

Wireless-Based Integrated Information System between Private Higher Education Institutions and Local Government

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Abstract- Private Higher Education (PHE) in areas such as West Nusa Tenggara (WNT) province, in managing resources efficiently, needs an operation network integrating the PHEs. Therefore, it needs a wireless-based integrated network for Private Higher Education Information System (PHE-IS) connected with the both Local Government (LG) of Mataram and WNT. The aim is to facilitate the academic community, prospective students, students, and local governments and the general public in accessing information. Besides, among the integrated PHEs could update complementary data at any time by the administrator, so it will create an interactive and interesting wireless-based integrated PHE-IS. The method used in this study is the System Development Life Cycle (SDLC) with the stages of planning, analysis, design, and implementation and design of integrated wireless network model. This research will discuss the integration of wireless-based PHE-IS which include: 1) Resources System, informed sources owned by each PHE in use-sharing for efficiency, 2) Library Information System, especially thesis and student final project, to avoid research plagiarism, 3) On-line Admissions System, 4) E-Learning Systems, the use of wireless networks in learning process that enables students to get the material and assignments, on-line.

Keywords- *Sistem, Informasi, Perguruan Tinggi, Swasta dan Wireless*

I. INTRODUCTION

Higher education as part of a national education system has a strategic role in the intellectual life of the nation and to advance science and technology with respect and apply the value of the humanities as well as the cultivation and sustainable empowerment of the Indonesian nation. To enhance the nation's competitiveness in the face of globalization in all fields, needs higher education that is able to develop science and technology and produce intellectuals, scientists, and / or professional cultured and creative, tolerant, democratic, strong character, and dare to defend the truth for the sake of the nation [1].

Utilization of Information and Communication Technology (ICT) in the field of academic administration services in higher education becomes a necessity, not just a prestige or lifestyle of modern higher education management. However, in its implementation, many obstacles encountered in implementing ICT on higher education institutional management process, both technical and non-technical factors [2].

Strengthening governance, accountability and the public image of higher education institutions will lead to improved performance of the higher education institutions and quality of the product. This policy will be meaningful when linked to the fulfillment of quality institution management services, quality teaching programs, quality education facilities, and also quality education staff [3].

Related to the present context, the use of ICT in the implementation of governance improvement policy, accountability, and the public image of higher education institutions, the information systems implementation in higher education management services is certainly very precise [4].

The effectiveness of the ICT implementation in the management of higher education institutions should receive more attention considering its central role in managerial decision-making process or others [5].

To increase the effectiveness of this implementation, which will obviously affect the effectiveness of the achievement of education institutions implemented, the factors that influence the effectiveness of the ICT implementation in institutional management, particularly in terms of academic administration, needs further investigation. It is intended for academic management processes in higher education to be more effective and efficient so as to support the high performance achievement of the institution [3].

Issues that arise while implementing the integration of information systems is the heterogeneity that occurs. Ideally the implementation of system integration performed in the early stages of the system development and conducted top-down. In fact, in many colleges, the systems integration is done after the information systems are built and operated on each domain and unit [6]. Since the development is not

centrally coordinated, there usually considerable platforms differences among these systems [5].

Differences in hardware, operating systems, programming languages, and database systems make communication among the systems cannot be done directly. Fortunately today's technology has been able to accommodate these differences. Interoperability technologies such as web service allows for two systems with different platforms communicate via standard protocols [7].

Nowadays, the use of web services for the purpose of information systems integration has been quite popular, and solutions for a variety of platforms development (Java, PHP, Net, etc.) also available [8].

Needs to be addressed is that the integration is by maintaining the old systems and build "inter-systems bridges" will not give optimum results. The purpose of integration will not be achieved because the old systems are not designed to achieve the integration goal [1].

Partial designs (only for certain sectored interests) as if a "barrier" to the achievement of internal integration. In the end, to achieve full integration goal needs reconsideration and redesigning of the system. Unfortunately, this strategy requires huge resources, a high level of consistency, and takes a long time [3].

A more conservative strategy is the integration executed gradually. First, determined steps to be taken, then the integration process are carried out by the steps [9].

This time, there is Private Higher Education Information System (PHE-IS) on six (6) private universities in Mataram, namely STMIK Bumi Gora Mataram, as the gateway (Tajuddin and Manan, 2004), STIEamm Mataram, IKIP Mataram, University 45 of Mataram, STIKES Yarsi Mataram, and ABA Bumigora Mataram. The wireless networks are used to connect inter PHE, and PHE to the local governments [3].

Integration of wireless-based PHE-IS eliminates the distance between one PHE to other PHEs and to the local governments for information access because connected with the wireless network. The presence of information technology is as automation replaces manual processes for efficiency, reduced overhead costs, minimizing the use of human resources, and will further expand the students' knowledge on progress of information technology.

II. LITERATURE REVIEW

2.1. *Application of information technology in the field of higher education*

In the future, information technology and telecommunication are the dominant sectors. Those who mastered this technology will master the world. Information technology plays a role in many areas such as in education field (e-education). In [5], globalization has triggered a shift in the education of face-to-face conventional education toward a more open education [7].

2.2. *Wireless network*

Convergence of services enabling communication services and information can be provided to customers on a variety of wireless network technologies such as wireless WiFi networks, GSM/CDMA cellular networks, or broadband networks. Convergence of services will increase customer loyalty as they are always met the need for communications anywhere and at any time without troubled with limited network owned by the operator [10].

Network convergence means "many services, one network", is building a network of NGN yet provides many communication and information services for customers. As explained in the previous section, one option for infrastructure development to support next generation networks is the use of WiFi technology standardized in the IEEE 802.11 where the WiFi networks forms wireless mesh network [11].

In general, these networks consist of mesh router and mesh client. Mesh router is node functioning to serve the access for client besides as a link to connect other routers mesh. Here the mesh router has dual function, as transport and access links. While the mesh client is a client that can access the mesh network formed by a mesh router, and in additional, the mesh clients can also communicate each other directly to form a client network [11].

2.3. *Information security management of wireless network*

Technology application process sometimes confuses the users. By conducting management or regulation of the wireless information security, that will never happen. In fact, the business processes formed a strong risk management to cope with a number of physical assets and network equipment are also working to protect the wireless resources [10].

III. RESEARCH METHOD

3.1. *Type of Research*

Type of research is survey research, namely by taking a sample of the population using a questionnaire as a data collection tool that fits [12]. Research survey conducted for the purpose of explanatory that provides an explanation of the relationship between variables through research and testing as formulated before.

3.2. *Research Sites*

Research sites is on 6 (six) private colleges in Mataram which includes STMIK Bumi Gora as the wireless network center, because it has a three-angle antenna and server which also will serve as a gateway, STIEAMM Mataram, IKIP Mataram, University of 45 Mataram, STIKES Yarsi Mataram, and ABA Bumigora Mataram; and the local governments of city of Mataram and West Nusa Tenggara province.

IV. RESULT and DISCUSSION

In addition to satisfying these principles, the system development should also apply the information systems development method. One very popular method is the System

Development Life Cycle (SDLC) [13] using structured and prototyping techniques. The methods used are:

The PHE management information system (MIS) development method is through the System Life Cycle (SLC), also known as the "waterfall approach", consists of four stages:

a) Planning Stage;

- Problem identification;
- Job flow;
- Control of project implementation
- Objective of network system;
- Limitation of network systems;
- Feasibility study of PHE MIS

b) Analysis Stage, preceded by a feasibility study;

- SWOT analysis
- Analysis of potential network
- Analysis of network team
- Analysis of network needs
- User study
- Interview, observation, survey
- Flowchart analysis, data diagrams analysis, etc.

System analysis stage include: background analysis, functional analysis and system requirements. Background analysis is a collection of facts as a basis for studying the existing systems such as: the nature of organization, the history of organization, organizational goals, organizational forms, legal aspects, resources (men, money, machines, materials and method), product / service, experience, and problems encountered.

c) Design Stage;

- Structured design;
- Hardware and software configuration;
- Evaluation of all network sub-systems;
- Design implementation;

System design is output-oriented, meaning that the process and input is seen after the desired output is specified, so it will find the minimum requirements of an information network system.

d) Implementation Stage;

- Preparation of a detailed implementation plan;
- Procurement of equipment (completing);
- Preparation of the database structure, data entry, scanning, reformat, etc.
- Migration to new system;
- Migration directly and totally;
- Migration gradually;
- Migration in parallel.

Implementation stage is the process to compose a change plan from theoretical system into a practical system.

e) Software Development

1- Administrator

1. News, containing information about the activities undertaken by each PHE regarding the great three services (*Tridharma*) activities of higher education.

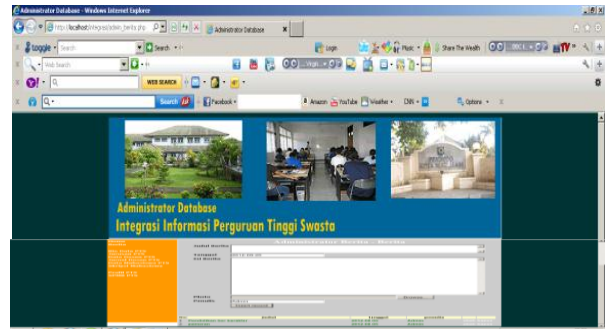


Fig. 1

2. Biodata of PHE, containing information about the courses owned by respective PHE also accredited status of the study program.

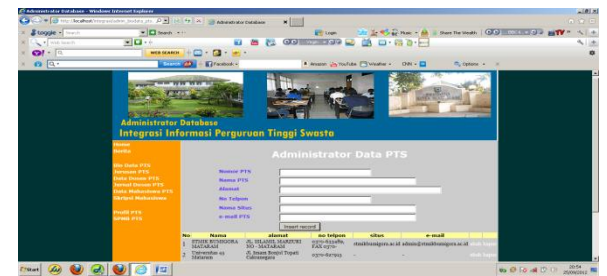


Fig. 2

3. Department of PHE, contains detailed information about the PHE's status and validity period of accreditation.

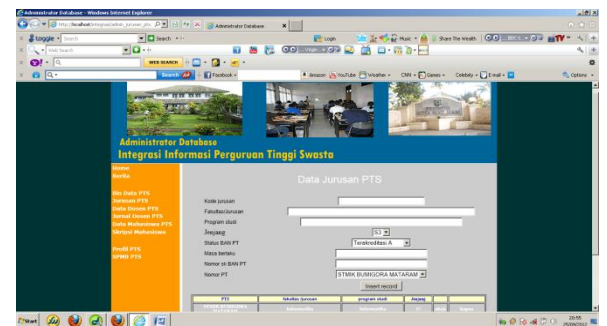


Fig. 3

4. PHE Lecturer Data, human resources' capabilities possessed by PHE including their specific expertise.

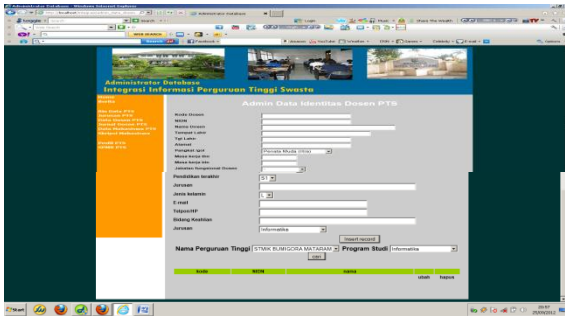


Fig. 4

5. PHE Lecturer Journal, the number of articles undertaken by PHE's lecturers in international, national and not national accredited, journals.

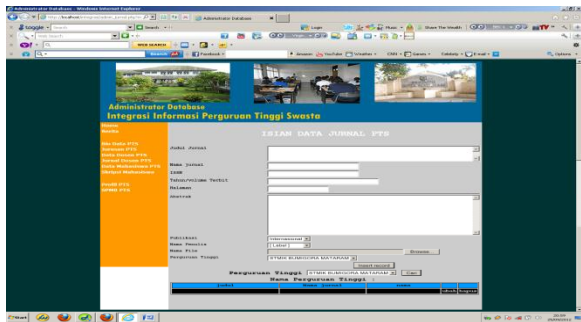


Fig. 5

6. PHE Student Data, contains detailed PHE student identity data.

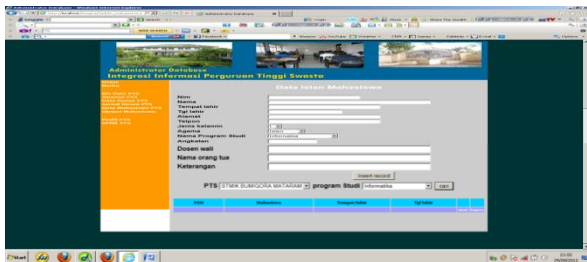


Fig 6

7. PHE Thesis, data on student thesis which contains at least abstract of the thesis page.

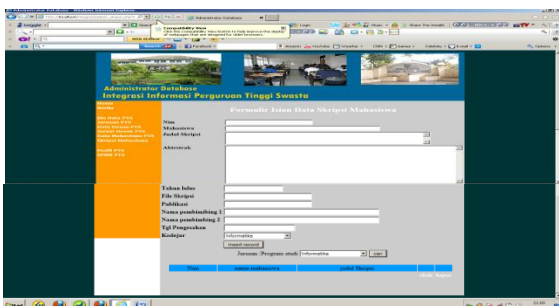


Fig. 7

8. PHE Profile, as the campaign media of the PHE in showing activities carried out.

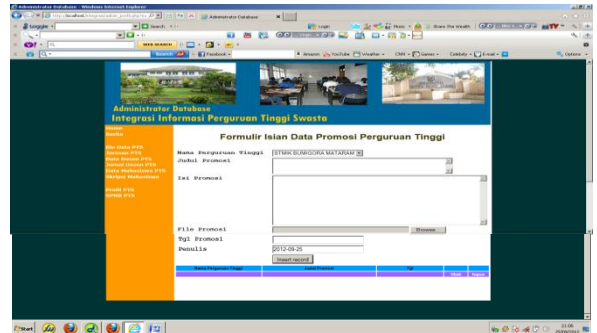


Fig. 8

2. **Browsing**

1. News, user can access news on each PHE activities as desired.



Fig. 9

2. PHE profile, user can know the PHE profile for optional consideration.



Fig. 10

3. PHE Identity, user finds the activity of lecturers and students of each PHE.



Fig. 11

- Lecturer Journal, user knows which PHE has active lecturers in writing articles in the journals.



Fig. 12

- Lecturer Expertise, user who needs expertise held by PHE lecturers can make direct access.



Fig. 13

- Student Identity, this data is very useful for local governments in order to provide financial assistance to students.



Fig. 14

- Student Thesis, in order to avoid plagiarism, students can know what titles of studies have been done.



Fig. 15

V. CONCLUSION AND RECOMMENDATION

A. Conclusion

- Conceptually, theories relating to the use and integration of information technology into the PHE-IS, diffusion of innovation, and communication theory are very clear references in giving instructions in the use of activities and the integration of technology into learning.
- PHE-IS is an urgent need in order to build a reliable human resource in Indonesia. However, the growing integration of information technology in Indonesia is still in the level of imitation, adoption, and adaptation such as the use of technology into learning. Integration that leads to modification, diffusion, and the creation of information technology innovation can not be done either by telematics practitioners or by education experts. Both telematics practitioners and education scientists still run separately and have not worked collaboratively to develop strength to make modification, diffusion, and the creation of an integrated information technology innovations in learning.

B. Recommendation

- Integration of technology into the PHE-IS should be more focused on activity modification, diffusion, and creation (creating/making new). Allocation of funds need to be prepared to perform the integration activities so that the implementation of e-learning in Indonesia *not just follow* what the developed countries done, but should be able to realize the effort to create a reliable human resource in Indonesia.
- Cooperative collaboration between local governments and higher education institutions must be implemented to create collaborative working systems such as in using telemetric experts and education specialists. In addition, it needs to do a lot of research, research (primarily development research) of technology integration in learning.

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