Requirements Engineering in The Integration of Social Media Based Interactive Learning

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Abstract. Due to the pandemic Covid-19, Department of Industrial Engineering, University of Diponegoro started requiring online learning for each subject using the Microsoft platform Teams. These changes caused several obstacles faced by students. The Microsoft Teams app requires stable connectivity and high quota usage because online learning takes place in real-time. For this reason, it is necessary to increase better facilities by meeting the needs of students in online learning. This study aims to map user needs in online learning into telegram-based social media features and WordPress-based websites. This study uses the Requirement Engineering method in designing its information system. The Computer Simulation course at the Department of Industrial Engineering focuses on designing this online learning application. The analysis of user requirements obtained will be implemented as the basis for making information systems. Lecturers can provide course material as learning content into Telegram groups or websites. The telegram bot feature is used to present learning material shortly, concisely, and clearly.

1. Introduction

The changing times have caused changes in teaching and learning methods. This also applies to the Diponegoro University Industrial Engineering Department, which applies a bold learning system during COVID-19. Diponegoro University Industrial Engineering Department implemented a bold learning system utilizing Undip's Microsoft Teams and Kulon (Online Course). However, the learning system of the Diponegoro University Industrial Engineering Department currently still has weaknesses. Weaknesses such as network problems, flashback videos that are limited in time, incompetent student hardware. Therefore, additional learning support is needed to cover the existing weaknesses. Supports a group website and telegram which can take care of any weaknesses. The website that will be created will be used as a container, while group telegrams function as a medium of liaison between students and lecturers.

To design a website and social media application requires an appropriate method. In this case, we are using the requirements engineering method. The requirement engineering method was chosen because this method is easy to use to identify stakeholders, stakeholder needs, understand the design flow, and help developers create information systems. In this

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paper, the use of requirements engineering starts from identifying requirements to mapping the application capabilities. capabilities.

2. literature review

2.1 Online Learning

2.1.1 Definition of Online Learning

Online learning implies technologies such as the web, e-mail, chat, groups, audio and video conferencing delivered through computer networks to provide education. E-learning can bring joy to learning through the delivery of innovative content [1]. The use of online learning in the pandemic era is increasingly finding its relevance. [2,3] researched the impact of the COVID-19 pandemic on students in the radiology field.

2.1.2 Benefits of Online Learning

The benefits of online learning can be felt in the field of education. Online learning can facilitate interaction, increase motivation and learning experiences, and offer course material. Online learning with the help of social technology allows students to express their work through blogs [4] freely.

2.2 Benefits Social Media

Social media can be used for academic related purposes as a technological tool for enhancing online communication and interaction between students and other faculty members [5].

2.3 Information And Data

Information is data that has meaning to the recipient and has real value needed for future or present decision-making processes. Meanwhile, data is a picture or fact which is relatively insignificant to the recipient [6].

2.4 Information System

Information systems involve information technology such as computers, software, databases, communication systems, the internet to perform specific tasks or inform various people. Information systems can be related in terms of technology. Information systems use hardware and software to analyze, plan, and make decisions in the database [7]. An *information system* can also be defined as a set of interrelated components that collect, process, store, and provide the information needed to complete business tasks [8].

2.5 Requirement Engineering

Requirement engineering is a part of systems engineering that deals with discovery, development, tracing, qualification analysis, communication, and management of requirements that determine a system at a sequential level of abstraction. The classic model called the V-Model is used to provide an overview of the stages of research development [9].

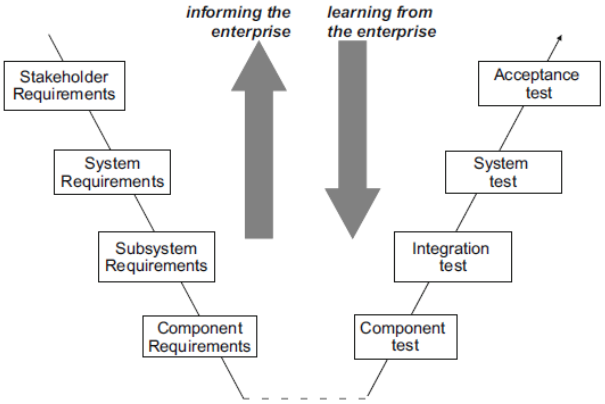

Figure 2.1 V-Model Requirement Engineering.

2.6 Workflow

Workflow is a sequence of work steps of an activity. Workflow is an activity diagram in the form of a UML diagram that describes the activities of a system, people or components in completing activities, and the sequential of activities [8].

3. Information System Design

3.1 Stakeholder Needs

The initial stage in developing an information system is to determine who the stakeholders are involved [6]. In this research, the stakeholders involved are students and lecturers, and the roles of each stakeholder are summarized in table 3.1.

Table 3. 1 The Role of Each Stakeholder.

Stakeholder	Role
Lecturer	Lecturers have a role in providing material in the form of videos or articles as discussion material and learning materials for students.
Student	Students have the role of receiving material to complement learning and discuss material both with lecturers and with fellow students.

Creating an information system requires capturing the needs of each stakeholder involved. To find out the needs of stakeholders, further interviews were conducted with the stakeholders involved.

Based on interviews with stakeholders, several needs are used as a primary reference in identifying requirements. The needs captured from the interview results are presented in Table 3.2.

Table 3. 2 Stakeholder Needs.

Statement of Needs	Explanation
Users need a application with a content search feature	The application provides a material search feature
Users need a application that can provide questions (quizzes) or assignments as student evaluation materials	The application provides a feature to test the level of understanding of students before studying the material
Users need a application that can present learning videos	The application is able to display material in the form of videos
Users need a application with a simple appearance	The application has a simple theme, few menus, and concise
Users need a application that can display course material	The application can present course material both mathematical and theoretical material
Users need a application that doesn't waste internet quota	The application can be used without requiring a lot of internet quota
Users need a application that can be accessed 24 hours	The application can be used by users online 24 hours
Users need a application that can be accessed by laptops, smartphones and tablets	The application can adapt according to the hardware used by the user
Users need a application that displays class schedules	The application provides a class schedule menu to remind students
Users need a application that can recommend related articles	The application can provide recommendations for similar articles to users
Users need a application that can provide online library features	The application provides an online library that can be used to support student learning
Users need a application that is easy to operate (lots of symbols)	The application must be equipped with symbols to make it easier for users
Users need a application with emoticon features	The application provides an emoticon feature when learning two-way on the website
Users need a application that provides material in the form of games	The application is able to present interesting learning content in the form of games
Users need an interactive application (there is a two-way interaction)	The application can be used as a means of two-way communication between lecturers and students
Users need a application to upload and download various types of files	The application can be used as a medium that can upload and download various types of files
Users need a application that is responsive (not slow)	Application access is expected not to be slow in presenting information (fast loading)
Users need a application that can categorize the material	The application is able to group each material in one category
Users need a application that provides file download access	All content on the application, whether in the form of files, videos, or ebooks, can be downloaded by users
Users need a application with bright colors	The application has a nice appearance supported by bright colors
Users need a application equipped with a virtual assistant	The application has artificial intelligence that can guide students in finding material
Users need a application that is not easy to down	The server used by the application must be accessible to all students
Users need a application that does not have many advertisements (no more than 3)	No more than 3 announcements or advertisements on the application
Users need a application that can display computer simulation case studies	The application can display case examples in computer simulations

Statement of Needs	Explanation
Users need a application that can provide an overview of computer simulation software	The application can provide an overview or explanation of computer simulation software
The user needs an illustration in the form of an image	The application can display images to provide illustrative material
Users need a download link for the latest computer simulation software	The application is able to present computer simulation application files
Users need a application whose security is guaranteed	The application has good security
Users need a application that can be accessed on outdated devices	The application can be accessed on old device (low hardware specification)
Users need a application that can find out user activity	The application has an article recommendation feature that users frequently comment on
Users need a application with clearly displayed menus	The application can present the entire menu on the start page
Users need a reminder in the form of an email	The application has a feature to alert students via email

The application requires reasonably high hardware and stable internet connectivity when running it. If not, the application will run slowly and interfere with meeting activities. To provide learning support for Microsoft Teams, social media and websites were developed. The reason for choosing these two platforms is because it is light, easy to use, simple. Table 3.3 shows the capabilities of WordPress and telegram to meet the needs of users.

Table 3. 3 Application Capabilities.

Statement of Needs	Social Media	Website
Users need an application with a content search feature	✓	✓
Users need an application that can provide questions (quizzes) or assignments as student evaluation materials	✓	✓
Users need an application that can present learning videos	✓	✓
Users need an application with a simple appearance	✓	✓
Users need an application that can display course material	✓	✓
Users need an application that doesn't waste internet quota	✓	✓
Users need an application that can be accessed 24 hours	✓	✓
Users need an application that can be accessed by laptops, smartphones and tablets	✓	✓
Users need an application that displays class schedules	-	✓
Users need an application that can recommend related articles	-	✓
Users need an application that can provide online library features	-	✓
Users need an application that is easy to operate (lots of symbols)	✓	✓
Users need an application with emoticon features	✓	✓
Users need an application that provides material in the form of games	-	✓
Users need an interactive application (there is a two-way interaction)	✓	✓

Statement of Needs	Social Media	Website
Users need an application to upload and download various types of files	✓	✓
Users need an application that is responsive (not slow)	✓	✓
Users need an application that can categorize the material	✓	✓
Users need an application that provides file download access	✓	✓
Users need an application with bright colors	✓	✓
Users need an application equipped with a virtual assistant	-	✓
Users need an application that is not easy to down	✓	✓
Users need an application that does not have many advertisements (no more than 3)	✓	✓
Users need an application that can display computer simulation case studies	✓	✓
Users need an application that can provide an overview of computer simulation software	✓	✓
The user needs an illustration in the form of an image	✓	✓
Users need a download link for the latest computer simulation software	-	✓
Users need an application whose security is guaranteed	✓	✓
Users need an application that can be accessed on outdated devices	-	✓
Users need an application that can find out user activity	-	✓
Users need an application with clearly displayed menus	✓	✓
Users need a reminder in the form of an email	-	✓

Websites are developed using WordPress because WordPress has various features and a flexible interface. We chose telegram because Telegram has bot features, channels, and discussion groups. The telegram bot feature is used to present an explanation of the learning material. Learning material can be shared through the Telegram channel and group features in the form of files and learning videos. Users use the Telegram channel feature to carry out discussions that focus on a topic without disturbing another topic. In contrast, the Telegram group is used for random discussions.

4. Conclusion

The design and creation of websites and telegram groups in this study were carried out to complement the online learning media of the Diponegoro University Industrial Engineering Department. This design is carried out by meeting the needs of stakeholders, as shown in table 3.2.

This paper contains a discussion on mapping user needs to application capabilities. To use this new system in online learning, good cooperation between lecturers and students is needed. In online learning through this website, the interaction between lecturers and students is needed. This is facilitated by a forum for discussion between lecturers and students and between students and students.

WordPress was chosen because it is light, easy to use, and can be used for all lecture materials. Meanwhile, Telegram was chosen because it is light, simple, can be used as a link to the website and as a place for discussion. It is hoped that this information system design can help complement the existing shortcomings of any current learning system.

This research will be continued with application design activities based on needs and mapping the needs of application capabilities, namely websites and telegrams.

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