Design and Implementation of SkillShare Campus: A Web-Based Collaborative Learning Platform for Higher Education

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ARTICLE INFORMATION	ABSTRACT
	The rapid development of information technology has transformed higher education learning toward more flexible and collaborative models. This study aims to design and implement SkillShare Campus, a web-based collaborative learning platform that facilitates skill sharing and class management between students and tutors. The system was developed through needs analysis, system design, implementation, and functional testing using the black box method. SkillShare Campus was implemented using PHP and MySQL and provides features such as user authentication, skill management, and class creation. Functional testing results indicate that all core features operate according to user requirements. Therefore, SkillShare Campus effectively supports collaborative and self-directed learning in higher education environments.

1. INTRODUCTION

The development of information technology has brought significant changes to the learning system in higher education. Conventional learning models that rely on face-to-face interactions are now being complemented by digital platforms that support flexibility, collaboration, and independent learning. The use of web-based technology is one solution widely implemented to increase the effectiveness of the learning process in academic environments [1], [2].

Collaborative learning is an approach that emphasizes active interaction between students in the process of sharing knowledge and skills. This approach has been proven to improve conceptual understanding, critical thinking skills, and active student participation [3]. Furthermore, collaborative learning supported by digital technology enables a broader exchange of knowledge that is not limited by space and time [4].

However, in practice, many universities still lack integrated digital media to optimally facilitate collaboration between students and tutors, particularly in the context of sharing skills outside of formal classroom learning. The few online learning platforms available generally focus more on one-way delivery of material and do not fully support active collaboration between users [5].

Based on these issues, a web-based learning platform is needed that can accommodate the needs of structured collaboration between students and tutors. The platform developed must enable users to share skills, create learning classes, and manage academic activities within a single, easily accessible, integrated system. The development of a web-based learning system is considered capable of increasing the accessibility and efficiency of the learning process in universities [6].

This research aims to design and implement SkillShare Campus, a web-based collaborative learning platform for higher education environments. The platform is designed to support independent and collaborative learning through skills management and classroom learning features. It is hoped that the results of this research can provide an alternative solution to support the digital transformation of learning in higher education and contribute to the development of information technology-based learning systems.

Various previous studies have discussed the use of web-based learning platforms to support the learning process in higher education. These studies show that the implementation of e-learning can increase the accessibility and flexibility of learning. However, several studies also report that most existing learning platforms are still oriented towards content delivery and learning management, with limited support for active collaboration and skill sharing between users [2], [7]. In addition, limited feature integration and user roles in e-learning systems are also obstacles in supporting optimal collaborative learning [6], [8]. Therefore, there is still a research gap in the development of web-based learning platforms that are able to integrate skill sharing activities and structured learning class management between students and tutors in a higher education environment [9].

Although various web-based learning platforms have been implemented in higher education, most systems primarily emphasize content management and instructor-centered learning. Limited attention has been given to platforms that support structured skill sharing and active collaboration between students and tutors within a single integrated system. Therefore, this research addresses this gap by designing and implementing SkillShare Campus, a web-based collaborative learning platform that integrates skill management, class creation, and learner-driven participation to support collaborative learning in higher education.

2. RESEARCH METHODS

This research uses a system development research method that focuses on the design and implementation of a web-based collaborative learning platform for a higher education environment [10]. This method was chosen because the main objective of the research is to produce a functional system artifact that can be used to support collaborative learning activities between students and tutors.

2.1. Research Stages

The research stages included needs analysis, system design, system implementation, system testing, and evaluation. This step-by-step approach is commonly used in software development to ensure the system meets user needs and established specifications [11]. The research stages are shown in Figure 1.
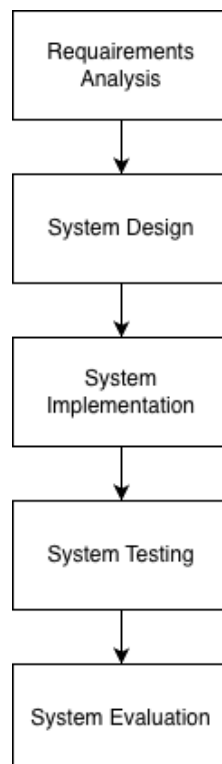

Figure 1. Block diagram of the research methodology

The selected system development approach follows a structured and sequential process that is suitable for educational platforms with clearly defined user roles and functional requirements. Compared to more iterative approaches such as Agile, this approach allows comprehensive requirement analysis and design validation before implementation, which is appropriate for collaborative learning systems that require stable core functionalities and role-based access control.

2.2. Requirements Analysis

The needs analysis stage is carried out to identify problems and user needs for the system to be developed. This analysis includes identifying user roles, namely students, tutors, and administrators, along with the functional requirements of each role. Needs analysis is a crucial stage in system development because it directly influences the quality of the resulting system [12].

2.3. System Design

System design is performed to describe the overall system architecture and workflow. At this stage, the Unified Modeling Language (UML) is used, which includes use case diagrams to model the interaction between users and the system and class diagrams to represent data structures and relationships between entities in the database [13]. UML was chosen because it is able to provide a clear visual representation of the system design before the implementation stage.

2.4. System Implementation

The implementation phase is the process of applying the system design results into a web-based application. The system was developed using the PHP programming language for server-side scripting and MySQL as the database management system. Implementation is carried out by translating the design model into program code so that the system can be run according to the designed functionality [11].

2.5. System Testing

System testing is conducted to ensure that all system functions run according to user needs. The testing method used is black box testing, which is a testing method that focuses on testing system functionality without paying attention to the internal structure of the program code [14]. Testing is conducted on the system's main features, such as the login and registration process, skills management, and the creation and management of learning classes.

2.6. System Evaluation

The evaluation stage is carried out based on the results of system testing to identify deficiencies or obstacles that still exist in the application. The evaluation aims to ensure that the developed system meets user needs and is ready for use in a higher education learning environment [15].

3. RESULT AND DISCUSSION

3.1. System Design Result

The SkillShare Campus system design is represented using Unified Modeling Language (UML) to describe system functions and data structures. UML is used to provide a clear and structured overview of the system before implementation.

Use case diagrams illustrate the interactions between users and the system based on their respective roles: students, tutors, and administrators. Students can register, log in, view skill lists, and join classes. Tutors have access to manage skills and create classes, while administrators are responsible for managing user data and maintaining the system. This division of roles ensures that system access and functions operate according to each user's responsibilities.

Furthermore, class diagrams are used to illustrate the database structure and relationships between entities within the system, such as users, skills, classes, and class registrations. Class diagrams serve as a reference in database design and support structured system implementation.
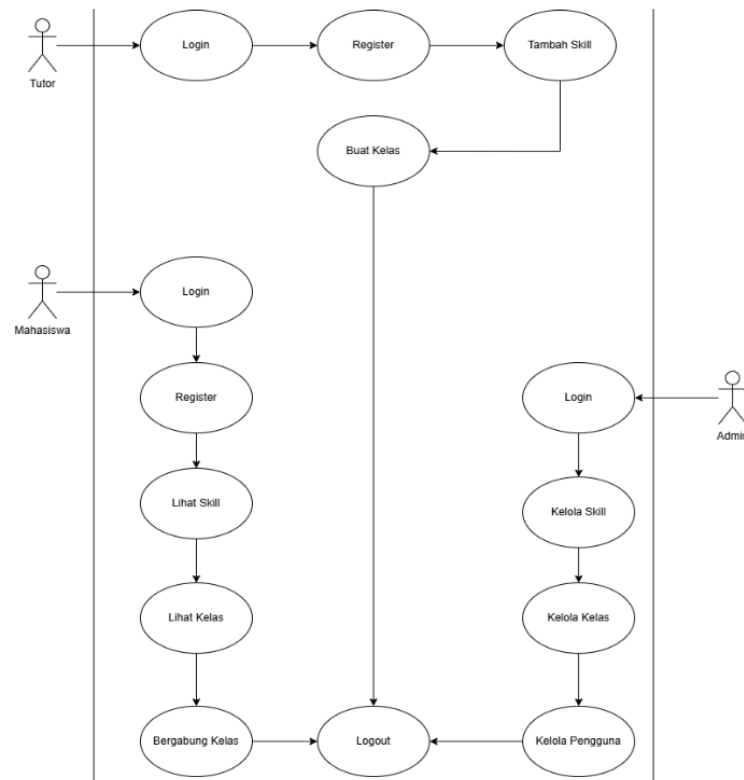
Figure 2. Use Case Diagram

Figure 2 shows a use case diagram for the SkillShare Campus system, depicting the interaction between the system and three main actors: tutors, students, and administrators. Tutors can log in and register, add skills, and create learning classes. Students have access to log in and register, view the skills list, view available classes, and join learning classes. Meanwhile, the administrator plays a role in managing skills, managing classes, and managing user data. This use case diagram clearly demonstrates the division of functions and user access rights, supporting structured system management that aligns with the roles of each actor.
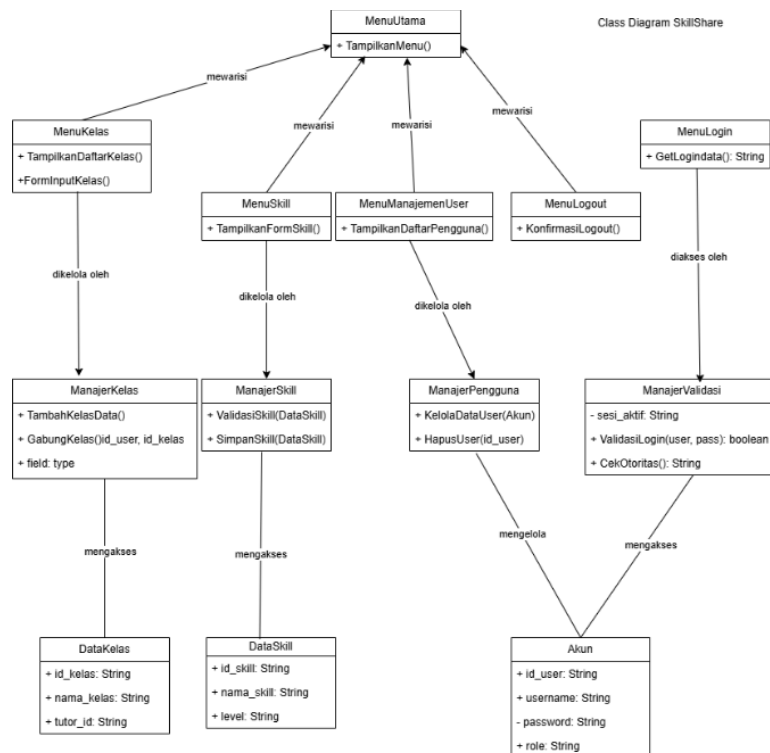

Figure 3. Class Diagram

Figure 3 shows a class diagram depicting the structure of the SkillShare Campus system and the relationships between classes. This diagram consists of several main classes, such as the main menu, skill menu, user management menu, logout menu, and a manager class that handles the validation process and manages skill data, class data, and account data. In addition, there are data classes such as SkillData, ClassData, and Account that are used to store system information. This class diagram serves as a reference in database design and system implementation, ensuring consistent and organized data processing.

3.2. Results of System Implementation

Based on the design results, the SkillShare Campus system was implemented as a web-based application. This system provides several key features that support collaborative learning between students and tutors.

The user authentication feature allows users to register and log in according to their respective roles. After successfully logging in, users are directed to a dashboard page that displays menus and features according to their access rights. Students can view and select available learning classes, while tutors can add skills and create new classes.

Furthermore, the system provides a class management feature that allows tutors to organize learning activities and students to attend classes according to their interests and needs. These features are designed to support both independent and collaborative learning within a single, integrated platform.
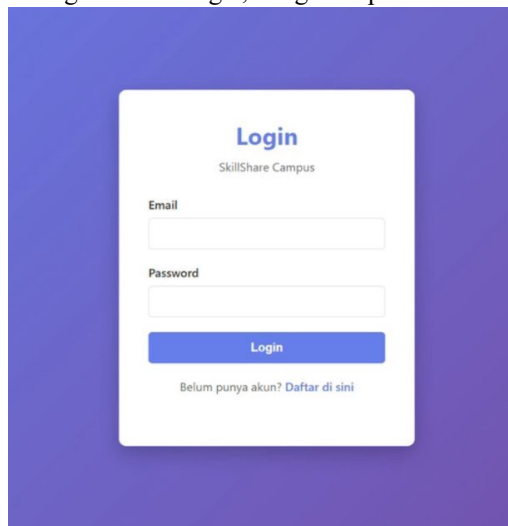

Figure 4. Login Page

Figure 4 displays the login page interface on the SkillShare Campus system. This page serves as the entry point for users to access the system by entering the appropriate authentication data. Through this login page, the system can identify user roles so that the access rights and features displayed on subsequent pages can be tailored to each user's role.
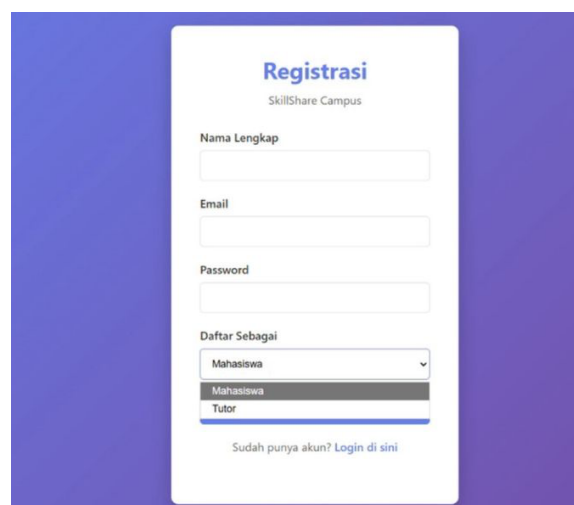

Figure 5. Registration Page

The image above displays the user registration page on the SkillShare Campus system. On this page, users can register a new account by entering their full name, email address, and password, and selecting their role as student or tutor. This role selection feature allows the system to grant different access rights according to user type. The registration page serves as the first step for users to participate in learning and skills-sharing activities on the platform.
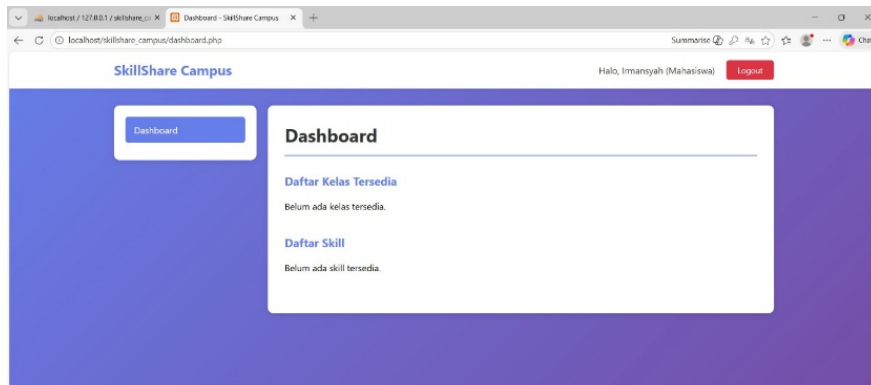

Figure 6. Dashboard Page

This dashboard displays the system's main information and menus according to user access rights. Students can access a list of available classes and skills, while tutors can manage skills and learning classes. The dashboard's layout is designed to make it easy for users to efficiently access the system's main features.
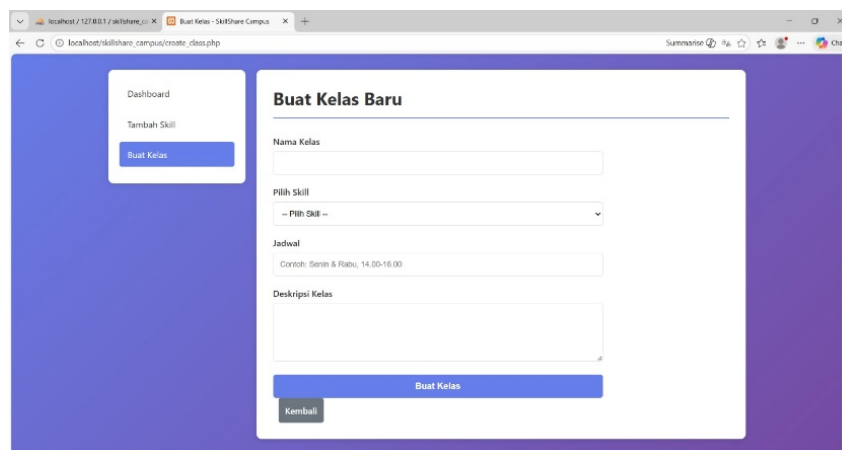

Figure 7. Class Management Page

Through this page, tutors can create, edit, and manage learning classes, while students can view class information and join available classes. This class management feature supports collaborative learning by providing a structured platform for interaction between students and tutors.
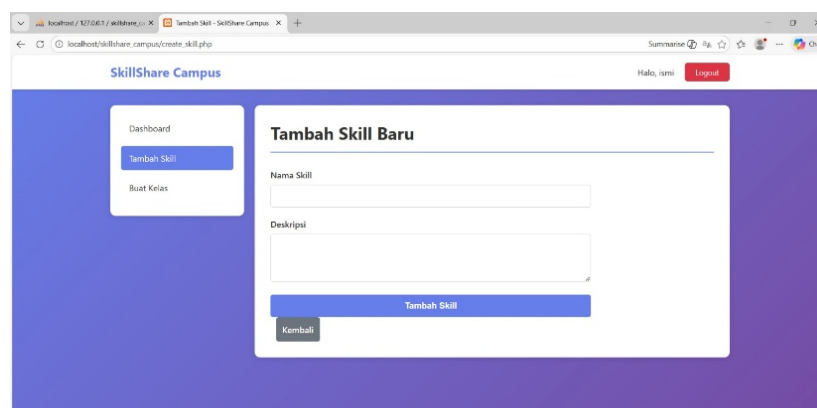

Figure 8. Add Skills Page

Figure 8 shows the add skill page on the SkillShare Campus system. Tutors use this page to add new skills to the system by filling in the required information, such as the skill name and skill level. This feature allows tutors to share their skills in a structured way, making them accessible to students. Added skill data is stored in the database and can then be used as the basis for creating learning classes. The add skill page plays a crucial role in supporting the concept of skill sharing and collaborative learning on the platform.

3.3. System Test Result

System testing was conducted using black box testing methods to ensure that all system functions operate according to user requirements. Testing focused on the system's core features, including login and registration, skill management, and class creation and management.

Test results demonstrated that all tested features functioned properly and met predetermined specifications. Users could log in and register without issues, tutors could manage skills and create classes, and students could join available classes. These results demonstrate that the SkillShare Campus system meets user functional requirements.

3.4. Discussion

Based on the results of system design, implementation, and testing, it can be concluded that the SkillShare Campus platform is capable of supporting collaborative learning in a higher education environment. The role-based system design provides clarity in the division of functions between students, tutors, and administrators, thereby improving the system's ease of use and management.

Compared to online learning platforms that generally focus on delivering content, SkillShare Campus emphasizes skills sharing and active collaboration between users. The integration of skills management and class creation features allows tutors to play an active role in sharing their expertise, while students can independently select and enroll in classes according to their interests. This aligns with the research objective of addressing the limitations of learning platforms that do not yet support structured skills-based collaboration.

Despite the positive results, this study has several limitations. System evaluation was limited to functional testing using the black box method, without usability testing or performance evaluation. In addition, the platform has not yet been assessed in large-scale learning environments. Future research may include usability evaluation involving users, performance and scalability testing, and feature expansion such as learning analytics, notification systems, or mobile platform support to enhance the effectiveness of SkillShare Campus.

Table 1. Results of System Interface and Functionality Testing

No	Tested Features	Testing Scenario	Expected Results	Status (Valid/Not)
1	User Login	User enters a valid email address and password	The system receives data and displays a dashboard according to the role.	Valid
2	User Registration	User completes registration information and selects a role	The system saves data and creates a new account.	Valid
3	Add Skills	Tutor adds new skill data	Skill data is saved and displayed in the system.	Valid
4	View Skills	Students access the skills list	The system displays a list of available skills.	Valid
5	Create Class	Tutors create skill-based classes	Class data is saved and accessible to students.	Valid
6	Join Class	Students select and join classes	The system records student class registrations.	Valid
7	Manage Class	Tutors manage class data	Changes to class data are saved correctly.	Valid
8	Logout	User logs out of the system	The system terminates the user session.	Valid

Table 1 shows the results of black box testing on the main features of the SkillShare Campus system. Testing was conducted to ensure that each system function met the established functional requirements. Based on the test results, all tested features performed according to the test scenario, thus concluding that the system functioned properly in terms of functionality.

4. CONCLUSION

Based on the results of the system design, implementation, and testing, it can be concluded that the SkillShare Campus platform has been successfully developed as a web-based collaborative learning system for higher education environments. This system provides key features such as skills management, class creation, and student participation in classes tailored to interests and learning needs.

Functional testing results using black box testing methods indicate that all key system features function well and meet established functional requirements. The division of user roles into student, tutor, and administrator allows for more structured system management and increases ease of access and use.

Although the system functioned according to the research objectives, this study still has limitations, namely that the testing only covered the functional aspects of the system. Therefore, further research is recommended to conduct usability testing, system performance testing, and the development of additional features to improve the effectiveness and quality of the SkillShare Campus platform as a collaborative learning platform in higher education.

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