DESIGN AND DEVELOPMENT WEBSITE ENGLISH LEARNING FOR ELEMENTARY SCHOOL TO INCREASE ENGAGEMENT

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Abstract

The development of technology has a great influence on the development of Learning media is one of the factors that plays an important role during the learning process especially for elementary school. Elementary school currently use gadget media as a daily guide but are not used as a medium for learning English. This causes a decrease in value and a lack of interest in learning English through book media due to the lack of enjoyable interaction. The purpose of this study is to find out how to design and build English learning media and increase engagement for elementary school in grade 4 based on a website that can increase interest in learning and help the teaching and learning process to be more efficient. This learning media is designed with several features such as materials, sample questions, learning videos, and practice questions which are expected to motivate students to continue to understand the learning materials obtained. The steps used in building this website are through planning needs then system design then system development and the last is implementation. This study uses Cognitive Engagement type engagement which means involvement in cognitive. With the system on the website, it is expected to help 4th grade elementary school students in English learning activities.

1. Introduction

Learning media is one of the factors that play an important role during the learning process. Teachers use media as an intermediary in delivering material so that it can be understood by their students well, proving that the use of learning media in the teaching and learning process can arouse new desires and interests, arouse motivation to learn English and stimulate learning activities for students so that students easily understand the material being taught.(Wahyuningtyas & Sulasmono, 2020) To understand the material being taught The problem that occurs in elementary school today is that they tend to use gadgets as a daily tool but do not use them as a medium for learning English, causing a decline in their English grades and also a lack of interest in learning English through books due to the lack of enjoyable interactions.(Alam, Alifandra, Wijirahayu, & Yuliani, 2023) So that students can easily understand the material presented then the creation of this website requires a learning system that is easier and more enjoyable in order to increase students' enthusiasm for learning English. Equipped with other operational features such as animated videos, fun quizzes. This system also created for English learning media for elementary school students based on websites and support student learning media, improve quality and effectiveness in English learning.

1.1 Literature Review

This chapter discusses reviews of previous journals of a similar nature, and several studies that have been conducted previously.

Based on the journal I read with the title "Design and construction of a website-based learning media information system (case study: de potlood tutoring)". The purpose of the design is to provide a clear and complete picture to the programmers and engineers involved. Having the advantages of a web-based De Potlood Tutoring Website-Based Learning Media Information System that can be used by Admins, Teachers and Students requires system development using the Extreme Programming (XP) development method starting from planning, design, coding, and testing. Published in 2021, with the Extreme Programming (XP) development method.

For other journals with the title "Website-Based Early Childhood Education E-Learning Learning Media". With the aim of Creating a Website-Based Learning Media Design for Early Childhood Education (PAUD), so that can learn anywhere and anytime. Which has the advantages of developing educational materials, facilitating schools to provide information, and carrying out a website-based learning process or also known as e-learning (electronic learning). Published in 2021, using the blackbox method.

And the last journal with the title "Development of Spellearn Media to Improve Spelling and Learning of Elementary School". With the aim of developing a spelling media that is implementable in elementary school English learning. It has the advantage of carrying out development and validation actions for products used in learning activities. Published in 2021 using the Research and Development method.

1.2 Design

System design is an activity/process carried out to describe how a business process works by creating diagrams such as use case diagrams. One of the design processes or system development processes that already exists and is widely known by developers is the System Development Life Cycle (SDLC), the steps in this SDLC consist of 5 parts, namely Investigation, Analysis, Design, Implementation and Maintenance and Assessment .(Taufiq, Ummah, Nasrullah, Angga, & Permana, 2019)

Design and construction is the process of creating a new system or replacing or repairing an existing system either in whole or in part.(Munir, 2017)

1.3 Engagement

The word engagement etymologically means involvement in something. In terminology, engagement is defined as a concept of social relations that is multidimensional, dynamic, which includes various psychological attributes and social behaviors such as forms of connection, interaction, participation, and involvement. The purpose of these forms of relationships is to achieve or obtain the expected results both individually, organizationally, and socially.(Hernik, 2021)

Advertising engagement consider the effectiveness of advertising campaigns in attracting attention and maintaining consumer interest. Media engagement encompasses consumer engagement with a variety of media channels, from social media to traditional platforms, and states that user engagement (online activities) is the quality of user experience that focuses on positive aspects of interaction, and that interaction is collected and tied to a web application, and is also accompanied by motivation to use it.(Ade, 2024)

1.4 English Language Learning

English as a means of communication is used to convey ideas, thoughts, opinions, feelings, and also to respond to or create discourse in social life. To be able to learn English well, knowledge of the characteristics of English itself is required. Each subject has certain characteristics when viewed in terms of the objectives or competencies to be achieved, or the materials studied in order to support these competencies.(Qori Fatima, Khairunisa, Chandra Priatna, Prihatminingtyas, & Tribhuwana Tunggadewi Malang, 2019)

This English subject emphasizes aspects of language skills which include oral and written language skills, both receptive and productive. These characteristics are what distinguish one subject from another. In general, the four language skills are used to communicate. In order for the communication process to run smoothly, language learning must be equipped with knowledge of language and language skills.

1.5 Information Systems

An information system is a series of systems grouped in an organization consisting of a set of components, both computer-based and manual, created to collect and prepare data containing output information for users, or a set of hardware and software connected to create and process data into useful information.(Sujarwadi, 2021)

Meanwhile, according to other experts, an information system is a collection of components that include people, hardware, software, communication media/networks and data resources, which work by collecting, changing and delivering information in an organization.(Taufiq et al., 2019)

1.6 DFD (Data Flow Diagram)

Data Flow Diagram(DFD) is a graphical representation of the flow of data in a system. DFD describes how data moves from one process to another in a system, including the inputs and outputs of each process and where the data is stored.(Christian & Ehuwinae, 2021)

Data Flow Diagram(DFD) is a diagram that uses notation in the form of symbols to describe data flow in a system. DFD is described starting from level 0, level 1 to level 2. DFD level 0 is at the highest level, which describes a large circle that represents a system that interacts with external entities. (Apri, Manurung, & Manuputty, 2020)

1.7 ERD (Entity Relationship Diagram)

Entity Relationship Diagramis a network that has a data structure stored in the system abstractly ERD is a design tool for modeling a database. The purpose of creating ERD in an organization is for modeling that shows the relationship between data that has a relationship, also documenting existing data by explaining each data and its relationship. Cardinality of Relationship is the maximum number of entities that can relate (connect) to an entity in another entity set. (Istiqomah, Imayah, Saidah, & Yaqin, 2022)

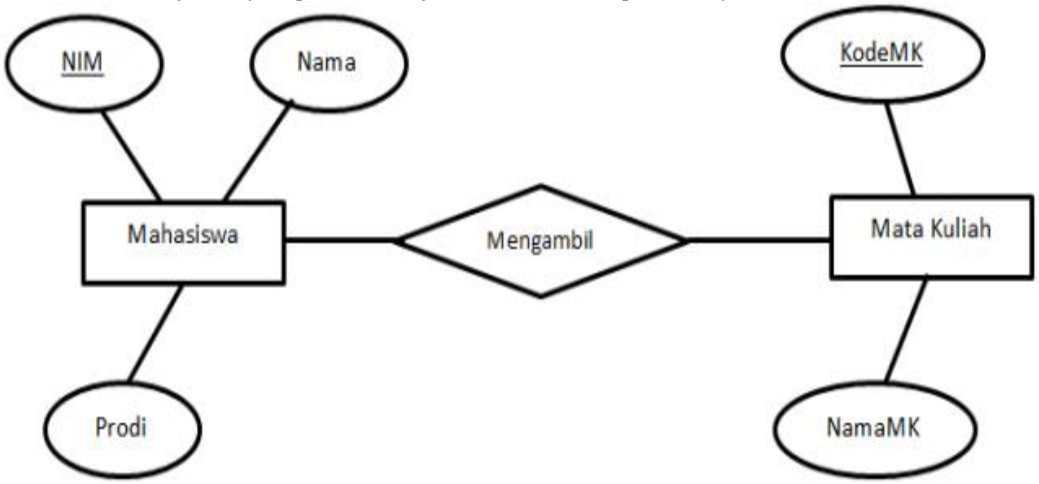

Fig. 1 Examples ERD

1.8 Conceptual data model (CDM)

Conceptual Data Model(CDM) A model created based on the assumption that the real world consists of a collection of basic objects called entities and relationships between the entities in the system. Usually represented in the form of Entity Relationship (Qomariyah, 2018)

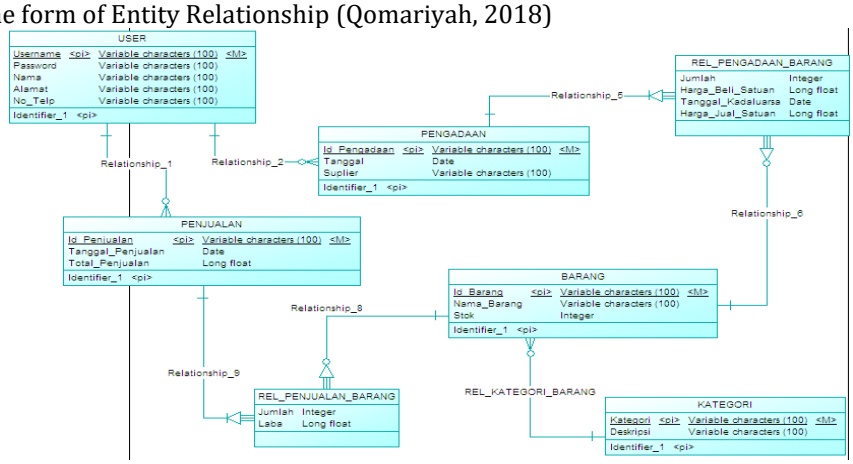

Fig. 2 Examples CDM

1.9 Physical Data Model(PDM)

After the CDM concept has been created, it is then generated into PDM, which is a model that uses a number of tables to describe data and the relationships between the data. Each table has a number of columns where each column has a unique name.(Qomariyah, 2018)

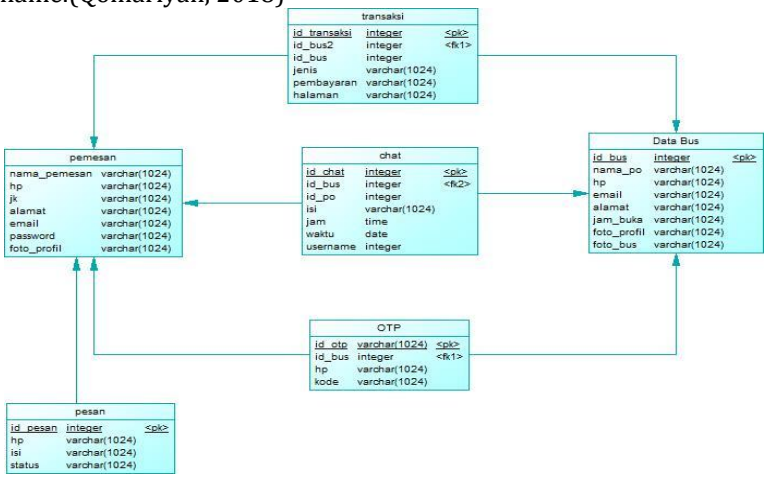

Fig.3 Examples PDM

1.10 Instructional Media

Learning media is defined by Gagne and Reiser as physical tools where instructional messages are communicated. So an instructor, printed book, film show or tape recorder and other physical equipment that communicates instructional messages are considered as media. Teaching and learning activities with the intention that the process of educational communication interaction can take place appropriately and effectively. Learning media can help improve understanding, present data in an interesting and reliable way, facilitate data interpretation and condense information.(Qori Fatima et al., 2019)

2. Research Methods

In completing this, the researcher obtained various data and information through several methods.

2.1 Running System Analysis

The system currently running in creating an English learning website for 4th grade elementary school students can be described in the form of Figure 4.

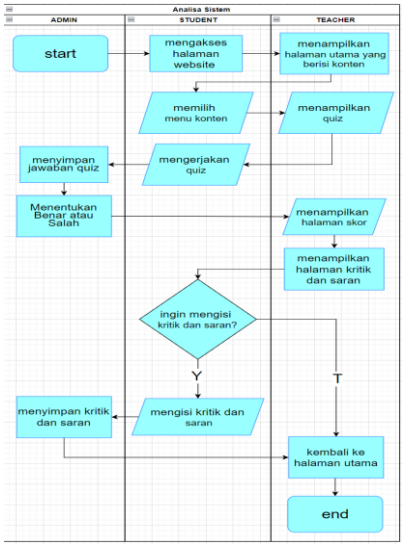

Fig. 4 Business process system website

From the image above, the following is the business process flow that is depicted:

1. Start: Process started.
2. Accessing website pages (Student): Students access website pages that contain content.
3. Displaying the main page containing content (Teacher): The main page containing content is displayed by Teacher.
4. Selecting the content menu (Student): Students select the content menu from the main page.
5. Displaying quiz (Teacher): Teacher displays the quiz selected by the student.
6. Taking the quiz (Student): Student takes the quiz that is displayed.
7. Saving quiz answers (Admin): The quiz answers that have been filled in by students are saved by the admin.
8. Determining Right or Wrong (Admin): The system corrects whether the answer given by the student is right or wrong.
9. Displaying the score page (Teacher): Teacher displays the score page after the answers are corrected.
10. Want to fill in criticism and suggestions? (Decision - Student):
    - Students are given the option of whether they want to fill in the criticism and suggestions or not. If "no" then they will return to the main page.
    - If "yes" then the student will fill in the available criticism and suggestions.
    - Furthermore, the criticism and suggestions filled in by students are stored by the admin.
11. End: Process ended.

This flowchart illustrates the interaction between students, teachers, and admins in a website-based learning system. The process starts from students accessing the website, selecting content, completing quizzes, evaluating results, and providing criticism and suggestions by students.

2.2 Research methods

The application of the method to the website system that will be implemented by the author is below:

1. Implementation Methods in Website Management

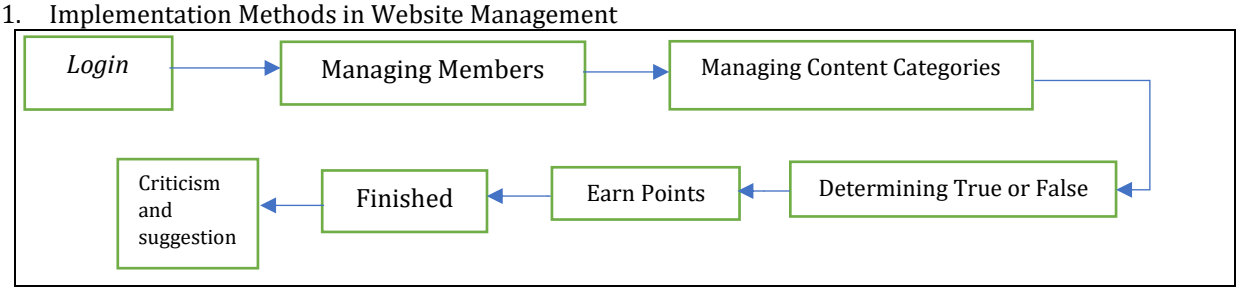

Fig. 5 Implementation method

Figure 5 Explains the implementation methods used in management.emen learning website.

- This method will appear during the waiting process from the login stage, then the admin will manage the members and then the admin will manage the existing content categories.
- Next, the admin will determine whether the answer is right or wrong on the quiz results.
- Admin will display points if the answer is correct and will return to the main page.
- Lastly, if the user chooses to fill in criticism and suggestions, the admin will save the criticism and suggestions and then return to the main page.

This method will display interesting images, videos, animations and audio.

2. English Language Learning Website Engagement Analysis Process.

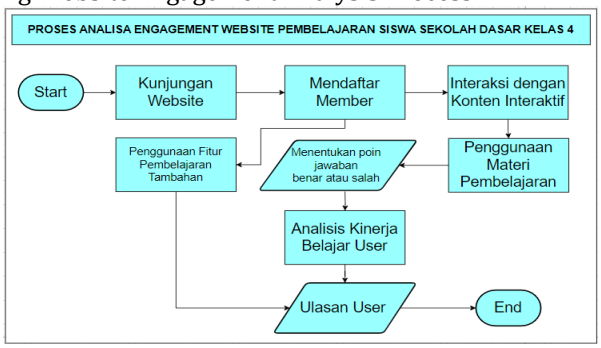

Fig. 6 Analysis Process Engagement For English Learning Website

The following is a picture of the analysis process engagement For website English language learning. This image explains the main stages that are analyzed to understand engagement in platform:

- Visit Website: Measure the number of daily visits and traffic sources to find out where users come from.
- Register Member: Measuring the amount user who register and complete the registration process.
- Learning Material Usage: Measures how often learning material pages are accessed and how long users spend there.
- Interaction with Interactive Content: Measures the number of interactions with quizzes, learning videos.
- Determine Points right or wrong answer: Measures the number of quizzes collected by user and quiz completion ratio.
- Use of Additional Learning Features: Measures the amount and frequency of use of additional features such as practice questions.
- Review User: Collect and analyze reviews user regarding their experience of use website.
- Learning Performance Analysis User: Measure student learning outcomes through quizzes and monitor score improvements over time.

This image helps visualize the process flow used to analyze and improve the experience user on website the learning.

2.3 Research Flow Diagram

Below is the process flow of the research method for creating an English learning website for 4th grade elementary school students.

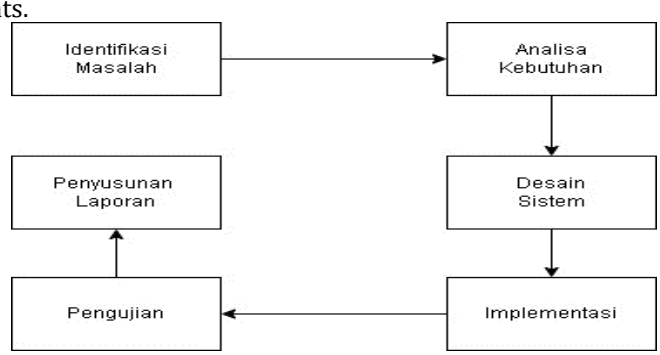

Fig. 7 Research Flow Diagram

Figure 7 shows the flow of the research method from the beginning:

- First, identify the problem to collect problem data on the English learning website for 4th grade elementary school students.
- Second, conduct a literature study by collecting data related to the problem topics that have been discovered.
- Third, analyze functional and non-functional needs.
- Fourth, carry out system design with DFD Level Context.
- Fifth, Implementation by building an information creation system regarding the learning website for grade 4 elementary school students.
- Sixth, Conduct system testing using the blackbox testing method.
- And the last one is documenting the making of the research report.

2.4 Identification of problems

Without a structured method, the process of creating an English learning website for 4th grade elementary school students. Therefore, the author determines the formulation of the problem based on the results of observations for research purposes.

1. Website This is designed to meet the English learning needs and interests of 4th grade elementary school students.
2. Delivering an understanding of English learning that is easy for elementary school students to understand through interactive learning.
3. Create an interactive website by using value points for website users.

2.5 Needs Analysis

After carrying out the problem identification steps, the next step that the author will take is to identify the needs or analyze the needs to obtain information, models, and system specifications that users want.

Below is an analysis of functional and non-functional requirements that can make it easier to determine user needs.

Functional Requirements

Functional needs are a form of needs that have points about a process that is then carried out by the system. These needs have points about the information that exists and is produced by the system. Here are various functional needs from this study:

1. Learning website admin requirements:
    1. Admin learning website can login and logout on the website.
    2. Website Admin learning can input, update, and delete learning media data
    3. Website Admin Learning can monitor new questions and materials that come in or out.
2. Need Website users learning :
    1. User learning website can login and logout on the website.
    2. User website learning can provide suggestions and criticism on the learning media data website
    3. Website users Learning can monitor new questions and materials that come in or out.

2. Non-Functional Needs

The definition of non-functional requirements is an analysis to determine various system requirements specifications. Non-functional requirements contain various things that are needed by users. The following are the non-functional requirements of this study:

1. The system can be run as follows:
    1. Personal Computer(PC), Laptop and Windows operating system, Mobile phone minimum RAM 8 GB.
    2. Softwareto access (Google Chrome, Mozilla Firefox, Opera and others).
2. The system has security, namely by using a username and password when logging in.

The research instruments used in this study are:

2. The hardware used to create this system is as follows: an MSI laptop with the following specifications: 11th Gen Intel(R) Core(TM) i5-11260H @2.60GHz 2.61 GHz Processor, 16.0 GB RAM.

The software used to create and run this website is as follows: laptop, Operating System, Windows 64 Bit, Visual Studio Code, Power Designer, Google Chrome, Mysql, Php, and Html.

2.6 System Design

In this phase, the author uses a system design based on the needs that will later be used to build a ranking system. The software used in this system design is Power Designer and Visio.

1. ERD Entity Relationship Diagram

The database design is designed in the form of an entity relationship diagram to help the process of creating a database from the website to be designed. ERD English Learning Website.

- This system has 4 entities, namely User, Admin, Login, and Content. For the first flow, it starts with the User entity, the user has several attributes, namely 'user id', 'password', 'name', and 'username'. Users can perform the 'login' process. Namely by entering the 'username' and 'user password' to login, then the system verifies the login data. Verified users can access the content.
- Next there is the Admin entity, which has attributes namely 'admin id', 'password', 'name', 'username'. Admin can perform processes, which may involve creating or managing content, namely by editing content, selecting content, selecting content, adding and deleting content.
- Next is the login entity, which has attributes namely 'login id', 'user password', 'name', 'username'. The login entity is related to the admin and user, meaning that the admin and user must log in if they want to access the website. If the login data is valid, it will be verified and given access according to the role (admin or regular user).
- Next is the content entity, which has the attributes 'content id', 'video', 'quiz questions', 'criticism and suggestions'. then verified users can access the content. And the content accessed by the user is identified by the 'content id'. Admin can compile and manage content to be presented to users.

2. DFD (Context Level Data Flow Diagram)

In designing this system design, the author uses DFD Level Context with the aim of depicting the flow of the English learning website creation system. Below is the DFD system design level context in this study:

- The website management system has 1 entity, namely the admin. This system has a flow that the first Admin can log in then input data on the number of new members and active members, find out about uploading content questions, new learning videos and understanding quizzes. In this system, the Admin has full control over the system.
- The next entity is the user, which has a flow, namely the user can register as a member by creating an account, then the user logs in to the member account that has been created, the user can find out about uploaded content questions, new learning videos and understanding quizzes to filling in criticism and suggestions.

2.7 Implementation

At this stage the author carries out the implementation of the research "Implementation of Methods for Makingwebsitelearning for 4th grade elementary school students". This calculation system is built using PHP language and various software such as Adobe Visual Studio Code.

This system displays various information onwebsite platformabout the calculation of predetermined criteria. Data and criteria are input by the admin and each user will get the result information.

2.8 System Testing

Next is the system testing stage, at this stage the author will carry out testing of the design system that has been created with the aim of seeing...outputThe system and function of the system run as desired through 2 things, the first is the information system and the engagement process.

2.9 Report Creation

At the stage of making a report, the author compiles a report on the results of the research that has been carried out correctly so as to produce a report in the form of a manuscript.

2.10 Research Schedule

Research implementation of implementation for creation website learning for grade 4 elementary school students was conducted within six months. The research schedule is in table 1.

Table. 1Implementation Study

N	Activity	Month					
		1st	2nd	The 3rd	4th	The 5th	The 6th
1.	Identification of problems						
2.	Literature study						
3.	Functional and Non-Functional Requirements Analysis						
4.	System design						
5.	Implementation						
6.	System testing						

3. Result and Discussion

Table 2 System Process

Entity	**Activity**	**Data/Information Needs**
Admin	Login account	Username and Password
	Inputting Material	Add new video material, Edit material, and delete material.
	Entering Quiz	Add new quizzes, Edit quizzes, and delete quizzes.
	Entering points	Data points worked on by members.
	View member history	Data taken from the number of members who log in.
	View criticism and suggestions	Criticism and suggestion data.

3.1 User Interface Implementation

In the implementation of this interface design, PHP programming code is used andframeworkcss or bootstrap. At this stage the website has been completed and can be used by users for existing problem needs. In the Implementation contains several contents including. Login page, member data, learning material videos, quizzes, until the point results are complete.

1. User Login Page

On the login page, the admin can access the website by entering a username and password.

Fig. 8 Login Page

2. Home Page

On the main page used by the admin. Displays the menu on the sidebar to move pages, namely dashboard, quiz, materi, papan skor, profil, in addition it can display points obtained by the admin and to display the point obtained by the admin each point.

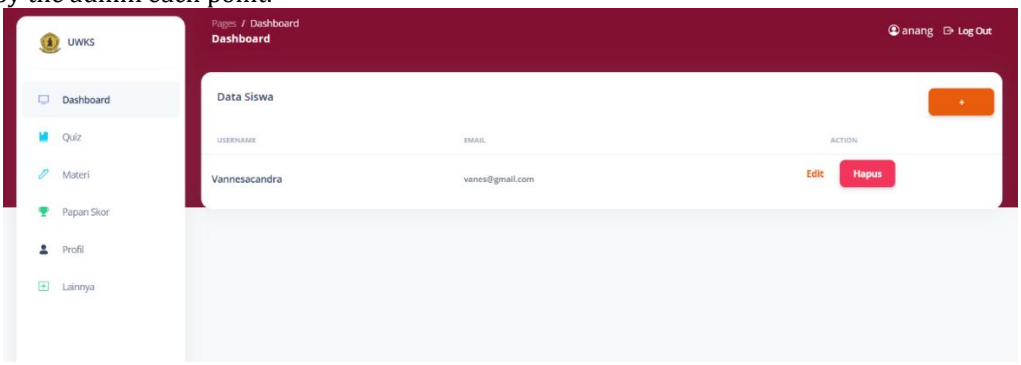

Fig. 9 Main Page

3. Material Page

On the material page, it is used by the admin to enter material data. In addition, the add button is useful for deleting the material you want to delete, a table that displays material data, and there are action buttons, namely change, notes, delete.

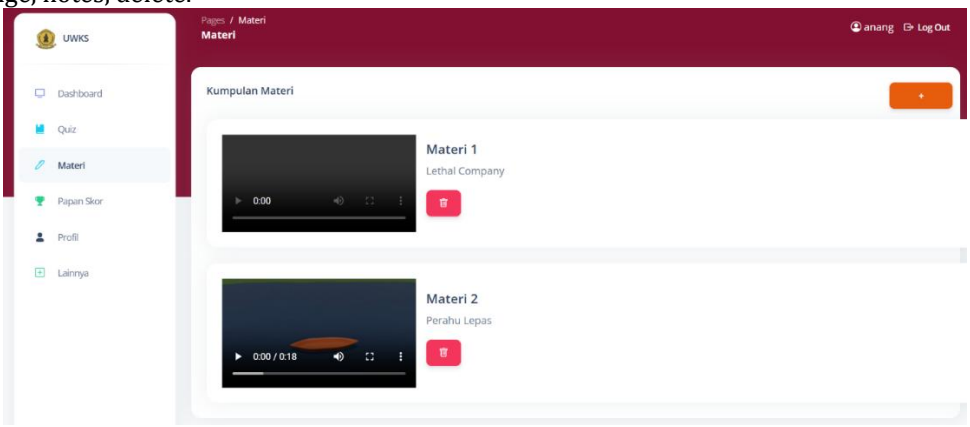

Fig. 10 Material Page

4. Quiz page

This page is used to see the increase and decrease in quizzes. On this page you can also record quizzes that will be displayed in a table. Incoming quizzes are recorded on this page.

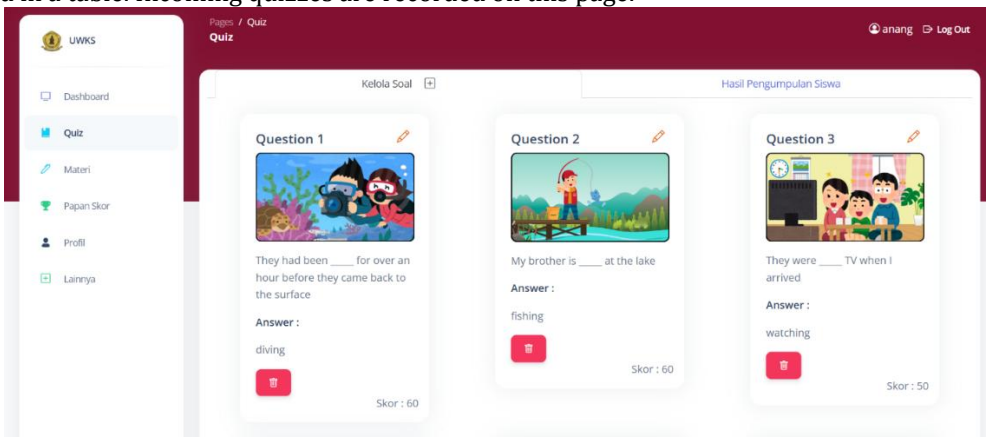

Fig. 11 Quiz page

5. Points page

On the point page, it is used by the admin to enter point data and its amount. In addition, the table that displays point data along with the name, and the amount cannot be changed and deleted.

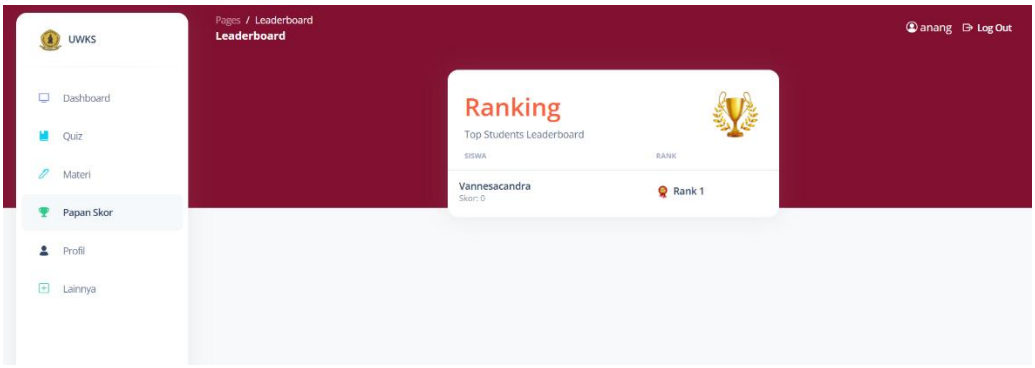

Fig. 12 Point page

6. Member page

On the member page, the admin uses it to see the number of new members and active members on the website until the login process is finally complete.

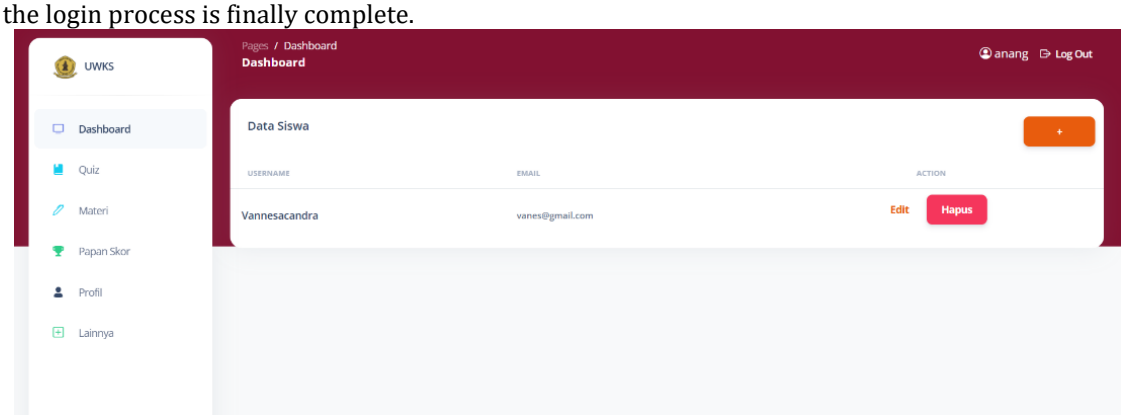

Fig. 13 Member page

3.2 System Testing

1. Login Page Testing

In the login page test, the admin must be able to fill in the username, password. The test scenario is carried out and the results obtained are then confirmed whether the system is running as it should.

Table. 3 Login Page Testing

No	Test Scenario	Results Obtained	Conclusion
1	If you fill in the username, password	So the system cannot log in to the main page of the website.	Valid
2	If you fill in the username and password correctly	Then the system can successfully log in and then go to the main page.	Valid

2. Testing of Material Pages

In the material page test, the admin must be able to add, edit and delete materials. The test scenario is carried out and the results obtained are then confirmed whether the system is running as it should.

Table. 4 Testing of Material Pages

No	Test Scenario	Results Obtained	Conclusion
1	If adding new material	Then the system displays the new material data that has been added.	Valid
2	If editing existing material	Then the system can display the edited material.	Valid
3	If deleting existing material	Then the system can delete the deleted material.	Valid

3. Testing the quiz page

In the quiz page test, the admin must be able to add, edit and delete quizzes. The test scenario is carried out and the results obtained are then confirmed whether the system is running as it should.

Table. 5 Testing Quiz Page

No	Test Scenario	Results Obtained	Conclusion
1	If adding a new quiz	Then the system displays the new quiz that has been added.	Valid
2	If editing an existing quiz	Then the system can display the edited quiz.	Valid
3	If you delete an existing quiz	Then the system can delete the deleted quiz.	Valid

4. Point Page Testing

In the point page test, the admin must be able to enter points. The test scenario is carried out and the results obtained are then confirmed whether the system is running as it should.

Table. 6 Page Testing points

No	Test Scenario	Results Obtained	Conclusion
1	If adding a new point	Then the system displays the points that have been added.	Valid
2	If editing an existing point	Then the system can display the points that have been edited.	Valid
3	If you delete an existing point	Then the system can delete the deleted points.	Valid

5. Member Page Testing

In testing the member page, the admin is directed to see new members, there are several inputs that must be filled in which will be mentioned below.

Table. 7 Add Production Page Testing

No	Test Scenario	Results Obtained	Conclusion
1	If you fill in the data in the register	Then the system will save all the forms that have been filled in the database.	Valid

4. Conclusions

4.1 Conclusion

1. The system that has been designed in database to help the English learning process in the form of reading, speaking, and monitoring the learning process every day.
2. This user interface from website has proven to be attractive in activities to increase engagement because it provides interesting features in its operation, such as interactive video materials and additional points obtained from the accumulation of points at the completion of each quiz as a form of appreciation so that it can increase students' learning motivation.

4.2 Suggestion

From the results of the analysis of the information system for creating an English learning website to improve engagement provides suggestions for further development by creating more diverse interactive features.

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