 2012b, Abdillah, 2016b), the lessons are: 1) Part One Planning Phase (The Systems Analyst and Information Systems Development, Project Selection and Management), 2) Part Two Analysis Phase (Requirements Determination, Use Case Analysis, Process Modeling, Data Modeling), 3) Part Three Design Phase (Moving Into Design, Architecture Design, User Interface Design, Program Design, Data Storage Design), and 4) Part Four Implementation Phase (Moving Into Implementation, Transition To The New System, The Movement To Objects).

2.3 Learning Activities

This study applies a blended learning approach that combines the process of conventional learning (face to face) activities with electronic based learning.

Out of sixteen meetings, more than half were face-to-face meetings. There are 2 (two) meetings that are indeed allocated for e-learning activities. If there is a lecture schedule during the national holiday period, then the schedule will be held with an e-learning approach.

In conventional learning, students will study together with students in certain classes (around 20-40 students). In each class, a number of groups will be created. Each group will consist of 4 (four) to 8 (eight) students who will discuss a particular theme. The theme will be given in the early conventional meeting by the lecturer.

3 RESULTS AND DISCUSSIONS

The results and discussion section explain the results obtained after the research was completed. This section consists of 1) Characteristics of student respondents, 2) Use of blogs, 3) Use of cloud repositories, 4) Evaluation of blog usage, and 5) Evaluation of cloud repository usage

3.1 College Students Characteristics

From the 150 students, 47.33% of them were taking CRM course subject, 40% are taking SCM course subject, and the rest of them or equal to 12.7% are taking SA&D course subject.

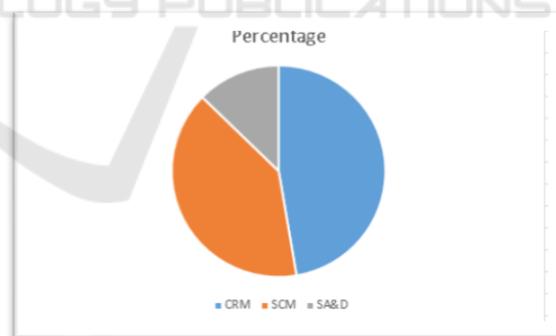


Figure 1: Lecturer Blog Page.

Meanwhile, most of the college participants were dominated by male students by 56% or 84 students, while female students amounted to 44% or 66 students.

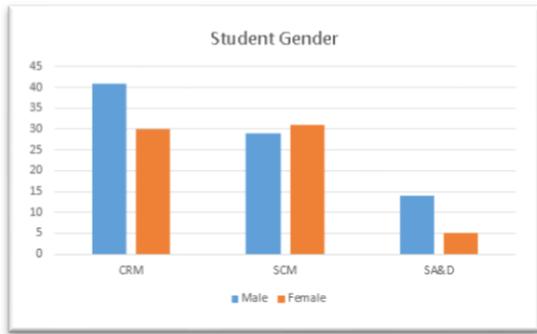


Figure 2: Lecturer Blog Page.

3.2 Blog

The use of blogs in learning provides alternatives that are cheap and fast. Blogs are generally offered free or without fees. Blogs also have templates that can be selected according to the needs and desires of the lecturers or students. Furthermore, blogs can be combined with both social media and the cloud repository.

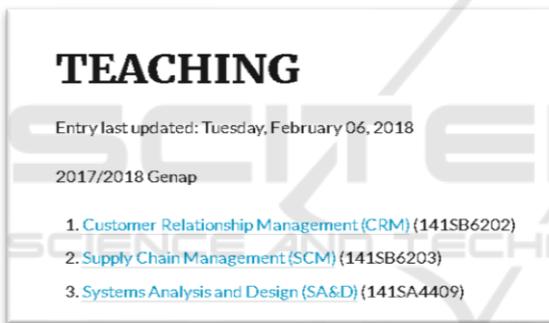


Figure 3: Lecturer Course List Blog Page.

Lecturers can utilize blog media for lecture materials, group lists, as well as a list of students who take certain courses. If needed, the lecturer can also add links that are considered useful or related to the course.

Meanwhile, students will work on weekly group assignments. Each task will be made into a post on the blog or in cloud storage. Every student who joined a flow group posted the assignment on their respective blogs.

3.3 Cloud Repository

During the lecture, there were a number of assignments given to students. In the conventional lecture system, these tasks will be collected in the form of volumes of papers. In this study, the authors utilized cloud storage media. Placing files in the cloud has many benefits (Mitroff, 2016). Almost all popular

cloud repositories at the moment provide some free storage, paying for extra space, and the most important thing is the ability to synchronize between devices. Files stored in the cloud can be accessed anywhere and anytime as long as there is an internet connection.

In weekly assignment, some of the assignments will be posted in the blog, and some others will be stored in the cloud repository and the URL will be linked into blog. Cloud services provide 3 (three) main services (Fikri et al., 2015): 1) Software as a Service (SaaS), 2) Platform as a Service (PaaS), and 3) Infrastructure as a Service (IaaS). This study employing DropBox is close to SaaS.

3.4 Blog Usage Evaluation

During the exam, the lecturer will provide a questionnaire regarding the involvement of blogs and cloud repositories. Lecturers can use blogs as a medium to place lecture materials that will be given to students. Based on the questionnaires distributed, it is known that most of the students really like and like to get lecture materials through blogs (figure 4).



Figure 4: Student responses in getting lecture material through a blog.

Blogs can also be used to view the tasks from the group assignments. Each assignment will be grouped together and collected individually in the form of a blog post. Based on the questionnaires distributed, it is known that the majority of students are very fond and like to work on lecture assignments through blogs (figure 5).

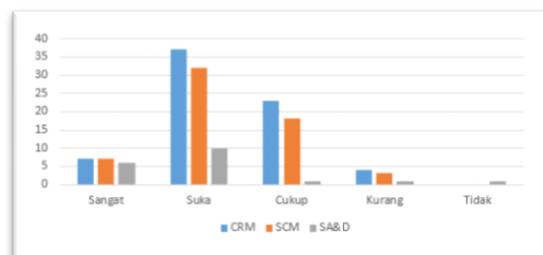


Figure 5: The response of students working on college assignments through blogs.

3.5 Evaluation DropBox Usage

Cloud repository is also used by students to store lecture tasks. A number of operating systems have provided cloud storage service. Apple has an iOS platform providing iCloud, Google with Android has Google Drive, and Microsoft Windows provides OneDrive.

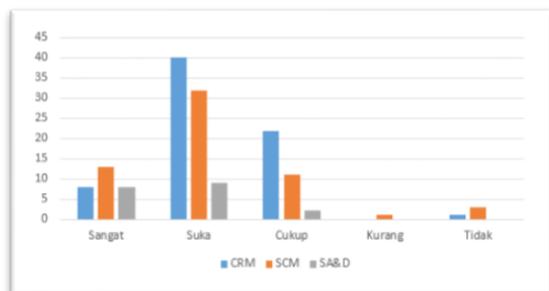


Figure 6: Students responses in storing their assignment in DropBox.

All cloud repositories must be accessed with an email affiliated with them. For this study, the authors prefer to use DropBox which can run on all platforms. DropBox provides huge storage media up to 10 (ten) TB for free. Based on the questionnaires distributed, it is known that most of the students really like and like keeping their college assignments using DropBox (figure 6). In addition, it is known that most students also like and like to receive lecture materials from lecturers through DropBox (figure 7).

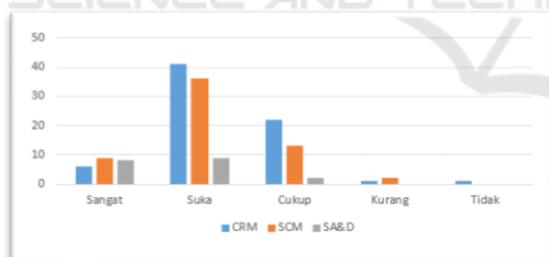


Figure 7: Students responses in getting their lecture materials by using DropBox.

4 CONCLUSIONS

Based on the results of the research. The following conclusions can be drawn: 1) The application used is an application that is free or does not require specific costs, such as software costs, hardware costs, and maintenance fees, 2) The use of WordPress and DropBox in the learning process greatly minimizes the use of paper and ink, and 3) Most students really like to receive lecture materials and work on their

lecture tasks through Blog (WordPress) and Cloud Repository (DropBox).

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