

ANALYSIS AND DESIGN OF THE "KIN'S ENGLISH" ENGLISH GUIDELINE USING THE ICONIX PROCESS METHOD

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Abstract

Kin's English is an institution that offers English classes to students of all ages, including children, teenagers, and adults. With the assistance of selected tutors, students can be freed to choose what material they want to learn. However, the issue is that this institution still does not have an official website to support its operational activities. Therefore, we require a website that can accommodate all of Kin's English learning resources and provide additional features such as an English language proficiency test service that can be accessed anywhere and at any time. The scope of this research is the analysis and design of “Kin's English” English tutoring website from the requirements analysis and designing systems using the ICONIX process until the evaluation stage.

Keywords: *ICONIX, analysis and design system, information systems, website*

1. INTRODUCTION

Tutoring or commonly abbreviated as tutoring according to (Oemar Hamalik 2004) is guidance aimed at students to get an education that suits their needs, talents, interests, and abilities, as well as help students overcome learning problems experienced by students by determining effective and efficient learning styles. Currently, tutoring institutions are not only present offline, but also online. There are various *websites* course guidance One of them is Kin's English. Kin's English is an institution that serves English courses for all people. With the tagline "*We don't teach you English, We make you speak English*". The institution, which was founded by Seto Kinara in 2018, offers superior programs in online English courses to people spread across various regions in Indonesia.

In the current era of digitalization, the development of information technology has brought many changes to human life, one of which is in the field of education. With

these developments, almost all activities can be done only by using the internet. To meet the need for such information, systematic information processing is needed in order to facilitate every activity in Kin's English. In this case, a facility is needed that can make it easier for tutors and students to carry out learning by providing a forum that can collect materials, practice questions, and information related to Kin's English that can be integrated and operated online on the internet.

Based on these problems, the author is finally interested in creating a website English tutoring. The existence of this design is expected to produce a *website* that can help students in the learning process as well as an alternative learning media other than face-to-face learning.

2. BASIC LIBRARY

2.1 Website

Website is a collection of pages that contain information in the form of digital data such as text, images, video, and audio that are provided and can be accessed with an internet connection (Abdullah et al., 2016). Meanwhile, according to Yuhezhar (2016), *the website* is an entire page or web page contained in a domain and contains information, where *website* is usually built from several *web* that are interconnected with each other. According to (Muhyidin et al., 2020), *website* is a service that provides information with the concept of a *hyperlink* as a means of *suffering* to search for information on the internet.

There are several types of *websites*, namely *website search engines*; *news*, *weather*, *sports*, and *other mass media*; *education*; *business*, *governance*, and *organizational*; *banking and finance*; *travel and tourism*; and *e-commerce*. (Sebok et al., 2018: 75). These various types of *websites* have the same function, namely as information service providers and according to their type. *website* serves to speed up access to information because *the website* itself focuses on the content contained on the website along with an attractive appearance. *The website* also has a function to facilitate communication because of the facilities or services that allow communication such as *web mail*, *contact forms*, and others.

2.2 UML (Unified Modeling Language)

UML (*Unified Modeling Language*) is an object-oriented visual system development and modeling method. UML has been around since January 1997 and was created by the Object Management Group. UML is widely known as the standard language for writing *blueprints* for building *software*. There are several types of UML diagrams, namely as follows.

a. Use Case Diagram

Use case diagrams describe the functional requirements of the software design to be made. *Use Case Diagrams* show the sequence of process activities on the system and provide an understanding of system requirements.

b. Class Diagram

Class diagram is a diagram that illustrates the structure, description of *classes*, *packages*, and objects and their relationships. *Class diagrams* in detail show objects, their descriptions, roles, and interactions, which consist of *class*, attributes, and operations.

c. Robustness Diagram

Robustness diagram contains a description of the object of the use case that has been created. *Robustness diagram* serves to translate use case text into the form of an object so that it is easier to understand.

d. Sequence Diagram

Sequence diagrams serve to visualize interactions or relationships between objects, such as the interaction between the user and the display. *Sequence diagram* shows the sequence of requests to be requested by the object and its interaction with the system that will execute the request. (Gellysa et al., 2015).

2.3 ICONIX Process

ICONIX Process is one of the software development methodologies used in the design and development of a software. The ICONIX Process aims to produce object-oriented designs so that they will be easier to code later. There are 4 (four) stages in the ICONIX Process, which are as follows.

1) Requirements

At this stage there are 4 (four) sub-stages in system design according to the needs of the business process.

a. Functional Requirements

According to (Ristiyawan & Harini, 2019), to carry out the design of a system, researchers must first analyze and describe the functional requirements needed in making software.

b. Domain Modeling

Domain modeling means the process of visualizing real objects on the state of ongoing business processes in their actual state into a form of class abstraction (Ristiyawan & Harini, 2019). According to Setiyanto and Samopa (2016), the domain model contains the main objects involved in the business processes of a system.

c. GUI Storyboard

Next, a simple design is made, an initial description of the display that will be implemented (Ristiyawan & Harini, 2019).

d. Use Case Modeling

Use Case modeling is the process of making use case diagrams, where this diagram contains a description of the relationship between the user or the user and the system. (Purnama et al., 2014). According to (Dedek et al., 2021), use case diagrams identify activities and interactions carried out by actors when later accessing the system in accordance with ongoing business processes.

2) Analysis and Preliminary Design

At this stage there are 2 (two) sub-stages in system design according to the needs of the business process.

a. Robustness Analysis

This stage is a bridge between the analysis and the system design process. Robustness analysis will produce a robustness diagram which is a visualization of the object from the use case that has been determined in the previous stage. (Wisono et al., 2019)

b. Domain Model Update

At this stage, changes are made to the previously defined domain model at the requirements stage. Ristiyawan & Harini (2019), said that the changes made were in the form of eliminating dual classes and or adding classes needed in the system.

3) Detailed Design

At this stage there are 2 (two) sub-stages in system design according to the needs of the business process.

a. Sequence Diagram

According to Ristiyawan & Harini (2019), a sequence diagram is a visualization of interactions between objects in the system, including users, displays, features, etc. in the form of messages that refer to time. The sequence diagram contains a flow that is determined based on the robustness diagram that has been made, where each diagram is made for each use case (Yusa, 2017).

b. Update Domain Modeling

Changes in the domain model are arranged based on the sequence diagram that has been designed. The updated domain model contains additional operations according to the sequence diagram.

4) Implementation

At this stage there are 2 (two) sub-stages in system design according to the needs of the business process.

a. Coding/Unit Testing

The next stage is the process of implementing the system by translating the system design into coding (Yusa, 2017). In addition to program coding, testing of the system is also carried out whether it is successful or not in accordance with the design that has been prepared.

3. RESEARCH METHODOLOGY

This section contains the steps taken to achieve the objectives of the research including the following.

3.1 Literature Study Literature

study is a method of collecting data through materials written in journals, books, and *e-books* as references that can support this research.

3.2 Data Collection Data

collection in this study used interview and observation methods. The interview was conducted by asking several questions related to the research to the resource person, namely the owner of Kin's English. Observations were made by observing directly the activities carried out in Kin's English.

3.3 Requirements Analysis

Perform a requirements analysis by analyzing and then describing the flow of the old system in the form of a *flowchart*, determining the functional requirements of the system, and making proposals for the flow of a new system in the form of a *flowchart*.

3.4 System

The system design uses the *ICONIX* process with the *Unified Modeling Language* (UML) approach. *Unified Modeling Language* (UML) is a graphical image-based or visualization language for designating, constructing, and documenting systems.

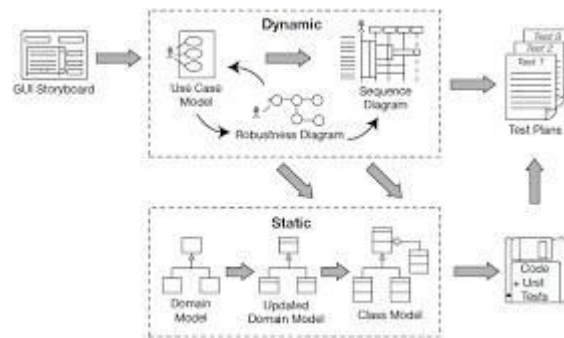


Figure 1. System Design *ICONIX* process

Consists of 4 (four) stages, among others:

1. Requirements

a. Functional Requirements

An activity that collects and processes data and then in accordance with the functional requirements needed for system development.

b. Domain Modeling

Static UML stage, where data is taken from functional requirements and extracted into several parts that are connected according to software requirements.

c. GUI Storyboard

The stage of creating the user interface.

d. Use Case Modeling

Stages of describing what activities are carried out by users and their relation to system responses. In this section there is an identification of actors and business processes that are currently running.

2. *Analysis and Preliminary Design*

a. Robustness Analysis

The development of the analysis stage is then carried out in the design stage process.

b. Model Domain Update

removes some *classes* and *redundant* adds some *classes* and attributes in the modeling domain.

3. *Detailed Design*

a. Sequence Diagram

modeling *sequence diagram* continued from the *robustness analysis stage diagram*.

b. Class Diagram Class diagram

stages *modeling* based on *domain model* and previous diagrams.

4. *Implementation*

The last stage of the *ICONIX process* where the designs that have been created are submitted to the *programmer* to be translated into programming codes.

4. RESULTS AND DISCUSSION

4.1 Requirements (Needs Analysis)

At this stage includes the old system and the new system as well as the functional requirements of the system.

4.1.1 System Analysis

The identified business processes related to current business processes and which will be proposed to Kin's English are as follows.

1. Current registration process Current
2. learning process Current
3. learning certificate approval
4. process Proposed registration
5. process Proposed learning program selection
6. process Proposed payment
7. process Proposed learning
8. process Proposed English proficiency test process
9. Proposed viewing of learning outcomes or certificates

Examples of business process modeling that have been made are as following.

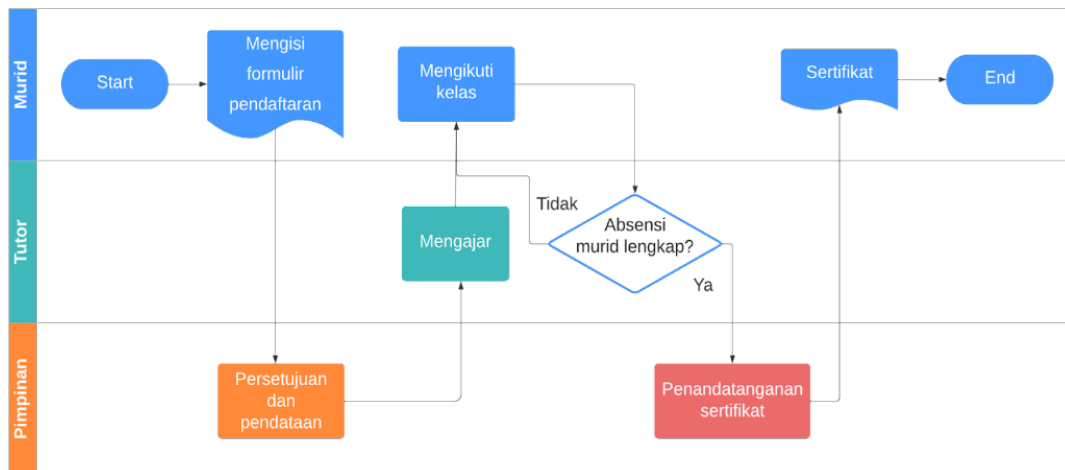
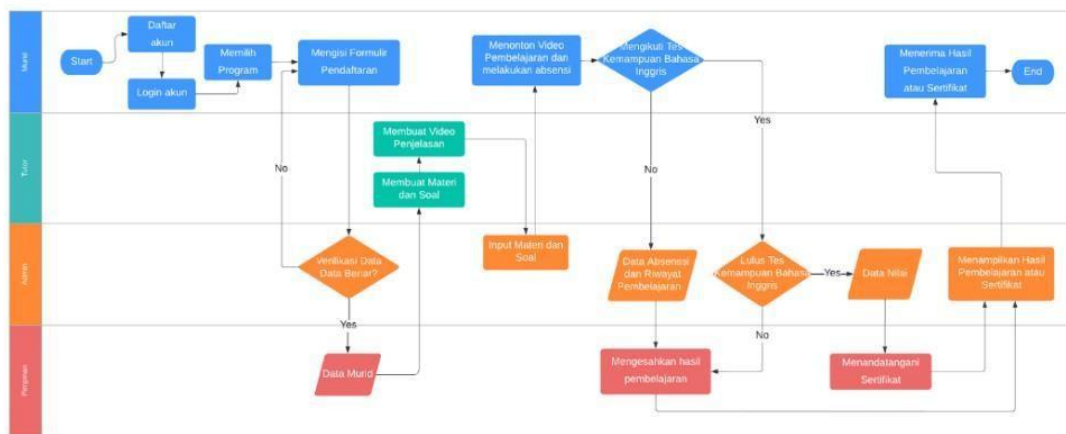


Figure 2. Kin's Current



Business Process Modeling Proposal Kin's English

Based on Figures 1 and 2 it can be seen the difference between the current and proposed system capabilities. Where in the old system the operational activities were still manual, then the Kin's English activity process was proposed which implemented a computerized system.

4.1.2 Functional Needs

The functional needs that have been identified in this system, obtained 4 actors, namely Admin, Leaders, Tutors, and Students. All four have the characteristics of interaction with the system and different information needs. Here are the scenarios from the four system users or actors:

- Admin
Verifying student graduation, displaying student certificates, verifying materials, videos, and questions that have been inputted by the tutor.
- Leaders
Obtain student data, certify learning outcomes, sign certificates.
- Tutor
Input material and questions for students, as well as input learning videos.
- Students
log in, choose a learning program, fill out registration forms and verify the correctness of the data that has been inputted, view materials and watch

learning videos, take tests proficiency language, get learning outcomes or test result certificates.

4.2 System Design

At this design stage includes *user interface* design and database design.

4.2.1 Graphical User Interface (GUI)

Design of the initial *user interface* on *website* Kin's English. Figure 4 below is a display of the *homepage* Kin's based on its feature and functional requirements. On the home page, there will be main menus on the Kin's English website displayed on the dashboard on the website. The menus are Home, Program, Course, TOEFL, Certificate, and Account. Users can select each menu by clicking on it and will be directed to the display on each menu as well. On this page there is also a bit about Kin's English and the login button.

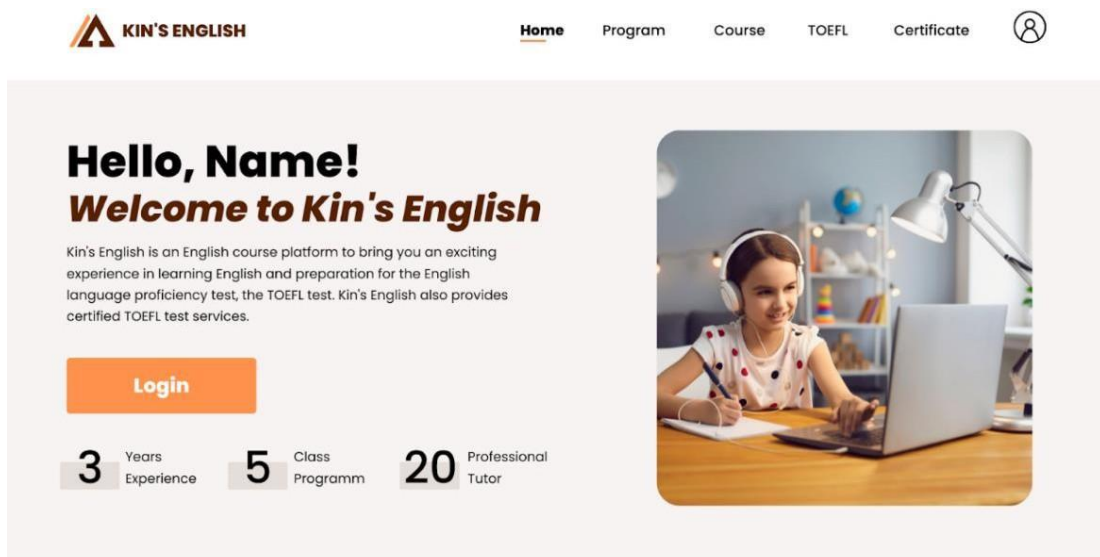


Figure 4. Homepage

4.2.2 Domain Modeling

Identifying nouns and terms at the needs analysis stage. After the nouns are collected, the word filtering is carried out to become 10 domains as Figure shown 5. The domains are tutors, students, student accounts, admin, attendance, class programs, transactions, materials and questions, learning outcomes, and leadership. Almost all domains have a Has a relationship but there are also those that have an Is a relationship, namely on students to learning outcomes, learning outcomes to attendance, and class programs to program a, program b, and program c.

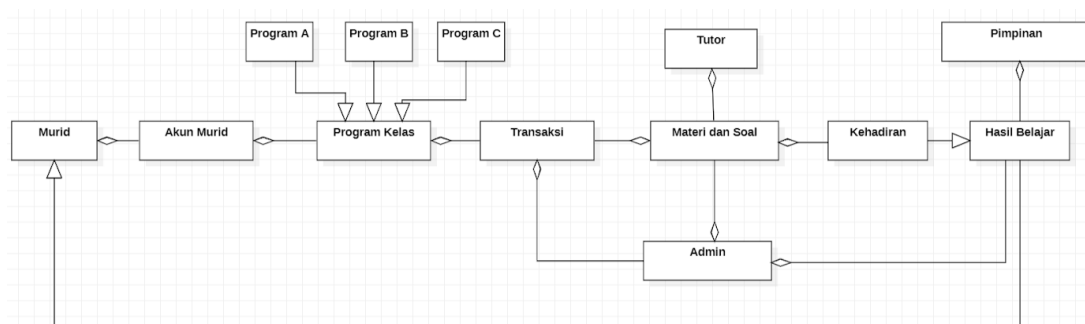


Figure 5. Domain Modeling

4.2.3 Use Case Diagram

Use case diagrams describe the features and functions of the system. generated use case diagram with 4 actors and there are 14 use cases which can be seen in Figure 6. Student actors have 6 use cases, namely login, choose a

program, fill out application forms, watch videos, take tests, and receive certificates. The admin actor has 4 *use cases*, namely data verification, graduation verification, displaying certificates, material validation and questions. The tutor actor has 2 *use cases*, namely material and question input, and learning video input. And lastly, the lead actor has 2 *use cases*, namely validating the results and signing the certificate.

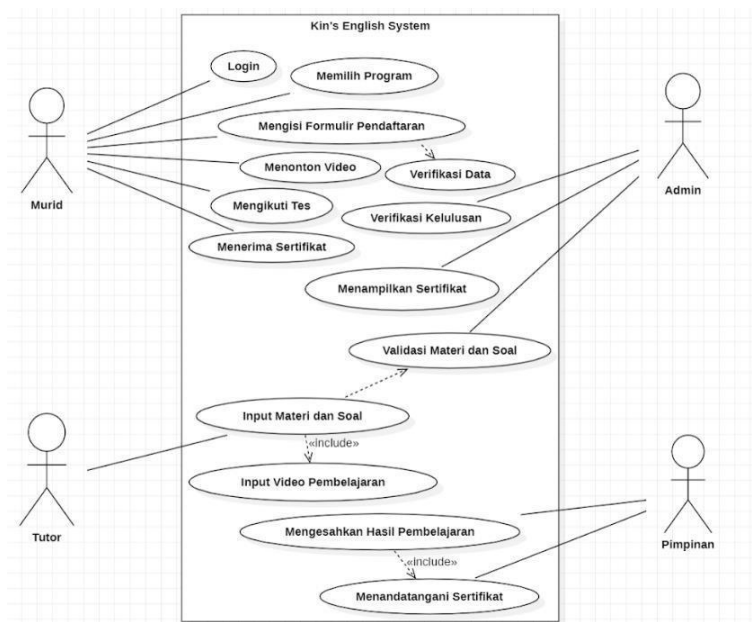


Figure 6. Use Case

4.2.4 Robustness Diagram

Robustness diagram is a link between analysis and system design. diagram is a description of the object of the *use case* that has been created.

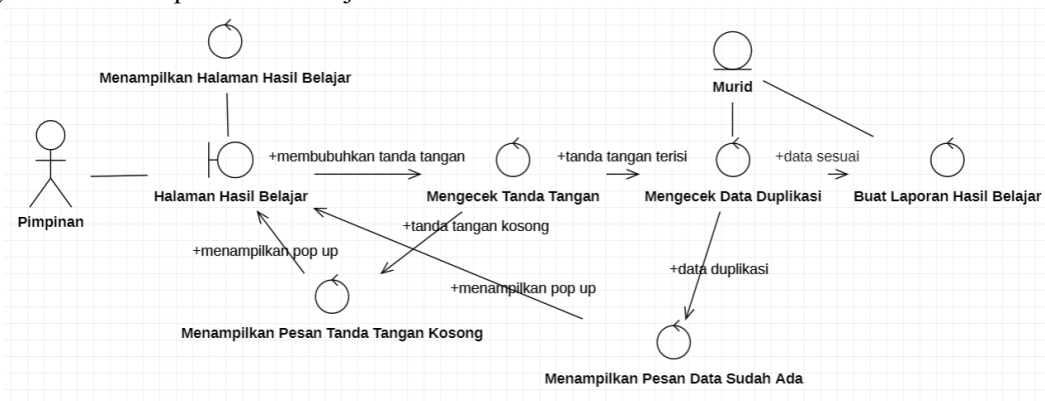


Figure 7. Robustness Diagram Validating Learning Outcomes

Figure 7 is a *robustness diagram* when the leader validates learning outcomes. The leader user enters the learning outcomes page and the leader affixes a signature on the learning outcomes report. Then the system will check the signature, if the signature is filled, then proceed to the process of checking the duplication of data, but if the signature is empty it will display an empty signature message via a pop up and be returned to the learning results page.

In the process of checking duplication of data, the signed learning outcomes report will be checked for duplication or not. If there is duplication of data, the system will display a message that the data already exists via a pop up and will be returned to the learning results page. If there is no duplication of data, a signed learning outcome report will be generated and entered into the student database.

4.2.5 Sequence Diagram

Sequence diagrams are made according to *use cases* and *robustness diagrams*, which

are 14 pieces. Naming for *actor*, *boundary*, *control*, and *entity* used is a term that is adapted to *the domain model* that has been created. The flow *sequence diagram* follows the

robustness diagram. Figure 8 is a *sequence diagram* when the leader validates the learning outcomes.

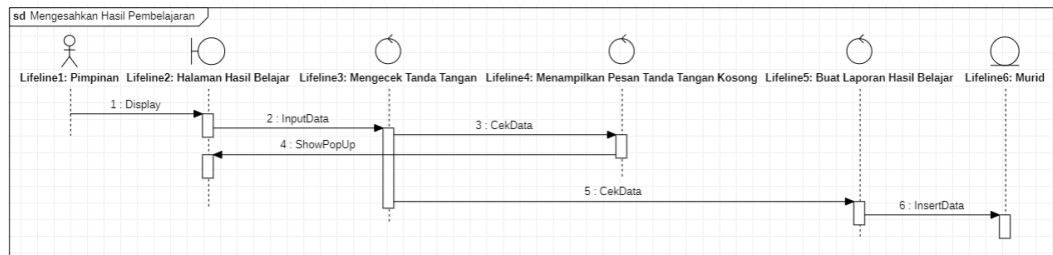


Figure 8. Sequence Diagram Validating Learning Outcomes The

The leader opens the learning outcomes page. On this page, data input will be carried out in the form of a signature. Next, check the signature data, if the data is empty, a pop up message will be displayed and returned to the learning results page, but if the data check is complete, the system will generate a signed learning outcome report. Learning outcomes report data will be entered into the student database.

4.2.6 Class Diagram

Class diagrams are made from the development of the *domain model* and previous diagrams. Their *entity*, *control*, *model*, and *view*. Making *class diagrams* of the previous process stages as needed. Figure 9 is a *class diagram* of Kin's English system.

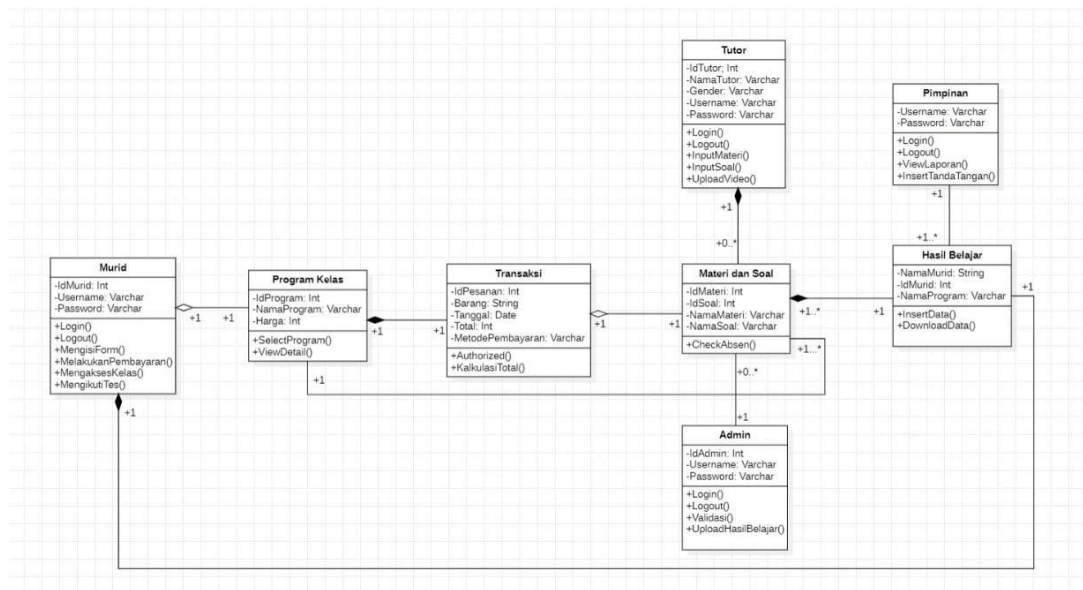


Figure 9. Class diagram

From student to class program has a one to one relationship. From class programs to transactions have a one to one relationship. From transactions to materials and questions, there is a one-to-one relationship. From the material and questions to the tutor, there is a many-to-many relationship. From the material and questions to the admin, there is a many-to-one relationship. From materials and questions to class programs, there is a many-to-one relationship. From material and questions to learning outcomes, there is a many-to-one relationship. From the results of learning to the leadership has a many to one relationship. From learning outcomes to students have a one to one relationship.

4.3 Implementation

The final stage of the *ICONIX process* is the implementation stage. At this stage the designs that have been made previously will be submitted to the *programmer* to be translated into programming codes.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

From the results of research and design, it is concluded that the process of designing

websites is carried out using the *ICONIX process*. The old system, which was still carried out offline or face to face, has now been changed to be able to be done online with additional features. As for *The ICONIX process* consists of four stages, namely *requirements, analysis and preliminary design, detailed design, and implementation*.equipped with

is functional requirements, domain modeling, GUI storyboards, use case diagrams, robustness diagrams, sequence diagrams, and class diagrams.

5.2 Suggestion

The results design using the *ICONIX process* for the website can be considered for the real system implementation stage and further implementation can add system testing to test the design and implementation process has been going well.

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