eLit: a Research Management Information System

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Abstract. eLit is a web-based research management information system developed using CodeIgniter programming and MySQL database. eLit developed to use at Universitas Negeri Makassar and universities in Indonesia in general. This information system has entered in the second year in its development. This Information System developed with systems-based life development (SDLC). It is expected that with this eLit, the management of research at Makassar State University is based on information technology.

Keywords: Research Management Information System, Universitas Negeri Makassar.

1. Introduction

Technological developments have entered the stage of the Industrial Revolution 4.0. This development can not be separated from the role of computer systems that work in a practical and structured manner so that this computer can be used as a support in various aspects. A computer-based system can provide information faster than manually. It is by Vaidya, Ambad, & Bhosle[1]:

*The term Industry 4.0 stands for the fourth industrial revolution which is defined as a new level of organization and control over the entire value chain of the life cycle of products; it is geared towards increasingly individualized customer requirements. Industry 4.0 is still visionary but a realistic concept which includes Internet of Things, Industrial Internet, Smart Manufacturing and Cloud based Manufacturing. Industry 4.0 concerns the strict integration of human in the manufacturing process so as to have continuous improvement and focus on value adding activities and avoiding wastes. The objective of this paper is to provide an overview of Industry 4.0 and understanding of the nine pillars of Industry 4.0 with its applications and identifying the challenges and issues occurring with implementation the Industry 4.0 and to study the new trends and streams related to Industry 4.0.*

Research is one of the college tridharma (Tridharma PT) that must be carried out by a lecturer. In research usually produces data that must be stored properly. The data in research will be used as evidence that a university has carried out research. In addition, this research data is also needed in filling out the BAN-PT/LAM accreditation forms. The Institute for Research & Community Service is an institution tasked with managing the track record of research activities and community service carried out by lecturers. At Universitas Negeri Makassar, the management of research and community service is managed by the Research Institute and Community Service Institute. Management of the track record that has been done is computer-based in this case based on Microsoft Excel and the collection of archives based on the print so that a time the room where the archive collection will be overloaded and will make it difficult when doing the data search process. Several academics have studied this kind of research, e.g., Yanuardi & Jananto in 2005 [2], Nurseto in 2016 [3], Williandy,
Fitriawan, & Arum in 2016 [4], and Handayani in 2017 [5]. So it is necessary to develop a research information system that can be utilized by the Research Institute of Universitas Negeri Makassar in managing research data that is not only research data but also in digital output of research.

2. Method
The study was developed using the Plomp approach that adapted to systems development life cycle (SDLC). SDLC has five stages of development, namely: planning, analysis, design, coding, and testing, & implementation [6][7]. This research was carried out at the Universitas Negeri Makassar which also served as a test site (implementation) for research information systems.

3. Result and Discussion
In this section, we will discuss the results of this study. The design of the information system of this research is divided into two parts, namely the development of display and database development. Display and database design is very important in an information system because these two parts are a core part of an information system [8].

3.1. System Architecture
System Architecture is a general description of the system to be developed.

![Figure 1 System Architecture](image)

3.2. The Display of Research Information System
In this login section, the lecturer uses the username and password in the Academic Information System (SIA) of Universitas Negeri Makassar. If there are users who do not have username and login password in SIA, then username and password can be created by research institute operator (figure. 1).
After the researchers logged, they will display the list of proposals that have been proposed by the researchers, and the researchers also can see whether any researches have opened to submit.
The initial stages undertaken by researchers in proposing research is to fill the research scheme and meta-data from research that is (title, abstract, research keywords, and science research families). After the researcher conducts the initial submission of the research, the next step is to fill in the data: (a) the identity and description, (b) the data of the research personnel, (c) the research costs, (d) letter of legalization, (e) upload the proposal, (f) the review process by reviewer, (g) announcement passes, (h) upload the logbook and progress report, (i) upload the research output, and (j) upload the final report.

Figure 5 The Display of the addition of Research Member

Figure 6 The Display of Upload the Proposal

Figure 7 The Display of Logbook
Figure 8 The Display of Upload the Progress Report

Figure 9 The Display of Upload the Research Output
3.3. Database Designing of Management Information System

3.3.1. Table of t_login dan mst_dosen

3.3.2. Table of mst_tahun

3.3.3. Table of mst_skema

3.3.4. Table of mst_capaian

3.3.5. Table of t_identitas_usulan dan t_uraianumum
3.3.6. Table of t_personil dan t_pengesahan

| PK | idpersonil | idusul | iddosen | urutpersonil |
|----|-------------|--------|---------|--------------|
| PK | idpengesahan | idtahun | idfak | iddosen1 | iddosen2 |

3.3.7. Table of data_usulan

| PK | id | idusul | identitas | uraian | personil | biaya | upload | cetak |

4. Conclusion
Based on the design and development, we can conclude that (1) this system will provide information to the general public about the research developed at Universitas Negeri Makassar; (2) this system can help the decision makers to issue policy about research in Universitas Negeri Makassar. Application development in the future is the addition of similarity features. If a research proposal exceeds the limits of the reasonableness of similarity, then this proposal is not inputted by the system and gives researchers feedback about the level of similarity.

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