Development of Web-Based Information Systems to Improve Governance of Student Fieldwork Practices

I Ketut Suwintana, I Made Suarta and I Gusti Agung Oka Sudiadnyani
Department of Accounting, Politeknik Negeri Bali, Badung Regency, Bali, Indonesia

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Abstract: The purpose of this research is to obtain a web-based information system that can be utilized in improving the governance of field work practices. The system development life cycle (SDLC) with agile methods is used in the development of this information system. This field work practice information system can meet the need to increase effectiveness and efficiency in the governance of field work practices. The system was developed web-based to make it easier for users to access from anywhere and anytime. This system is able to support the governance of field work practices, through user interface features such as user login, dashboard page, application page for field work practice, field work practice monitoring page, monitoring report, field work practice report exam page, and field work practice test score list page. System testing also shows that the app meets usability requirements. This system has some limitations, especially in the accessibility that can be done by industrial users.

1 INTRODUCTION

Information system applications are developing very dynamically as information technology advances. Information systems in education have been implemented to handle the academic system (Mahenge & Sanga, 2016), from registration of prospective students to reporting the results of the learning process (Lupu, Bologa, Sabau, & Muntean, 2008; Riyanto & Johanez, 2018). In addition, information systems are also used to support the promotion of educational institutions (Casap, 2018), financial management (Hartikayanti, Bramanti, & Gunardi, 2018), management of research and community service activities to student activities (Topi, 2019; Martins, et al., 2019; Borkar, 2021). Adaptation of technology and information systems has facilitated various academic activities to improve the quality of management and further improve the quality of services provided by educational institutions.

Field Work Practice is one form of academic activity at the Bali State Polytechnic that must be taken by every student towards the end of the study period. The aim is to give students the opportunity to know and experience firsthand the work process in the company and to apply the knowledge gained during lectures to be applied in the real world of work. The implementation of field work practices at the Department of Accounting at the Bali State Polytechnic is carried out based on the applicable service Standard Operating Procedures (SOP) by taking into account the principles of simple, participatory, accountable, sustainable, transparent and fair.

Currently, the management of field work practices in the Accounting Department has not been supported by the application of information systems. This condition raises problems such as limited information on companies where field work practices are carried out, registration of field work practice plans is carried out manually, assignment of field work practice supervisors, monitoring reports and evaluations of field work practices by supervisors, to final evaluation and assessment of field work practice activities. The problems that exist in the governance of field work practices have certainly not met the expectations as stipulated in the SOP for field work practices. Several studies have shown that the greatest benefit of information systems is their ability to provide users with the information they need to perform tasks efficiently (Marnewick, 2015; Waszkiewicza & Gumienny, 2021). The information system can produce specific information to assist the implementation of tasks or

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decision making, the format of the information can be adjusted to the user's needs, and the archived data is very useful for preparing reports (Al -Mamary, Shamsuddin, & Aziati, 2013; Sari & Priantinah, 2019). In addition, the existence of an information system can reduce costs and improve operational efficiency, provide better services, and provide sustainable system availability (MCafee, 2002; Ali & Abu-AlSondos, 2020).

Given the enormous benefits of information systems, it is important to study through research on the development of information systems in order to obtain solutions to the specific problems that exist in the governance of field work practices. The scope of this research is limited to the development of company/industry database systems, supervisory lecturers for field work practices, students participating in field work practices, reporting systems for monitoring and evaluating field work activities by supervisors and industry, to the final assessment of field work practices. The information system developed is a web-based application using PHP and MySQL. The purpose of this development research is to obtain a web-based information system that can be utilized in improving the governance of field work practices.

This research is expected to provide practical and theoretical implications in an effort to improve the governance of field work practices in the Accounting Department of PNB. The contribution of this research is in the form of a web-based information system application that has been tested for its usefulness in overcoming specific problems in the governance of field work practices. In addition, the contribution of this research can be used as a reference in the development of similar information systems considering the solutions to these problems are in the form of conceptual and logical designs, as well as algorithms that can be replicated.

2 LITERATURE REVIEW

In today's era, information is considered the most valuable resource. In order to better manage the organization, it is very important to manage information systematically and sustainably.
Information can be defined as data that has been processed in such a way that it is useful to the recipient (Boell & Cecez-Kecmanovic, 2015). It describes the qualities of information as meaningful, easy to understand, reduces uncertainty, helps monitoring and control, means of communication that complements memory and helps simplify procedures. Information becomes very important in achieving organizational goals and objectives.

Organizations need to take advantage of the opportunities offered by modern information technology (IT) and information systems (IS) to address the growing need for information. The definitions of IS and IT are closely related, however, they differ in their functions. Information technology is more about hardware, software, and telecommunications (Castagna & Bigelow, 2021). IT refers to preparing, collecting, transporting, retrieving, storing, accessing, presenting and transforming information in all its forms (sound, graphics, text, video and images). An information system is a combination of interrelated components such as hardware, software, and telecommunications networks, working together to collect, create, process, store, organize, and disseminate information to support decision making, coordination, analysis, and control in an organizational setting (Zemmouchi- Ghomari, 2021; Maiti, 2022). The main components of information systems are computer hardware and software, telecommunications, databases and data warehouses, human resources, and procedures (Hasan, 2018). The hardware, software, and telecommunications constitute information technology (IT), which is now ingrained in the operations and management of organizations. Common types of information systems are operations support systems, management information systems, decision support systems, and executive information systems.

Information systems have a great influence on society, enabling more diverse human activities. In this modern era, educational institutions need to use various technological devices that can help them in managing and running their institutions well (Gavua, Okyere-Dankwa, & Offei, 2016; Topi, 2019). Educational institutions need to choose a system or software that can help them connect all operations in the school. Having an education management information system can help institutions make all decisions faster along with providing a systematic, simple and efficient work bringing complete automation in everything (Sherifi, 2015; Musti, 2020). Educational information systems can be used to manage student admissions, student management, libraries, student-lecturer collaboration and communication, as well as financing management.

Information system development involves several stages and is circular in nature, including: analysis of system requirements (system specification requirements), design, implementation, testing and deployment (Zarandi, Hosseinioun, &

Salemi, 2014; Saravanan, 2017). This method is known as the system development life cycle (SDLC), is a standard process that needs to be followed in system development starting from analyzing, designing, implementing, and maintaining information systems. In addition, there is also a rapid development methodology which is an approach to the development of modern software systems (Saeed, Jhanjhi, Naqvi, & Humayun, 2019). In this methodology, the client is involved in analysis, design and implementation activities, as well as accelerating the system development phase through an iterative construction approach.

Field work practice or on the job training is a mandatory academic program that must be followed by students at the Bali State Polytechnic. Research on the development of field work practice information systems has been carried out by several researchers using the SDLC method (Herawati, Negara, Febriansyah, & Fatah, 2021; Syahputra, Dalimunthe, & Sidabutar, 2022). The stages in developing this system include analysis and requirements definition, system design and database, coding and implementation, and system testing. The components of the system developed include company/industry databases, supervisors, students, a monitoring and evaluation reporting system for field work activities by supervisors and industry, to the final assessment of field work practice activities. As part of the education management information system, the field work practice information system is able to provide information on the management of field work practice activities quickly, precisely and easily. Overall, the results of the study show that the management of field work practices has become more effective and efficient with the support of an information system.

3 RESEARCH METHOD

The system development life cycle (SDLC) method is used in the development of this field work practice information system. SDLC is an approach, which consists of several stages to analyze and design a system that has been developed through the use of cycles that are more specific to the activities carried out (Silberschatz, Korth, & Sudharsan, 2011). SDLC generally consists of four main phases, namely: planning, analysis, design, and implementation. The development model uses the Agile methodology (Woodward, Surdek, & Ganis, 2010; Campbell, 2019), which is an application development approach with continuous interaction of development and testing during the SDLC process. Through this approach, at the end of each sprint phase, product functional improvements are conveyed. Each new functional is directly added to the product resulting in gradual project growth. With features validated early in development, the chances of potentially failing product delivery are much lower. In the agile approach, software development is possible in a short time (1-3 months) with one-by-one feature development.

The first stage in application development is to identify problems and collect the necessary data. The next stage is conducting a needs analysis based on the data and facts obtained, and then designing based on the results of the analysis. The system design is carried out using Context Diagrams and Data Flow Diagrams (DFD) Level 1. Context diagrams for this information system are as shown in Figure 1. Context diagrams provide an overview of the system in general by showing the inputs, processes, and outputs of the system to be designed.

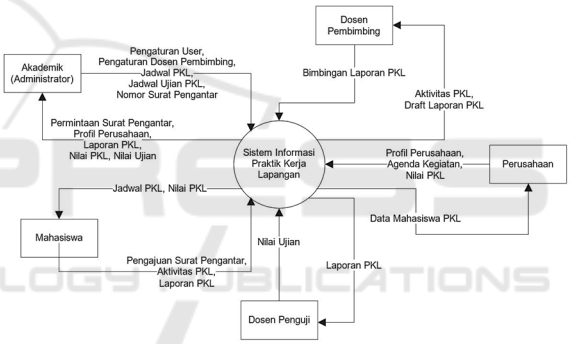

Figure 1: Context Diagram.

The process design is described using a data flow diagram (DFD) level 0 (Figure 2). This information system is designed to have 4 processes, namely master data management, user profiles, field work practice implementation management, and field work practice exam management. There are 5 external entities involved, namely Academics, Students, Supervisors, Companies, and Examiners.

The business process of this system begins with the student submitting a field work practice to the academic for a cover letter. The academic section gives approval by making a cover letter and distribution of supervisors. The supervising lecturer monitors the implementation of field work practices by checking the control activities made by students. At the end of the activity period, students make reports on field work practices and the company provides values from the implementation of field work practices that have been carried out.

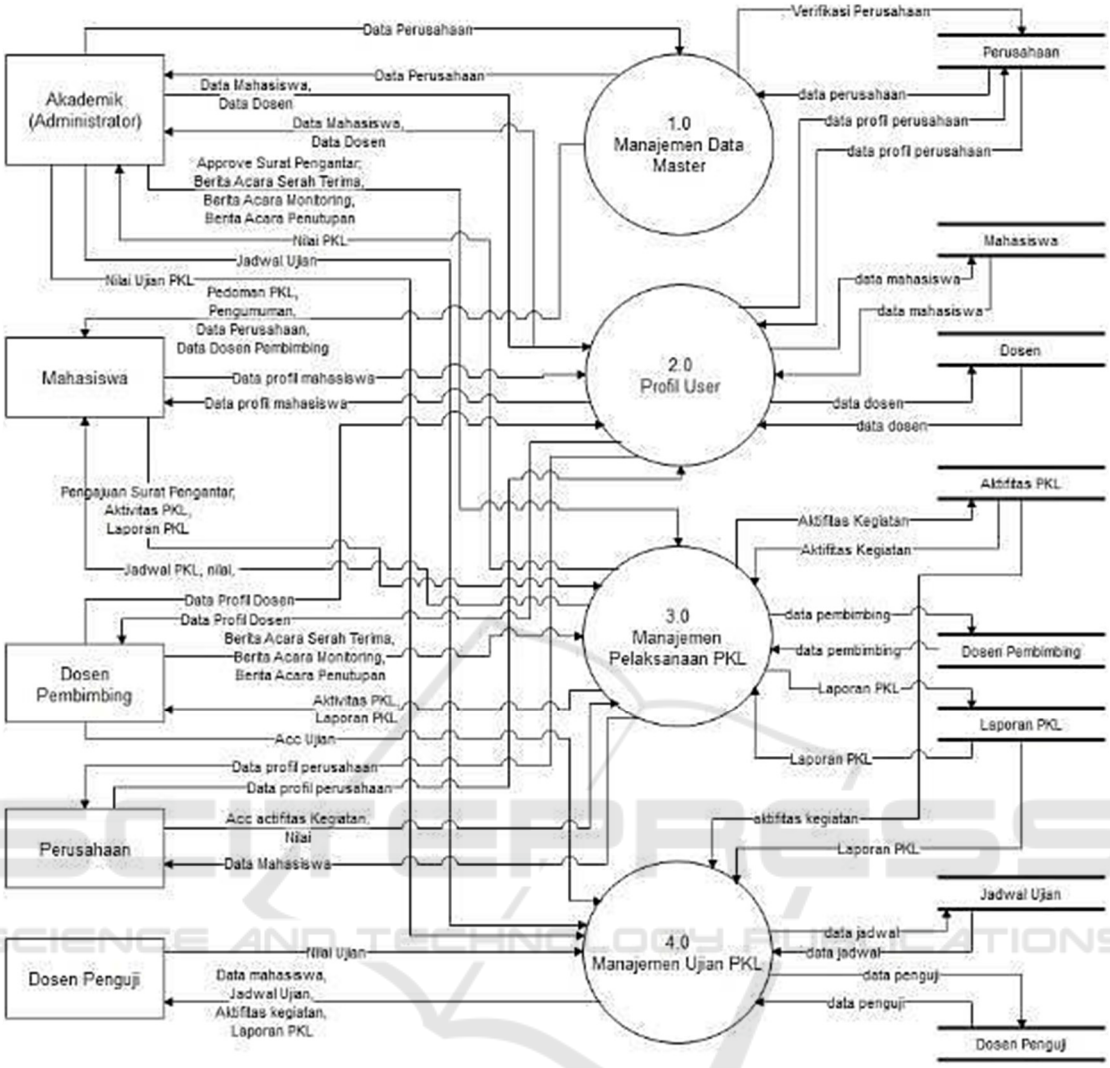

Figure 2: DFD Level 0.

Furthermore, a field work practice report examination is carried out which involves the examiner lecturer. The final grade for the student's field work practice is obtained from a combination of grades from the company and test scores.

4 RESULTS AND DISCUSSION

This study develops a web-based information system that is used to improve governance in the implementation of field work practices, by taking a case study at the Bali State Polytechnic. This development stage is in line with what has been done by previous researchers (Herawati, Negara, Febriansyah, & Fatah, 2021; Syahputra, Dalimunthe, & Sidabutar, 2022).

4.1 User Interface Implementation

This field work practice information system was developed web-based, so that it can be accessed by users through internet browser applications. The user interface developed includes: user login, dashboard page, application page for field work practice, field work practice monitoring page, monitoring report, field work practice report exam page, and field work practice test score list page.

a. User Login

Users must login first in order to use this application. Login using the username and password previously created by the admin.

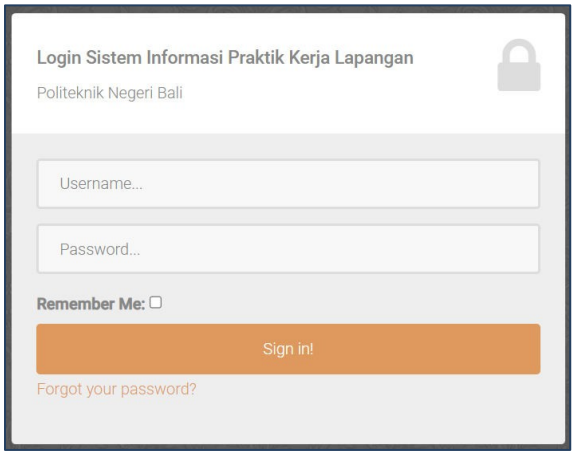

Figure 3: User login.

b. Dashboard Page

The dashboard is the main page of the application, containing the user's identity and application menus that can be accessed by the user.

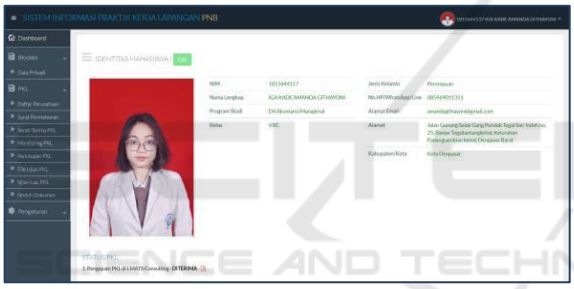

Figure 4: Dashboard page.

c. Field Work Practice Application Page

This page is used for the process of making a cover letter or application for field work practices, starting from the process of making letters, filling out letter numbers, and printing letters.

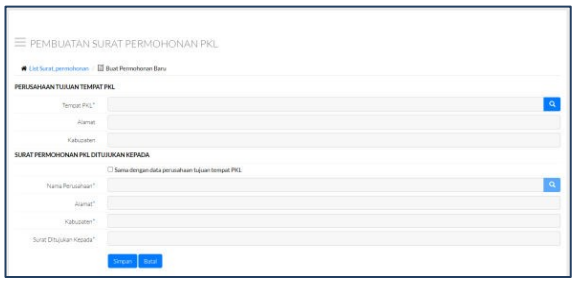

Figure 5: Field work practice application page.

d. Field Work Practice Monitoring Page

This page is used to print the minutes of monitoring the implementation of student field work practices.

Figure 6: Field work practice monitoring page.

e. Print Monitoring Minutes

This page is used to print the minutes of the student's field work practice monitoring activities. The following is an example of a monitoring report.

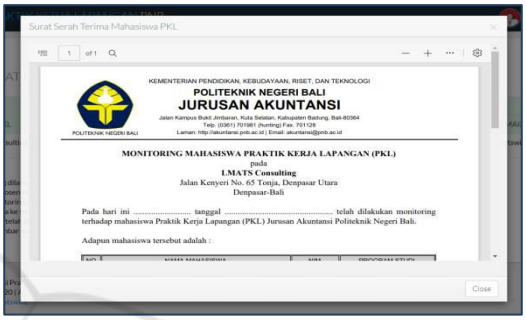

Figure 7: Print monitoring minutes.

f. Exam Report Page

This page is used to provide information about the field work practice report exam. From the student user perspective, this page displays the exam schedule for the field work practice report and students can upload documentation during the exam.

Figure 8: Exam report page.

g. Exam Score Page

This page is used by examiners to input test scores.

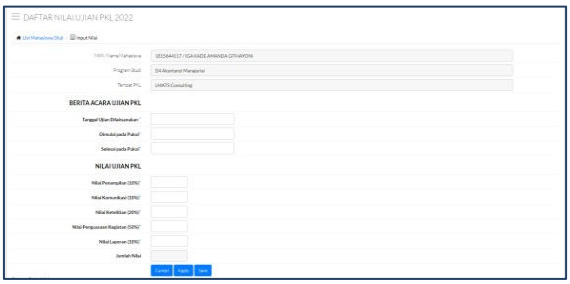

Figure 9: Exam score page.

Table 1: SUS score tabulation.

No	Question	Respondent					SUS				
		a	b	c	d	e	a	b	c	d	e
1	I think that I would like to use this system frequently	4	5	5	5	4	3	4	4	4	3
2	I found the system unnecessarily complex	3	2	3	2	2	2	3	2	3	3
3	I thought the system was easy to use	5	5	4	5	4	4	4	3	4	3
4	I think that I would need the support of a technical person to be able to use this	1	2	2	2	1	4	3	3	3	4
5	I found the various functions in this system were well integrated	5	4	4	4	4	4	3	3	3	3
6	I thought there was too much inconsistency in this system	1	2	1	1	1	4	3	4	4	4
7	I would imagine that most people would learn to use this system very quickly	4	4	5	5	4	3	3	4	4	3
8	I found the system very cumbersome to use	1	2	1	1	1	4	3	4	4	4
9	I felt very confident using the system	4	4	5	4	4	3	3	4	3	3
10	I needed to learn a lot of things before I could get going with this system	2	1	1	2	2	3	4	4	3	3
Score							34	33	35	35	33
SUS Score (Score x 2.5)							85	82,5	87,5	87,5	82,5
Average SUS score							85,00				

4.2 System Testing

The information system that has been developed is tested using the System Usability Scale (SUS) method (Broke, 1996). The usability measure must cover three aspects, namely effectiveness, efficiency, and satisfaction. One of the advantages of the SUS method is that it can be used on small sample sizes with reliable results. SUS is also able to effectively distinguish between usable and unusable systems.

The advantages of this SUS method are that it is easy to use and accepted by respondents, can be used in small research samples with accurate results, and is proven valid in determining whether the system can be used properly. The System Usability Scale uses a five-level Likert scale, namely 1 strongly disagree, 2 disagree, 3 neutral, 4 agree, and 5 strongly agree.

Application testing in this study was conducted with 5 respondents from prospective application users (Table 1). The calculation of the measurement results of the usability scale system is carried out in the following way:

a. For each question in odd order, subtract one. Example question 1 has a score of 4. Then subtract 4 by 1 so that the score for question 1 is 3.
b. For each question in an even order, subtract the score from five. Example question 2 has a score of 1. Then subtract 5 by 1 so that the score for question 2 is 4.
c. Add up the values of the even-numbered and odd-numbered statements. Then the result is multiplied by 2.5.

The average score of SUS is 85, and this score is in the good category. This finding indicates that the respondents agree that the application has met the usability requirements. The development of this information system is able to answer the research objectives to facilitate the management of field work practices. In line with the previous study of information system development (Sari & Priantinah, 2019; Ali & Abu-AlSondos, 2020; Herawati, Negara, Febriansyah, & Fatah, 2021; Syahputra, Dalimunthe, & Sidabutar, 2022), this system is able to manage databases related to field work practices and is able to produce information according to the format desired by the user. Thus, the management of field work practices can be carried out more effectively, improve operational efficiency, and reduce costs because it uses paperless in its governance.

5 CONCLUSIONS

The field work practice information system was developed to meet the need for increased effectiveness and efficiency in the governance of field work practices. The system was developed web-based to make it easier for users to access from anywhere and anytime. This system is able to support the governance of field work practices, through user interface features such as user login, dashboard page, application page for field work practice, field work practice monitoring page, monitoring report, field work practice report exam page, and field work practice test score list page. System testing also shows that the app meets usability requirements. This system has some limitations, especially in the accessibility that can be done by industrial users.

This study recommends improving the interface functionality so that it can be accessed by users from the industry where field work practices are carried

out. Managers or industrial supervisors where students carry out field work practices are possible to conduct assessments directly through this information system. In addition, it is also necessary to consider developing mobile-based applications, considering that most of the users of this system are students.

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