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System Identification in Designing Mobile Application for School Libraries

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Abstract : The school library information system is used to organize all its resources to be used optimally, especially if the system can be accessed anywhere and anytime. Therefore, it is necessary to build an information system that is able to facilitate everything and resolve issues related to academic needs. This study aimed to describe the readiness and need of school libraries to develop information systems which in turn will serve as a model to build a prototype digital information system that will empower data and information for purposes of the development of mobile technology. The method used in this research is analytic descriptive. The data used is data exploration, observation and interviews about the actual state of the information system that was developed and used by some school libraries as sample. The results were obtained from schools that have applied and developed information system. From seven sample schools, four schools already had information system and three others were still developing the system. The prioritized service points that used information system included management, services and administration. On the other hand, the procurement was still not going well. The expected model to be built included developing database on the basis on local area network and online and mobile information system models. The focused strength of system was service activities, especially in information searching.

Keyword : School Library, information system, mobile technology, model.

1. INTRODUCTION

The excellence in the development of library and information science has provided an opportunity for individuals cultivating the library and information science to have a big share in developing various concepts and applications for the development of libraries, which in this case is more to electronic library. While the perceived threat is the unavailability of a prototype for the information system and the manual to be applied or adapted cheaply and economically.

Electronic library in some developed countries are known to have given service with 'Library 2.0' concept. Users-oriented library is needed today so that visitors keep coming to the library. Library 2.0 concept originated from the concept of Web 2.0, which is the second generation of www. Web 2.0 participatory web describes how www is utilized by applications developing today to collaborate by users from all over the world; the application that allows that is mobile apps.

The concept of collaboration with many people is the concept that helped 2.0 to realize participatory library service, which is built based on feedback, evaluation and involvement of many people: library staff, library head, and users. Changes that occur in the library are based on the input, evaluation and user involvement. Thus, the core of library 2.0 is user-centered change, which is made possible with or without information technology.

Information system in the school library is employed to organize all the available resources to be used optimally especially when the information system used can be accessed anywhere and anytime.

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Attention in developing library with mobile technology is needed in school academic activities. However, it prerequisites an information system which is able to accommodate the needs of existing information data management. Thus, it is necessary to develop an information system that is able to facilitate everything and resolve issues related to academic needs.

This research is expected to be able to photograph the readiness and needs of school library in developing an information system that will subsequently serve as a model for building the next digital information system prototype of which the data and information will be empowered for the purpose of the development of mobile technology. Thus it is hoped that school community members can obtain and use a library management information system relate to the use of library services and access to the features provided through a mobile device technology.

2. LITERATURE REVIEW

Association for Educational Communication and Technology (AECT) limited the definition of learning resources as everything in the form of message, human, material (software), equipment (hardware), techniques (methods), and environment used singly or in combination to facilitate learning activities. This definition describes in details the types of learning resources that can be used in educational activities, which includes message, people, materials, equipments, techniques and environment.

Since the introduction of Apple's App store in 2008, the term 'app' became quite a popular buzzword in the world. Many businesses create apps specific to their oganizations. This trend is not just confined to businesses but it was also done by public organizations and academic institutions. Apple App store began to reach success after about 500,000 apps have been provided and uploaded as many as 10 million times. The question arose is whether the library also need to develop a mobile app or is mobile website enough (Iglesias & Meesangnil, 2011).

Information and Communication Technology (ICT) has three main functions in learning activities: (1) Technology used as a tool for student to facilitate learning, for example in word and number processing, creating graphic elements and databases, creating administrative program for students, teachers and staff, employment data, financial data, etc.; (2) Technology used as a science. In this regard, technology is a discipline that must be mastered by students. For example, the computer technology studied by several departments at universities such as informatics, information management and computer science. In 2013 curriculum, ICT is a science that must be mastered and integrated with other scientific competencies; (3) Technology serves as ingredients and tools for literacy. In this case, it is interpreted as both learning materials and tools to master computer-assisted competence.

In this case, the functions of information technology in educational institution are as follows: (1) To minimize the internal weaknesses by introducing global information technology with the tools of information technology itself (radio, television, computer); (2) To develop information technology that covers all areas of the ICT itself (wireless network connection, LAN); and (3) To develop educational institution community in ICT-based society in order to live side by side with information technology through information technology tools.

The role and function of ICT in broader context, namely in management education, are based on the study of the purpose of ICT use in leading education world in America. Alavi and Gallupe (2003) found some purposes of ICT use, namely: (1) Improve competitive reasoning; (2) Improve brand image; (3) Improve the quality of learning and teaching; (4) Increase students' satisfaction; (5) Increase revenues; (6) Expand the basis of students; (7) Improve the quality of services; (8) Reduce operating costs; and (9) Develop new products and services. Therefore, it is not surprising that today many educational institutions in Indonesia competing to invest in the ICT field to win the increasingly fierce competition. Therefore, to win quality education, it is important to reposition the educational institutions in the environment of favorable opportunities and internal strength.

Information technology is a staple of *e*-learning. It plays a role in creating a service that is fast, accurate, organized, accountable and trusted. In order to achieve these objectives, there are several factors that affect the information technology, they are: Infrastructure, Human Resources, Policy, Financial, Content and Applications (Soekartawi, 2003). The purpose of the above factors is that information technology can be developed rapidly. The first, infrastructure is necessary to allow access to information anywhere with sufficient speed. Second, human factors require the availability of human brain that controls high technology. Third, policy factors require a policy of macro and micro scale in favor of the long-term information technology development. Fourth, financial factors require a positive attitude of banks and other financial institutions to support the information technology industry. Fifth, the factor content and applications requires delivery of information on the right people, places and the time and the availability of applications to deliver the content in a convenient way to users.

The development of Information Technology spurs a new way of life, from the beginning until the end of life. Life as it is known as *e*-life, meaning life has been influenced by a variety of needs electronically. And now it was lively with various letters that begin with the prefix '*e*' such as *e*-commerce, *e*-government, *e*-education, *e*-library, *e*-journals, *e*-medicine, *e*-laboratory, *e*-biodiversity, and other electronics-based. (Mason R., 1994).

Library is generally defined as a building or a room to store library materials according to specific arrangements and used to readers. The definition of library materials include printed works such as books, periodicals, dissertations and reports, and the work of non-printing or paper records, such as audio recordings, videos, cassettes, and of micro, such as microfilm and microfiche, as well as the work of an electronic form, such as floppy disks, CD-ROMs. (Sulistyo-Basuki, 1991) This definition is a combination of the conventional definition of a library / traditional and the definition according to IFLA.

In a later development, there is a change of libraries 'regular' to the electronic library, is characterized by the presence of additional electronic collections, such as floppy disks, cassettes and CD-ROMs, and Digital Library, and the Library. This definition is a combination of the conventional definition of a library / traditional and the definition according to IFLA. Finally, there is a change from regular library to the electronic library, which is characterized by the presence of additional electronic collections, such as floppy disks, cassettes and CD-ROMs, and Digital Library, and Online Library.

Electronic Library is a library that collects analog electronic media that still require physical location, or building a library, reading room, reference desk, circulation desk, and so forth. Later, the development of electronic library and digital library creates hybrid library. Hybrid library still requires the building and the physical location of the network plus Internet. With a collection of printed and electronic as well as digital, there is still room to read, but already there is a virtual space. The reference desk is still there, plus a virtual reference.

Digital Library is the library with or without a physical location and consists of digital collections, space and cyberspace reference. While the virtual library is a library without a physical location and the collection is entirely digital with virtual space and virtual reference (Pendit, 2009). This library can only be viewed on the website because there may be a physical location, but just a room containing a computer and a set of cd room as principal collections. Library 2.0 originated from the concept of web 2.0 which is the second generation of www. Web 2.0 or participatory web that describes how technology of www utilized and developed at this time to collaborate with users from all over the world. Applications that allow it are blogs and wikis. The applications used by the users to contribute to the content of other websites.

In 2004, Tim O'Reilly initiated a seminar under the name of Web 2.0. According to Paul Graham (in Sudarsono, 2009), the name 2.0 emerged from a brainstorming to give the name of a conference on the new site. At the next meeting of the session trying to redefine Tim O'Reilly Web 2.0. Limitations that arise were the following criteria: Web 2.0 use the network as the foundation of work that reaches all connected

equipment. The application of Web 2.0 takes advantage of the essential groundwork, providing software that is continuously improved as more and more users participating in that effort, wear and integrate data from a variety of sources, including from individual users, providing data and services in a format that may be combined by others, creating network advantage with suitable architecture for the participation of various parties, exceeds the capabilities of Web 1.0 because it is enriched by the experience of the user.

The above criteria refer to two things that are mutually supportive and reinforcing in terms of technology and the human relationships in the form of participation. The technology side is represented by a group of devices such as Blogs, wikis, podcasts, RSS, feeds, etc. While the social side was represented by formation of social networking (Sudarsono, 2009). Miller (2005) developed a few issues around the concept of Web 2.0 and its meaning, for libraries and related organizations. Web 2.0 is a term that is being discussed, and even has caused the hysteria of a dot.com in the 1990s in San Francisco. Even a medium that is very much appreciated such as Business Week became aghast at Web 2.0 and an expensive conference at the end of October 1990 has been overrun. The question arises of Paul is whether web 2.0 is something real or whether it everything to the way in which we have to continue our work? Or is it just an idea that will explode if we leave it for a few months." We can see that the strategic placement of a web page as a platform (program), requires the placement of users, where we control the data of our own. Core competencies required are: services, architecture of participation (users), the ability of men scale cost effectively, the sources of data that are marked and transformed, software on all levels within a single facility, utilizing collective intelligence. This all requires the support of an 'attitude, not a technology', followed by silently (The Long Tail), the data, as the 'Intel' inside, the software is getting better when used wearer, a wealth of user experience, user confidence, and all the things that a circular from the center of the box to the bottom. In addition to the placement of the web as a platform, it requires a wealth of user experience using Gmail, Google and AJAX, and the belief in Wikipedi, participation in blogs, etc.

After publishing his paper, Reilly (2005) upload a brief definition in a company blog. According to Reilly, a network of Web 2.0, is an Internet network that is seen as a platform, which plays all networks connected belonging as Web 2.0 applications. It can benefit most from the platform. The properties of Web 2.0 applications for example the application is launched as a service (service) be updated on an ongoing basis (continually-updated), which automatically increases good as more and more people use it, consuming and "remix" of data from various sources (including user-individual users). While still providing data and services on their own, it remains possible to remixed by others, creating a "network effect" through "architecture of participation" (architecture of participation), towards the achievement of the more than just a metaphor such as Web pages in the Web 1.0, to give a rousing experience of user interface (rich user interface).

On education library is one important part in improving science, because it is in library we can get a variety of books that can help us to get information we need. If at an educational institution in this case is a library of data processing is still done manually it will cause various problems. Ranging from the length of time it takes just to record data library data, record the date of borrowing and repayment and activities other activities, not to mention if an error occurs writing the existing data so that the data will be spending a lot of time and effort to correct the error the error. This gives rise to the delay in making the report relating to the latest information to the library leadership that resulted in a leadership would be difficult to take a decision or action that is necessary for the development of the library. These factors led to the importance of the use of computers in data processing library.

The information system is a subsystem of management information that is used in solving the problem of providing information and information about library services. The information system can be defined as a data processing system that includes data collection, data manipulation, data storage, and preparation of reports.

3. RESEARCH METHOD

This research used descriptive analytical method and the data was taken from observation and interview about the actual state of the existence of an information system that was developed and used by some school libraries as the research sample.

4. RESULTS AND ANALYSIS

To obtain preliminary information about the needs for system information, an exploration of the existing system, management demand, and policy makers was conducted through observation and interview with the school and the school library on the issues that needed to be resolved and the information system required to optimize the process of management and service of the school library.

(*a*) The actual state of the school library information system that has been owned and used.

The existence of school library with the library information system development is presented in the table below, including the analysis of the actual state of library and its information system and the flow of information system development that is currently being developed.

Table 1
The data of school library condition that has implemented and developed library information system

School Library	*Has information system*	*In the progress of developing information system*
SMAN 1 Parongpong		V
SMAN 3 Cimahi	V	
SMAN 2 Bandung	V	
SMAN 3 Bandung	V	
SMAN 6 Bandung	V	
SMPN 9 Bandung		V
SMPN 12 Bandung		V

In general, the description of the school library information systems which are still in the process of development included the activity of selecting information system that would be used, selecting the resources to be managed with the use of information system, including the management staff and the collection materials owned by the school library.

Some school which already had information system also still managed the information system in a simple way, including in library service activities and other activities related to the use of information in the school library, so it still needed further development to make the information system better. The services which already used information system are presented below.

Generally, the flow information system development in library started from management, service and administration. The procurement stage was still not going well. Meanwhile, the procurement of library materials was conducted directly by staff outside the library so that the library manager did not fully manage the procurement activities using information system. Need identification in the development of information system is based on the input from respondents involved in providing and activating school library activities.

Table 2
The condition of library service points that used school library information system

School Library	*Procurement*	*Management*	*Service*	*Administration*
SMAN 1 Parongpong	–	V	V	V
SMAN 3 Cimahi	–	V	V	V
SMAN 2 Bandung	–	V	V	V
SMAN 3 Bandung	–	V	V	V
SMAN 6 Bandung	–	V	V	V
SMPN 9 Bandung	–	V	V	V
SMPN 12 Bandung	–	V	V	V

Table 3
The data of school library information system needs based on users rating

School Library	*School Principals*	*Teachers*	*Head of Library*	*Library Staff*	*Students*
SMAN 1 Parongpong	30%	15%	20%	25%	10%
SMAN 3 Cimahi	25%	10%	20%	35%	10%
SMAN 2 Bandung	15%	20%	20%	25%	20%
SMAN 3 Bandung	15%	15%	25%	30%	15%
SMAN 6 Bandung	20%	15%	25%	25%	15%
SMPN 9 Bandung	15%	20%	30%	25%	10%
SMPN 12 Bandung	20%	10%	25%	30%	15%

Table 4
The data of information system needs based on library staff assessment

School library	*Management*	*Service*	*Literacy*	*Communication*
SMAN 1 Parongpong	30%	20%	30%	10%
SMAN 3 Cimahi	20%	30%	30%	20%
SMAN 2 Bandung	30%	30%	25%	15%
SMAN 3 Bandung	25%	25%	30%	20%
SMAN 6 Bandung	35%	25%	25%	15%
SMPN 9 Bandung	20%	35%	25%	20%
SMPN 12 Bandung	25%	30%	30%	15%

In general, the information on the needs of information system development was needed by various school elements ranging from school principals, teachers, head of library, library staff, and students. Head of library required the biggest information to develop the needs of information system development. It

can be seen from the level of the needs of some schools that the biggest need was experienced by head of library as the leader of institution who understand the function of the school library as a learning resource center that needs to be supported by the availability of good information system facility. However, in some other schools, the need of information system was mostly experienced by library staff. This was because the principals and head of library did not have academic background in library science and therefore did not really understand about the needs of the school libraries.

The school library information system was greatly needed by the school elements in order to find out the information needed from the school library.

In general, the positive impact of library information system was assessed from various aspects such as management, service, literacy and communication which were properly good. In addition, there were several things that needed to be prepared in the developing a mobile app, as described below.

(*b*) Setting up a digital data packet in the school library that is required in developing a mobile app

Based on the assessment given by library manager and also librarians related to needed information system, it suggested that every school basically required a new system. This is because there has not been a compatibility between system owned in meeting the information needs of students in the library that are not supported by adequate internet facilities.

Furthermore, based on the assessment of library manager and staff, the expected model of new information system is a system that is expected to facilitate librarians in conducting library service and in addition, the model expected is in the form of mobile technology which can accessed easily using gadgets, which makes it easier for library users in searching information.

Assessment on what needs to be capitalized in the new system is that the system makes it easy for users in searching for information, which depends on how the library can provide features that facilitate users in accessing information related to collection materials needed to accelerate activities to perform the digitalization of library services at every library collection owned.

Related to the features needed by users in accessing information, data showed that the majority of users needed a feature like inter-library loan or cooperation between school librarians so that users was not only able to access information from one school but also from other schools with regard to collections combined in the coordination.

Results on the analysis of a form or model of information system and its packaging, it was found that some schools can be used as pilot projects in developing the system. The models of information system already exist in some schools are as follows:

Library Information System of SMAN 2 Bandung

The OPAC system used by the library of SMAN 2 Bandung was SLiMS (Senayan Library Management System) which was started to developed in 2012. SLiMS is an open source library management system software licensed under GPL v3. The web application which was developed by a team from the Center for Information and Public Relations of the Ministry of National Education of Republic of Indonesia was built using PHP, MySQL database, and Git revision control.

The use of this software facilitated librarians in managing library collections and helped library users in searching information about library collections. The process of collection management using this software includes among others the inventory, cataloging, classification, up to barcode production and other processes of library services. As for user service activities, it includes borrowing and returning collections and extension of borrowing time, which can be quickly and accurately conducted by using this software.

Library Information System of SMAN 3 Bandung

The OPAC system used by the library of SMAN 3 Bandung was Pinalib Software which was used since 2013 to process collection data and used as system in information searching. The use of this software facilitates the activity of information searching and collection process and also membership card making as well as other processes of library services.

The use of this software has assisted the activities of library services, namely technical services which include procurement activity, collection processing and users service which include circulation, reference and other services. However, the use of this software has not been fully maximized because the software was vulnerable to data loss in the event of error on the school system.

5. CONCLUSION

The data of the actual state of the school library information system was obtained from schools that have applied and developed information system. From seven sample schools, four schools already had information system and three others were still developing the system. The prioritized service points that used information system included management, services and administration. On the other hand, the procurement was still not going well. The library information system was needed by school elements ranging from school principals, teachers, head of library, library staff and students. Based on the assessment by library manager, the need of information system related to management, service, literacy and communication were good enough.

The preparation of digital data packet in the school library needed in developing a mobile application was conducting by identifying the requirements of the new system that needed to be prepared by the school library. The expected model to be built included developing database on the basis on local area network and online and mobile information system models. The focused strength of system was service activities, especially in information searching.

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