

Web-based Application Design at the Sharia Banking Laboratory of Bandung State Polytechnic

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Research article

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Abstract : The main purpose of this study is to analyze the needs for the designing of Islamic Bank web based Lab learning media. in Politeknik Negeri Bandung. The stages of research on needs analysis of teaching media development carried out were: data collection, data analysis and document review, identification of actors, and making use case diagrams. The analysis was carried out on the current system using PIECES analysis. The results of the PIECES analysis are made in tabular form. In addition, a functional and non-functional requirements analysis was also carried out. Identification of actors who will play a role in teaching media is described in the form of use case diagrams. The results of the PIECES analysis show that a system is needed that can accommodate practical learning in the lab. Islamic banks that can be accessed by students from anywhere in real time, fast and easy to use by all actors involved. Therefore, it is necessary to design an information system as a learning medium in the Islamic Bank lab. Politeknik Negeri Bandung.

Keywords: learning media; sharia banking; web-based application.

1. Introduction

In the dynamic landscape of the modern banking industry, continuous learning and adaptation are crucial for professionals to stay ahead of the curve. The traditional approach to banking education, characterized by static textbooks and classroom lectures, is rapidly evolving to embrace technology-driven learning solutions. Among these, web-based learning media has emerged as a powerful tool for delivering engaging and interactive educational content. This shift towards digital learning is not only driven by the need for flexibility and accessibility but also by the desire to replicate real-world banking scenarios in a controlled environment.

As financial institutions grapple with the ever-evolving regulatory landscape, customer expectations, and technological advancements, the importance of a well-designed web-based learning experience in a banking laboratory cannot be overstated. This article delves into the intricacies of designing effective web-based learning media tailored to the unique requirements of a banking laboratory. Drawing on recent advancements in educational technology and instructional design principles, we explore how to create a learning environment that not only imparts theoretical knowledge but also simulates the complexities of the banking industry.

To elucidate these concepts, we will examine the key components and considerations of

designing web-based learning media in a banking laboratory, with a focus on:

- 1) **Interactivity:** Discussing the role of interactive elements in enhancing engagement and knowledge retention (Hannafin & Land, 1997).
- 2) **Simulation-Based Learning:** Exploring the benefits of creating realistic banking scenarios to foster practical skills and decision-making abilities (Gaba, 2004).
- 3) **Adaptive Learning:** Highlighting the use of AI-driven algorithms to tailor the learning experience to individual learner needs (Van Velsen et al., 2017).
- 4) **Assessment and Feedback:** Analyzing the importance of formative and summative assessments in evaluating and improving the learning process (Black & Wiliam, 1998).
- 5) **User-Centered Design:** Emphasizing the significance of user experience (UX) design principles in creating intuitive and effective learning platforms (Norman, 2013).

By exploring these facets of designing web-based learning media in a banking laboratory, this article aims to provide educators, instructional designers, and banking professionals with valuable insights into the evolving landscape of banking education. As we navigate the intricate intersection of technology and finance, it becomes clear that a well-designed learning environment is not just an asset but a necessity in shaping the future of banking professionals.

One of the laboratories in the Accounting Department of the Bandung State Polytechnic is the Sharia Bank Lab. In the process of developing e-learning teaching media, especially the Sharia Bank Lab, many things must be considered so that the online learning media built is in accordance with the needs of the institution so that the expected goals and benefits can be achieved. Therefore, it is necessary to analyze the needs of the development, especially the needs needed for the implementation of learning media Lab. Islamic Bank later, such as analyzing the hardware and software requirements needed for development, determining or identifying actors who play a role in learning media. In addition, it is also necessary to analyze the learning process and the use of teaching media that is already running so that the proposed system can support the existing learning process to be even better.

The main objective of this research is to analyze the needs for the development of learning media information systems for Lab. Sharia Bank at Bandung State Polytechnic. Analysis is carried out on the current system with PIECES analysis. The results of the PIECES analysis are made in tabular form. In addition, functional and non-functional needs are also analyzed. Another goal is to identify actors who will play a role in teaching media and described in the form of a use case diagram.

2. Literature Review

The adoption of web-based learning (WBL) in the field of banking education has witnessed significant growth over the past decade. As the banking industry continues to evolve in response to technological advancements and changing regulatory landscapes, the demand for highly skilled professionals has never been higher. In this literature review, we explore the key trends, challenges, and benefits associated with the design and implementation of web-based learning media in a banking laboratory setting.

2.1. Advantages of Web-Based Learning in Banking Education

2.1.1. Accessibility and Flexibility

One of the primary advantages of web-based learning in banking education is its accessibility and flexibility. Learners can access educational materials and resources at their own

convenience, enabling them to balance their professional commitments with ongoing learning (Ally, 2008). This flexibility is particularly valuable in the banking industry, where employees often have demanding schedules.

2.1.2. Cost-Efficiency

Web-based learning can significantly reduce the costs associated with traditional classroom-based training. It eliminates the need for physical classrooms, travel expenses, and printed materials. In a banking laboratory context, this cost-efficiency allows institutions to allocate resources more effectively and reach a broader audience (Carr, 2000).

2.1.3. Realistic Simulations

Effective web-based learning media can replicate real-world banking scenarios, providing learners with practical experience in a controlled environment. Simulations are invaluable for teaching complex financial concepts and improving decision-making skills (Ismail, Yusof, & Alias, 2011).

2.2. Challenges and Considerations

2.2.1. Technology Integration

While technology is a boon for WBL, it can also be a challenge, especially for learners who may not be tech-savvy. It is crucial to ensure that the learning platform is user-friendly, and that technical support is readily available (Ally, 2008).

2.2.2. Assessment and Feedback

Assessing learner progress and providing timely feedback in a web-based environment can be complex. Effective assessment strategies, including formative and summative assessments, are essential to gauge knowledge acquisition and skill development (Gikandi, Morrow, & Davis, 2011).

2.2.3. Adaptive Learning

Tailoring the learning experience to individual learner needs is a key consideration. The integration of adaptive learning technologies, driven by artificial intelligence (AI), can enhance personalization and optimize learning outcomes (Van Velsen et al., 2017).

2.3. Design Principles for Web-Based Learning in Banking

2.3.1. Interactivity and Engagement

Research suggests that interactivity in WBL enhances engagement and knowledge retention (Hannafin & Land, 1997). Designing interactive elements, such as quizzes, simulations, and collaborative activities, can create a more immersive learning experience.

2.3.2. User-Centered Design

User experience (UX) design principles are paramount in designing effective WBL platforms. Norman (2013) emphasizes the importance of intuitive design to ensure that learners can navigate the platform seamlessly.

2.4. Future Directions

The future of web-based learning in banking education is promising. Continued advancements in technology, coupled with an increased focus on personalization and adaptive learning, are expected to reshape the landscape. Furthermore, as the industry evolves, the integration of blockchain technology, artificial intelligence, and data analytics into WBL platforms will be critical for staying ahead in this competitive field.

In conclusion, web-based learning media in a banking laboratory setting offers numerous advantages, including accessibility, cost-efficiency, and realistic simulations. However, it also presents challenges related to technology integration, assessment, and adaptability. By adhering to sound design principles and staying abreast of emerging technologies, banking educators can harness the potential of web-based learning to equip future banking professionals with the skills and knowledge needed in this ever-changing industry.

3. Research Methods

Designing a web application that effectively addresses user needs and aligns with best practices requires a systematic research methodology. In this methodology, we incorporate various research methods and stages throughout the development process, ensuring a user-centered and data-driven approach.

The research was conducted in the Sharia Banking Lab. Bandung State Polytechnic. The research stages of analyzing the needs of e-learning teaching media development carried out are data collection, data analysis and document review, actor identification, and use case diagram creation. Data collection was carried out using an unstructured interview method to the Head of the laboratory and lecturers teaching subjects in the lab. Sharia Bank Bandung State Polytechnic. The data and information explored are the state and form of existing teaching media and the ongoing learning process. This aims to know and understand the teaching media and the learning process that is currently taking place.

4. Results and Discussion

The needs analysis stage in the development of an information system is an important stage, at this stage the existing system is studied and observed then the results can be used to propose a new system to be developed. The needs analysis stages carried out are analysis of the current system, identification of actors and use case diagram design, analysis of functional and non-functional needs. These stages are explained as follows:

4.1. Running System Analysis

Analysis of the current system is the initial stage carried out to understand the needs of the learning media lab. Islamic banks that will be developed. Running system analysis serves to understand and know the business processes in the ongoing teaching and learning process and find weaknesses if any so that these weaknesses can be overcome in the teaching media to be developed. This stage is carried out through interviews and discussions with the Head of the lab, lecturers, and students. To complement the conclusions from the results of interviews and discussions, a document review of existing teaching tools was also carried out. The results of the analysis show that in the current system there are 3 actors who play a role in the teaching and learning process, namely: Laboratory Head, Lecturers, and Students. Activities that occur include preparation of learning activities, teaching and learning activities, and evaluation of learning outcomes.

For learning preparation activities, at the beginning of each semester before the new semester begins, the lecturer in charge of the subject has received a letter of assignment to teach in the laboratory. Then the lecturer can coordinate with the laboratory chairman to prepare. The head of the laboratory prepares facilities and infrastructure that can support learning while the lecturer prepares learning tools in the form of teaching materials and materials that are in accordance with the courses taught.

When teaching and learning activities begin, lecturers will deliver teaching materials and prepare exam materials and will provide assessments in the form of assignment scores, quiz scores, UTS, UAP and UAS in accordance with the agreed time. At the end of the semester the lecturer will assess the teaching and learning process and collect a recap of the grades in the Department. The Department will announce the recap of grades. Students will get a report on their learning outcomes for 1 semester.

In the analysis of the current system, an analysis from the PIECES point of view is also carried out (Al-Fatta 2007). PIECES stands for Performance - Information - Economic - Control - Efficiency - Service, the following is a PIECES analysis of the current system presented in Table 1.

Table 1. PIECES Analysis of Current System

No.	Analysis	Analysis Result
1	Performance	The learning process of the lab course. Islamic banking online is carried out only using media such as google meet, classroom, whatsapp so that the goal of creating skilled students cannot be achieved optimally.
2	Information	The source of information (knowledge) depends entirely on the lecturer.
3	Economic	The cost of providing laboratory facilities and infrastructure for offline learning is quite high
4	Security (Control)	The control process in the current system is less than optimal, there are difficulties due to the remote location.
5	Efficiency	Resources used are still limited
6	Service	Learning process services have not been maximized due to the limited reach of lecturers to students

4.2. E-learning Functional Requirement Analysis

Al-Fatta (2007) says functional requirements are an important part of analyzing the needs of developing an information system. Functional needs are analyzed to find out what information is expected in the system to be developed. The method used to determine functional and non-functional needs is focus group discussions. The group in this focus group discussion consisted of three (3) lecturers of the Sharia Finance study program and (3) people as a partner team from the Computer Engineering Department of Bandung State Polytechnic. The result of the focus group discussions is an analysis of user requirements for teaching media lab. Islamic banking, which is presented in table 2 below.

Table 2. User Requirement

No.	User needs	Requirement description
1.	Input	a. Lab Head can add system settings b. Lab Head can enter lecturer data and student data c. Lecturers can enter lecture materials and exam materials (assignments, quizzes, EAT, and EAS) d. Students can view lecture materials and exam materials. e. Students can send answers to exam materials (answers to assignments, quizzes, midterms and final exams)
2.	Output	a. The media can display course material data and exam material data. b. Media can display lecturer data and student data c. Media can display work instructions
3.	Process	a. Provide login and logout process b. Lab Head and lecturers have the right to organize, manage and perform the CRUD (create read update and delete) process on all data c. Each user (Lecturers and Students) must carry out the work process in accordance with their respective work instructions and functions.
4.	Performance	a. Media can support data storage b. Media can be accessed quickly and easily c. Media can be personalized easily d. Media can support all Islamic banking learning
5.	Controll	a. The media can provide secure access for lecturers and students through the login and password verification process. b. The inputted data can be stored properly c. lecturers can monitor student progress when carrying out their work

4.3. Media Non-Functional Requirement Analysis

The results of focus group discussions regarding non-functional needs include operational aspects, security aspects, information aspects and performance aspects. Table 3 presents a summary of the non-functional needs of the teaching media lab. Islamic bank.

Table 3. Summary of Non-Functional Media Needs

No.	Needs	Description
1.	Hardware	Computer/laptop, mobile phone
2.	Software	Browser, OS, Ms. Office

4.4. Actor Identification

The actor identification stage is the stage for determining actors who can interact with the media. Based on the analysis of the current system and the mapping chart that has been made and from the results of focus group discussions, it is determined that the actors who can be involved in the media, namely the Head of Lab. Islamic Bank, Lecturers and Students. Table 4 presents the actors who interact with the media.

Table 4. Actor Identification

No.	Actor	Description
1.	Lab. Head	Head functions as an admin or media manager in charge of providing services so that the system can run well.
2.	Lecturer	Lecturers are media users who are in charge of providing materials, conducting instructions, monitoring and evaluating learning using the media.
3.	Student	Students are users who can view material and do work based on instructions from lecturers and see the results of their work on the media.

5. Use Case Diagram

Use case diagrams are part of the Unified Modeling Language (UML) which serves to document software development. Use case diagrams are used to describe user interactions in the system. Table 5 presents the use cases and their descriptions.

Table 5. Use Case Diagram and its Description

No.	Actor	Description
1	Lab. Head	Can CRUD (<i>Create, Read, Update, Delete</i>) course data Can CRUD data of lecturers who teach MK Can CRUD student data Can personalize the system
2	Lecturer	Can CRUD learning materials Can perform function changes on students Can do learning Can monitor student progress
3	Student	Can view learning materials Can receive learning from lecturers Can perform instructions according to function

The first actor is the head of the laboratory who has a role to ensure that the media can be used by lecturers and students for learning. Ka. Lab can personalize the media and perform CRUD (*Create, Read, Update, Delete*) of course data, lecturers and students who will conduct learning.

The next actor who plays a role in the learning media is the lecturer who teaches the course. Lecturers can update their profile after being entered into the media by Ka. In addition, lecturers can upload all materials related to the courses taught. The main role of the lecturer is to provide learning to students as well as monitoring and evaluating the learning.

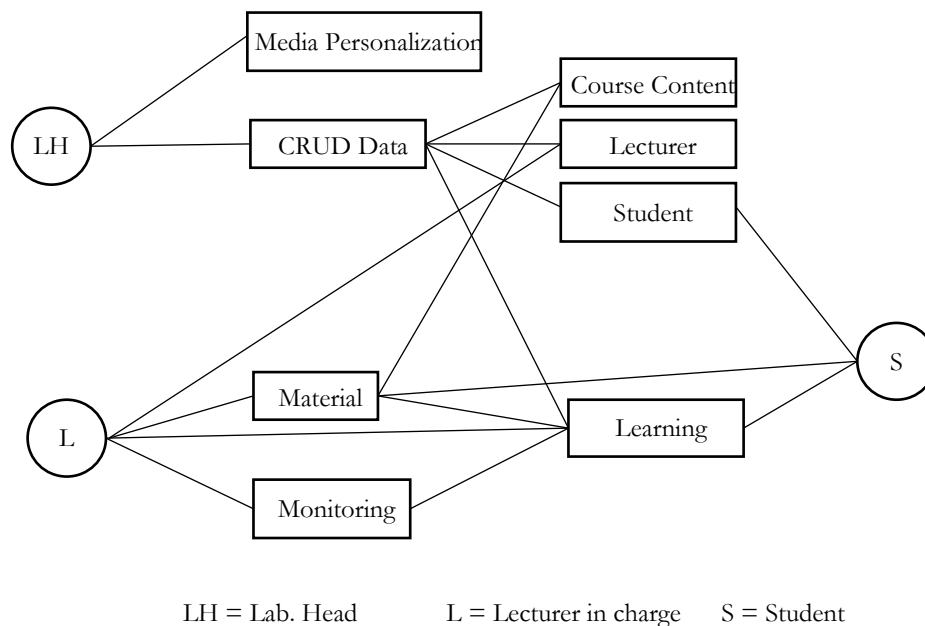


Figure 1. Use Case Diagram of Sharia Bank Lab Web-base application

The last actor in the media is the student. Students can update their profile after being entered into the media by ka. In addition, students can download all materials related to the courses taught. Students also receive learning, instructions and orders from related lecturers through the media.

5. Conclusion

Based on research that has been conducted regarding the Needs Analysis of Online Learning Information Systems at the Bandung State Polytechnic Sharia Bank Lab, it can be concluded that lab learning. Islamic Bank is still being carried out without a learning system that is suitable for practicum learning. The PIECES analysis results show that a system is needed that can accommodate practicum learning in the lab. Islamic Bank that can be accessed by students from anywhere in realtime, fast and easy to use by all actors involved. Therefore, it is necessary to develop an information system as a learning media in the lab. Islamic Bank Bandung State Polytechnic.

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