Digitalization Test Materials And Information System For Scheduling Competency Test Sites At Politeknik Negeri Bali's Professional Certification Institute

Made Pradnyana Ambara[1], Made Sudiarta[2] [ID],
and Sagung Mas Suryaniadi[3]

[1] Information Technology Department, Politeknik Negeri Bali, Bali, Indonesia
[2] Tourism Department, Politeknik Negeri Bali, Bali, Indonesia
[3] Business Administration Department, Politeknik Negeri Bali, Bali, Indonesia
pradnyana_ambara@pnb.ac.id

Abstract. Lembaga Sertifikasi Profesi (LSP) is an organization in charge of educational assessment and certification evaluation legally licensed by Badan Nasional Sertifikasi Profesi (BNSP). Politeknik Negeri Bali (PNB) is one of the supporting institutions of BNSP which has a competency framework in every major. At this point, PNB LSP has an integrated information system in the form of a website to help give information and services regarding competency certification. The issue we face at the moment is managing the schedule of competency test locations still done manually using a spreadsheet, which is prone to error. Other than that, the competency test material is currently still stored in Google Drive. Storing with Google Drive is convenient for some scenarios, but less effective in terms of access and updates for the assessor. Developing an information system for location management schedules and competency test material is the best solution for this problem. The system is capable of synchronizing schedules and material between all parties involved, including the assessor, participants, and LSP management. This ensures all parties receive up-to-date information at the same time. Developing the management information system will be using PHP Framework Codeigniter with the software development model Waterfall. Testing the system will be using the Blackbox testing method and the result of the test came out showing system functionality is working 100% as intended. The development of this system helps LSP Politeknik Negeri Bali to provide a more professional, efficient, and high-quality certification service, as well as to strengthen its role in producing a competent and certified workforce.

Keywords: Framework Codeigniter, Integrated system LSP, MUK Digitalization, TUK Schedule

1   Introduction

Lembaga Sertifikasi Profesi also known as LSP is an organization that conducts competency tests and has been accredited and licensed by the Badan Nasional Sertifikasi Profesi (BNSP). LSP plays a crucial role by ensuring that the graduates have competencies that meet industry standards and are ready to compete in the work market. Competency certification is not just proof of education quality, but this can decide graduates capability to solve problems professionally. At this point, Lembaga Sertifikasi Profesi Politeknik Negeri Bali has an integrated information system in the form of a website that helps give information and services regarding competency certification (Ambara et al, 2023). The management information system is integrated with LSP the purpose of this system is to make the process during competency certification easier and more efficient for the assessor, especially for candidates in the online registration process. The issue we face at the moment is the schedule management for test locations is still done manually using a spreadsheet, which is prone to error. Other than that the competency test material is still stored in Google Drive. The competency test material is being used as a reference to grade knowledge, creativity, and attitude of competency test participants (Agusjaya et al., 2022). Storing competency test material with Google Drive is surely convenient for some scenarios, but unfortunately, it's less effective in terms of access and update for the assessor, for example, it's hard to find the correct material, especially when the structure of the folder is not organized properly. Looking forward to this problem we already plan to develop a dedicated feature for the LSP Politeknik Negeri Bali integrated information system which is the development of locations management schedule and competency test material digitalization is the best solution to solve this problem. Related research conducted by (Akhmad et al., 2022). Which develops an information system for professional certification institutions with features for the administrative processing of candidate data, scheduling, and report documentation. This research does not yet include features for managing the digitalization of competency test materials. The next research conducted by (Kurniawan & Santoso, 2023) developed an online competency test system using the waterfall method. This research does not yet include a notification feature related to exam schedules for both candidates and assessors. From several studies, an information system has been developed with various features such as scheduling competency test locations and digitalizing competency test materials, which can synchronize schedules and materials among all parties involved, including assessors, candidates, and LSP management, ensuring that all parties have the same and up-to-date information. The scheduling feature for competency test locations now includes a notification feature that provides ease for candidates and assessors to receive automatic notifications about scheduled exams. With this notification feature, compliance with schedules can be improved, and the likelihood of negligence or errors in exam execution can be reduced. The system design uses the waterfall model of software development. The waterfall model is an SDLC method often used in information systems or software development. This method employs a sequential and systematic approach, starting from planning through to management, and is conducted systematically (Pratiwi et al., 2023). The system coding uses PHP with the CodeIgniter

framework. The choice of the CodeIgniter framework is due to its advantages, including a comprehensive set of libraries and packages. By using these libraries and packages, developers do not need to code everything from scratch but can use the provided libraries (Kusuma et al., 2022). The web page of the information system has an attractive and responsive design using the Bootstrap framework, which automatically adjusts the screen size on devices being used, whether desktop, smartphone, or tablet, making it user-friendly and pleasant to access (Putra & Yudhi, 2020). The system testing uses the black-box testing method, which can identify potential errors and failures during data input (Ridwan et al., 2024). This aims to ensure that the program's functions are operating according to the user's desired requirements (Prasetiawan & Yandani, 2023). The results of this testing have produced a system with 100% functionality operating as intended. This system development significantly helps LSP Politeknik Negeri Bali in providing a more professional, efficient, and high-quality certification service, as well as strengthening its role in producing a competent and certified workforce.

2   Methodology

The information system design uses the waterfall development model with the MVC (Model View Controller) framework from CodeIgniter. The waterfall model provides a sequential or orderly software lifecycle approach, starting from analysis, design, implementation, testing, deployment, and maintenance. The design with the waterfall model is shown in Figure 1.
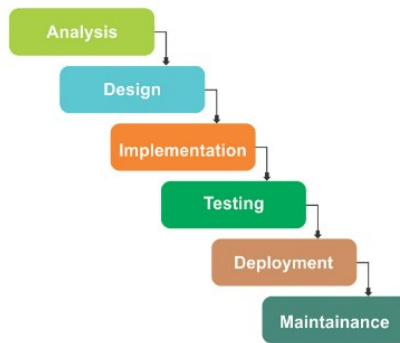

Figure 1. System design with the waterfall model

2.1   Analysis

The requirements analysis phase in the development of the competency test scheduling system and the digitalization of competency test materials is a crucial initial step to ensure that the developed system meets the users' needs and the objectives of LSP Politeknik Negeri Bali. The goal of this analysis phase is to identify all parties who will

use or be affected by the system, including candidates, assessors, department staff, and LSP management. The required data needs are shown in the Table 1.

Table 1. Functional requirements for scheduling and digitalization information system

No	Functional need	Details
1	Exam Schedule	System must be able to create, manage and displaying exam schedule automatically.
2	Notification	System must be able to give notification regarding exam schedule to assessor and assesse.
3	Document Digitalization	System must support documents digitalization required for certification.
4	Reporting and Analysis	Sistem must provide report and analysis perfomance for LSP management.

2.2 Design

The design phase of the information system for scheduling competency test venues and digitizing competency test materials at LSP Politeknik Negeri Bali is a critical step following the completion of the needs analysis. This phase includes system design, database design, user interface design, and process flow that will be implemented. It can be seen in Figure 2.
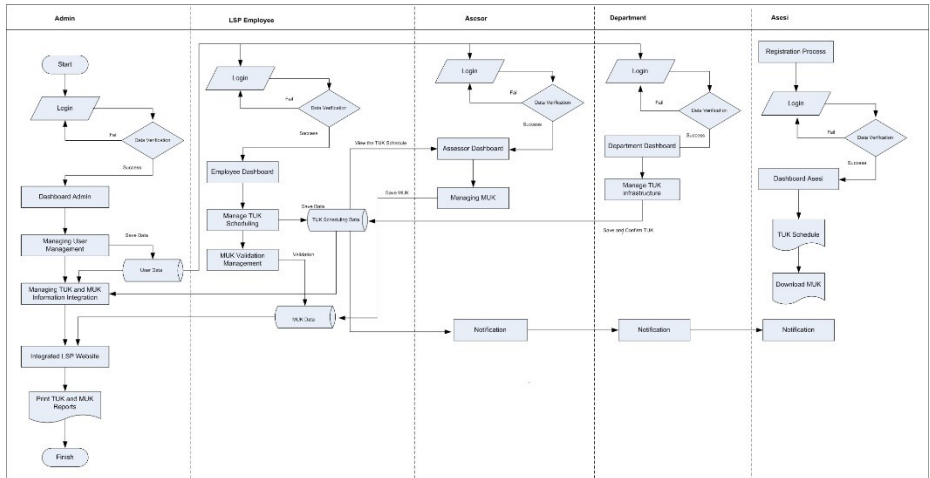

Figure 2. Flowmap of the information system design for TUK scheduling and MUK digitalization

2.3 Implementation

The implementation phase is the stage where the design of the information system for scheduling competency test venues and digitizing competency test materials is transformed into a functional system using the CodeIgniter programming framework.

In this phase, the system design is divided into three parts: Model, View, and Controller. By using MVC, it simplifies the coding process for the programmer, as the code for the model is stored in the same folder. MVC is a method used in system development that adheres to the principle of separating each framework, namely logic, presentation, and process, commonly known as Model, View, and Controller (Randa et al., 2023).

2.4   Testing

The testing phase is a crucial step in ensuring that the scheduling information system and digitization function properly and meet the specified requirements. This testing uses the black box testing method to ensure that all system features operate correctly, securely, and reliably.

2.5   Deployment

The deployment phase is the process of bringing the scheduling and digitization information system to LSP Politeknik Negeri Bali so that it can be used by users, including the assessees, assessors, and LSP staff. The system is published on a domain with the name https://tukmuk.lsp-pnb.ac.id, making it accessible online.

2.6   Maintenance

The maintenance phase is when the information system is managed after deployment to ensure that it continues to function properly, securely, and according to user needs. The following are the maintenance steps that need to be carried out: monitoring the running information system, software updates, bug fixing, enhancements, security maintenance, and backup and recovery.

3   Result and Discussion

The development of the information system for scheduling competency test venues and digitizing competency test materials at the Professional Certification Institute of Politeknik Negeri Bali has resulted in an innovative and efficient solution for managing the certification process in a more structured and integrated manner. This system is designed to optimize the scheduling of competency test venues (TUK) and facilitate the digitization of competency test materials (MUK), which were previously managed manually. The results of this development show that the system not only increases efficiency in process activities but also provides transparency and easy access for all involved parties, including LSP staff, assessors, and assessors. Figure 3 below is the initial display when accessing the integrated information system of LSP Politeknik Negeri Bali.

Figure 3. Integrated website display of LSP Politeknik Negeri Bali (in Indonesia language)
Photograph and permission by Made Pradnyana Ambara

The information system for scheduling competency test venues and digitizing competency test materials can be accessed from the "Other Applications" menu by selecting "TUK and MUK Applications".

3.1   Dashboard Page

The dashboard page in the TUK (*Tempat Uji Kompetensi*) and MUK (*Materi Uji Kompetensi*) scheduling and digitization information system at LSP Politeknik Negeri Bali serves as the main control center for users, providing quick access and a summary of important information related to ongoing activities in the system. This dashboard page includes several menus such as Master Data, TUK Scheduling, MUK Digitization, and User Settings. The dashboard layout is shown in Figure 4.
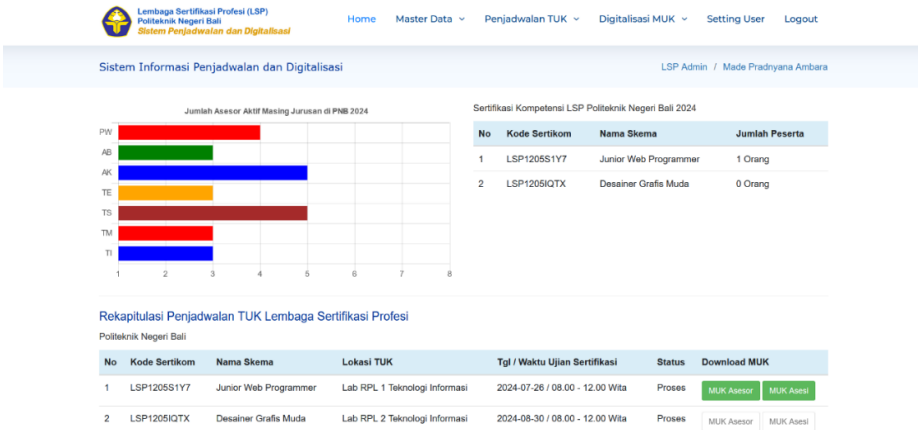
Figure 4. Dashboard display of the scheduling and digitization system (in Indonesia language). Photograph and permission by Made Pradnyana Ambara

In the Master Data menu, there are submenus including Assessor Data, Assessee Data, and Location Data. Selecting Assessor Data will display the assessor management form. The data shown is sourced from the main LSP system, which is integrated with the scheduling and digitization information system.

3.2   TUK Scheduling Management Page

The scheduling management feature for competency test venues is designed to organize and manage the time, location, and resources needed to conduct competency exams. This feature is crucial for ensuring that competency tests are conducted smoothly and efficiently. The display of the scheduling management results is shown in Figure 5.

Figure 5. List display of competency test venue schedules (in Indonesia language) Photograph and permission by Made Pradnyana Ambara

The competency test venue scheduling feature includes a notification function that provides convenience for assessees and assessors by automatically sending updates about scheduled exam times. This notification system helps improve adherence to schedules and reduces the likelihood of oversights or errors during the exam process.

3.3   Digitalization Management Page for MUK

The digitalization feature for competency test materials includes several submenus, including Manage MUK Digitalization and MUK Digitalization Summary. Digitalizing computer test materials involves converting physical materials (such as paper) into a digital format. This process includes the creation, management, and distribution of test materials in a digital format. The Digitalization Management Page for MUK is shown in Figure 6.

Figure 6. Manage competency test materials (in Indonesia language)
Photograph and permission by Made Pradnyana Ambara

The data entry for competency test materials is divided into two sections: MUK for Assessors and MUK for Assessees. Each section has its list, which facilitates the system's access mapping and management.

3.4   Testing Result

The testing results, conducted using two methods black box testing and a questionnaire survey indicate that the Information System for Scheduling Competency Test Venues and Digitizing Competency Test Materials at LSP Politeknik Negeri Bali is fully functional, with 100% of its features operating as intended. The system demonstrates strong performance in terms of functionality, security, and integration, and meets user access standards. Additionally, user feedback was gathered through an online questionnaire with pre-prepared statements. The results of the questionnaire are shown in Figure 7.
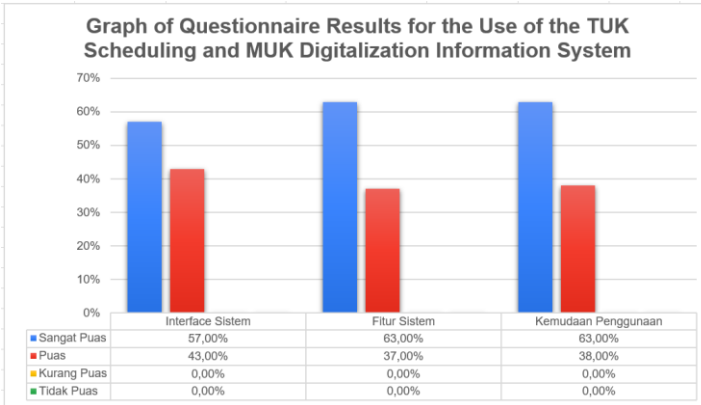
Figure 7. Usage questionnaire results graph (in Indonesia language)

Based on the graph results, user satisfaction with the developed system is notably high. For the system interface, 57% of respondents are very satisfied, and 43% are satisfied. Regarding system features, 63% are very satisfied, and 37% are satisfied. For ease of use, 63% of respondents are very satisfied, and 38% are satisfied. Overall, users have shown high levels of satisfaction with the system, with 61% very satisfied and 39% satisfied, and no respondents indicated being less satisfied or dissatisfied.

4   Conclusion

The development of the Information System for Scheduling Competency Test Venues and Digitizing Competency Test Materials at LSP Politeknik Negeri Bali has provided an efficient and effective solution to enhance scheduling management and access to certification materials. This system significantly aids LSP Politeknik Negeri Bali in delivering a more professional, efficient, and high-quality certification service, and strengthens its role in producing competent and certified professionals.

Acknowledgment

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