

Conference Paper

Design of Integrated School Learning Information System Using CodeIgniter Framework

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ABSTRACT

The development of Information and Communication Technology (ICT) requires schools to always improve the quality of learning by utilizing the use of ICT. The development of ICT in schools provides many new opportunities that can support the learning process. The use of ICT plays an important role in improving the quality of education by increasing the development of educational content, supporting administrative processes in schools, and increasing access to education for teachers and students through distance learning. Utilization of ICT in the school environment can also assist in evaluating and improving the abilities and knowledge of each student. This study aims to design an integrated school learning information system using the CodeIgniter framework. The design of the integrated school learning information system model uses the Unified Modeling Language (UML). The design of the integrated school learning information system uses the PHP programming language and MySQL as the database. Integrated school learning information system includes various features e-modules, e-daily tasks, question banks, e-tests, e-reports, and e-monitoring. Integrated school learning information system is expected to improve the quality of learning so that it can improve students' abilities and knowledge. Integrated school learning information system is also expected to make it easier to obtain information on the results of evaluating students' abilities and knowledge as well as being a medium that can improve student achievement and quality of graduation.

Keywords: CodeIgniter, integrated school learning information system, UML, PHP, MySQL

Introduction

The development of Information and Communication Technology (ICT) in the era of globalization has a significant impact on the world of education (Sart et al., 2022). The world of education is required to improve the quality of learning by utilizing the use of ICT (Mitchell & Nielsen, 2012). The utilization of ICT in education provides many new opportunities that can support the learning process (Barak et al., 2016). The use of ICT in the school environment plays an important role in improving the development of learning content, supporting administrative processes in schools, and assisting in evaluating and improving the abilities and knowledge of each student (Bindu, 2016). Utilization of ICT in the learning process can increase interest in learning by providing an attractive appearance so that you do not feel bored during learning (Ugwu & Kingsley, 2019).

Learning is a process of communication interaction between learning resources, teachers, and students. Communication interaction is carried out either directly in face-to-face activities or indirectly by using ICT-based learning media. Each student has different backgrounds, interests, needs, and levels of ability (Phutela & Dwivedi, 2019). Implementation of ICT-based learning

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supports students using multimedia technology to access materials, collect assignments, take exams, and interact with educators and other students (Fetaji, 2018). ICT-based learning activities help teachers evaluate and improve the abilities and knowledge of each student (Lowther et al., 2008).

This study aims to design an integrated school learning information system using the CodeIgniter framework to support and improve the quality of the school learning process. Integrated school learning information system includes various features, namely e-modules, e-daily tasks, question banks, e-tests, e-tryouts, e-reports, and e-monitoring. e-module is a feature to facilitate teachers to be able to upload learning materials for students which are equipped with a hidden feature. The e-daily task is a feature for teachers to send assignments to students which can be viewed and sent for the results of the work according to the collection deadline. A question bank is a place for a collection of questions made by the teacher based on subjects and materials with several question models. E-test and e-tryout are features to carry out exams and tryouts are supported by a system of randomizing the order of questions there is a timer while working where the questions can be taken from the question bank and the calculation of student work results will be calculated automatically by the system. E-monitoring here serves to monitor student assessments of each lesson and material to determine student deficiencies based on the subject matter and determine teacher performance assessments. The design of the integrated school learning information system uses the PHP programming language and MySQL as the database. PHP programming language or short for Hypertext Preprocessor is a code-based programming language (script) that is used to process data and send it back to a web browser into HTML code (Firman et al., 2016). The design of the school learning information system model uses the Unified Modeling Language (UML). UML is a standard specification language used to document, specify and build software (Gata & Gata, 2013).

The integrated school learning information system is expected to improve the quality of learning to increase the ability and knowledge of students. Integrated school learning information system is also expected to make it easier to obtain information on the results of evaluating students' abilities and knowledge as well as being a medium that can improve student achievement and quality of graduation to increase the attractiveness and trust of students' parents.

Literature Review

The literature review discusses the theoretical basis related to the design of an integrated school learning information system.

a. CodeIgniter Framework

The CodeIgniter framework is an open-source application in the form of a framework with the concept of MVC (Model, View, Controller) to build dynamic website-based applications using the PHP programming language. The CodeIgniter framework makes it easy for web developers or developers to create website-based applications quickly and easily (Supono & Putratama, 2016). CodeIgniter framework provides a variety of libraries that can simplify development. CodeIgniter framework itself is built using the Model-View-Controller (MVC) development pattern concept. MVC is a pattern/programming technique that separates business logic (thought flow), data logic (data storage), and presentation logic (application interface) or simply separates design, data, and process (Daqiqil, 2011).

b. UML (*Unified Modeling Language*)

UML (Unified Modeling Language) is a standard specification language used to document, specify and build software. UML is a methodology for developing object-oriented systems and is also a tool to support system development (Gata & Gata, 2013).

c. PHP

PHP or short for Hypertext Preprocessor is one of the open-source programming languages that is very suitable or devoted to web development. PHP language can be said to describe

several programming languages such as C, Java, and Perl, and is easy to learn. Another understanding of PHP is an acronym for Hypertext Preprocessor, which is a code-based programming language (script) that is used to process data and send it back to a web browser into HTML code (Firman et al., 2016).

d. MySQL

MySQL is a database that has function as a place to store data from a program. MySQL has a FOSS License Exception license and there is a paid or commercial version. MySQL has a tagline, "The World's most popular opensource database" thus making MySQL the most popular database version of the stack overflow. To perform operations on MySQL can use phpMyAdmin. PhpMyAdmin itself is an open-source-based tool or application. PhpMyAdmin uses the PHP language for programming so that in running phpMyAdmin it takes a browser and an Apache server.

Material and Methods

The method of developing an integrated school learning information system in this study uses Waterfall (Pressman, 2010). The stages in the waterfall model method are as follows:

a. Communication

Communication is the initial stage of communicating with stakeholders. This initial step is important because it involves collecting data and information about user needs. The results of the communication have the purpose of gathering requirements such as what applications will be used, and what features will be made to serve as project initialization materials. Communication stages of additional data collection in the form of journals, articles, and e-books related to the integrated school learning information system.

b. Planning

Planning analyzes the needs of the system to be made, what obstacles may occur, and the resources needed, as well as planning an integrated school learning information system work schedule.

c. Modeling

Modeling translates the requirements for designing an integrated school learning information system before coding is made. This process focuses on the design of data structures, software architecture, interface representation, and procedural details (algorithms). This stage will produce a document called software requirements based on the results of collecting data and information on user needs.

d. Construction

Construction is the process of creating code. Coding is the translation of a design into a language that can be recognized by a computer. Construction is a real stage in creating an integrated school learning information system, meaning that the use of computers will be maximized in this stage. After coding is complete, it will find errors in the system so that they can be corrected.

e. Deployment

Deployment implements an integrated school learning information system for users. After doing analysis, design, coding, and testing, the finished system will be used by the user.

Results and Discussion

Results and discussion stages explain the database design and implementation of an integrated school learning information system.

a. *Database Design*

Database design for an integrated school learning information system consists of a domain model, use case diagrams, CDM and DFD.

1. Domain model

The domain model is a representation of the relationship between objects (classes) in the integrated school learning information system. In the domain of the integrated school learning information system model, there are several objects, namely users (teacher, student, foundation), score reports, class, and subjects (task, exam, material).

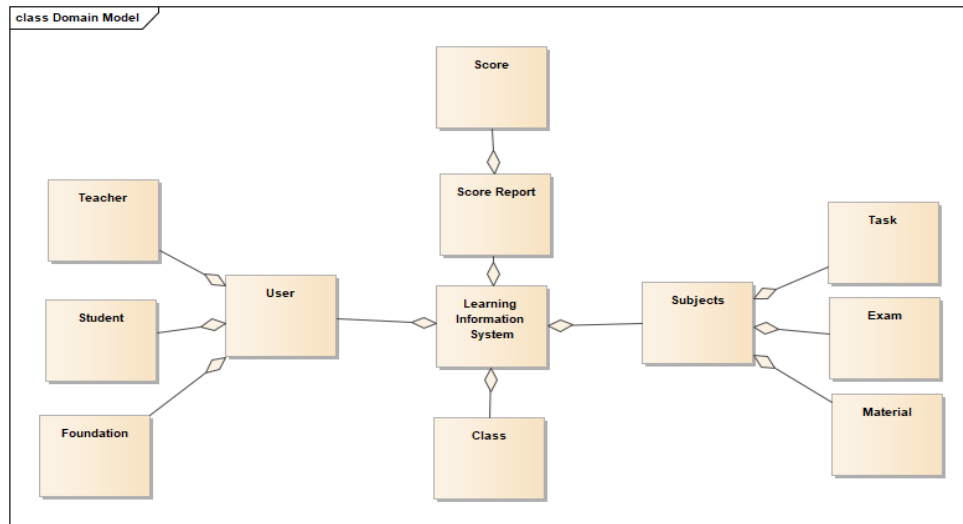


Figure 1. Domain model of integrated school learning information system

2. Use case diagram

Use case diagram is a representation of the actors involved and what activities can be done on the integrated school learning information system. In the use case diagram of the integrated school learning information system, there are several actors, namely admin, teacher, student, and foundation.

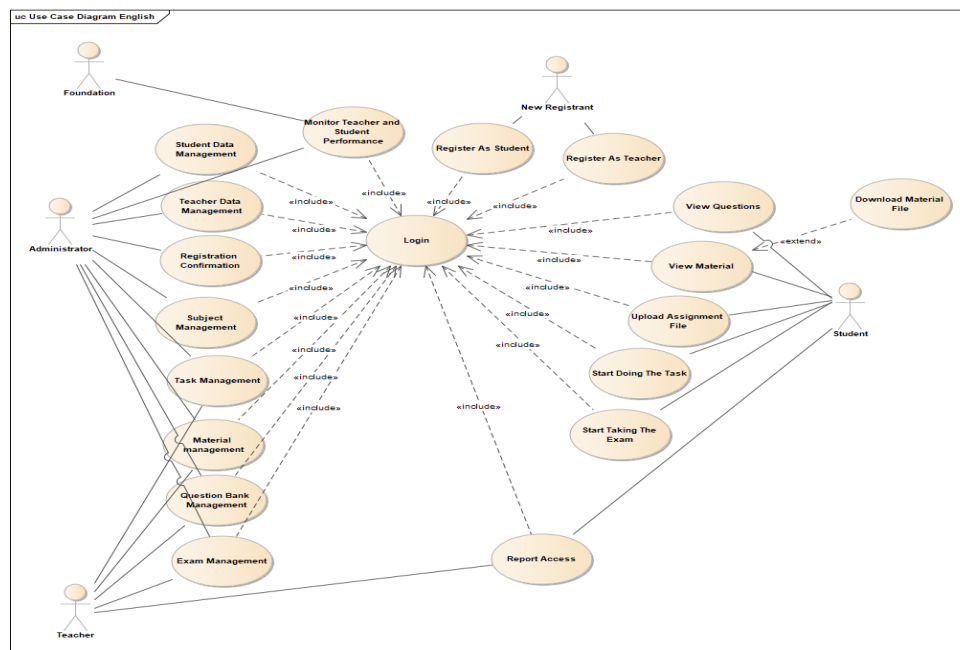


Figure 2. Use case diagram of integrated school learning information system

3. CDM

CDM is a representation of objects that are not implemented directly into the integrated school learning information system database.

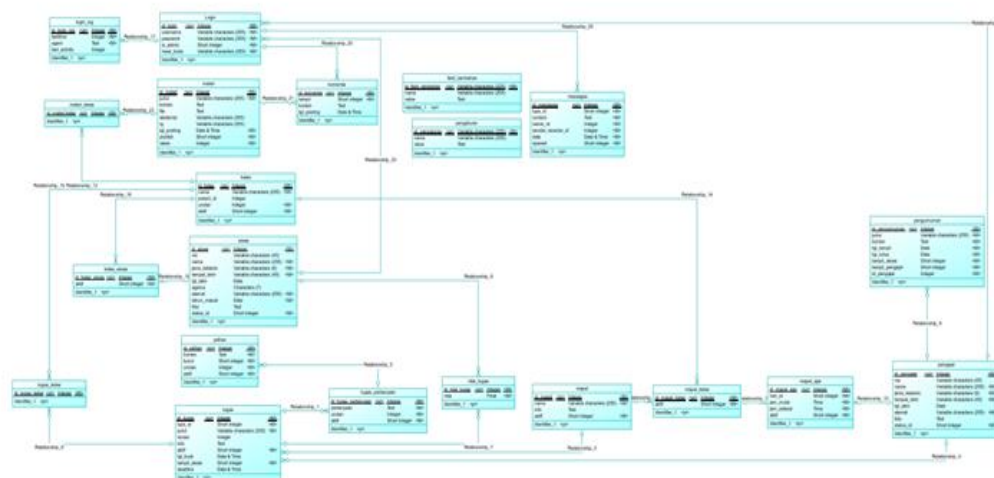


Figure 3. CDM of Integrated School Learning Information System

4. PDM

PDM is a detailed representation of the database on the integrated school learning information system.

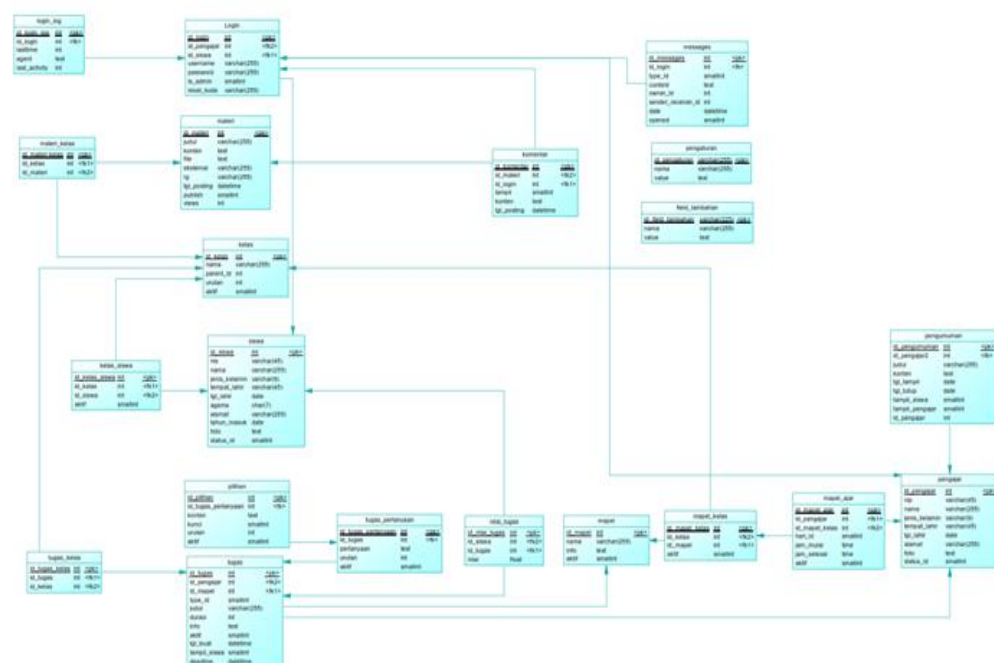


Figure 4. PDM of integrated school learning information system

b. System implementation

System implementation describes the interface to the integrated school learning information system which consists of registers, logins, e-modules, e-daily tasks, question banks, and e-tests.

1. Register page

The Register page functions for students and teachers to register on the integrated school learning information system by filling out the form provided.

Figure 5. Register Page of Integrated School Learning Information System

2. Login page

Login page serves to login to the integrated school learning information system. To log in, users of the integrated school learning information system are asked to enter their username (email) and password.

Figure 6. Login Page of Integrated School Learning Information System

3. Materials page

The materials page serves to upload materials to the integrated school learning information system. Uploaded material will be grouped by class and subject.

The screenshot shows the 'Theory' page of the system. On the left is a purple sidebar with navigation options: Home, Announcement, Message, Student, Teacher, Task, Study Material, Material Comment, Question Bank, Exam, Student Subjects, Class Management, Subject management, Settings, Clear Data, and Logout. The main content area has a search bar and an 'Add material' button. Below is a table of materials:

No	Material Information	Detail	Edit	Delete
1	BAHASA INGGRIS Konsep / File / Bahasa Inggris / KELAS X / Publisher: ADMIN, 31 Juli 2022 20:41 / Diunduh 2 kali / 0 Komentar	Detail	Edit	Delete
2	TES Terbit / File / Bahasa Indonesia / KELAS X / Publisher: ADMIN, 14 September 2022 19:30 / Diunduh 4 kali / 1 Komentar	Detail	Edit	Delete
3	MATERI Terbit / File / Bahasa Indonesia / KELAS X / Publisher: ADMIN, 11 Agustus 2022 18:32 / Diunduh 2 kali / 0 Komentar	Detail	Edit	Delete

3 dari 3 total data

Figure 7. Materials page of integrated school learning information system

4. Daily task page

The daily task page is used to upload assignments to the integrated school learning information system. Uploaded assignments will be grouped by class and subject.

The screenshot shows the 'Task' page of the system. On the left is a purple sidebar with navigation options: Home, Announcement, Message, Student, Teacher, Task, Study Material, Material Comment, Question Bank, Exam, Student Subjects, Class Management, Subject management, Settings, Clear Data, and Logout. The main content area has a search bar and an 'Add Task' button. Below is a table of tasks:

No	Task Information	Task Type	Close	Edit	Delete	Correct
1	COBAAUTO Geografi, KELAS XII - A Publisher: ADMIN, 18 September 2022 20:27	Upload	Close	Edit	Delete	Correct
2	COBAHAN Matematika, KELAS XII - A Publisher: ADMIN, 18 September 2022 20:25	Upload	Publish	Edit	Delete	Correct
3	COBA UPLOAD DOMAIN Bahasa Indonesia, KELAS X - A Publisher: ADMIN, 18 September 2022 19:28	Upload	Publish	Edit	Delete	Correct
4	COBA UPLOAD Bahasa Indonesia, KELAS X - A Publisher: ADMIN2, 17 September 2022 12:16	Upload	Publish	Edit	Delete	Correct

4 or 4 Total Data

Figure 8. Daily task page of integrated school learning information system

5. Question bank page

Question bank page serves to collect questions in the integrated school learning information system. The collection will be grouped into 3 categories, namely difficult, medium, and easy.

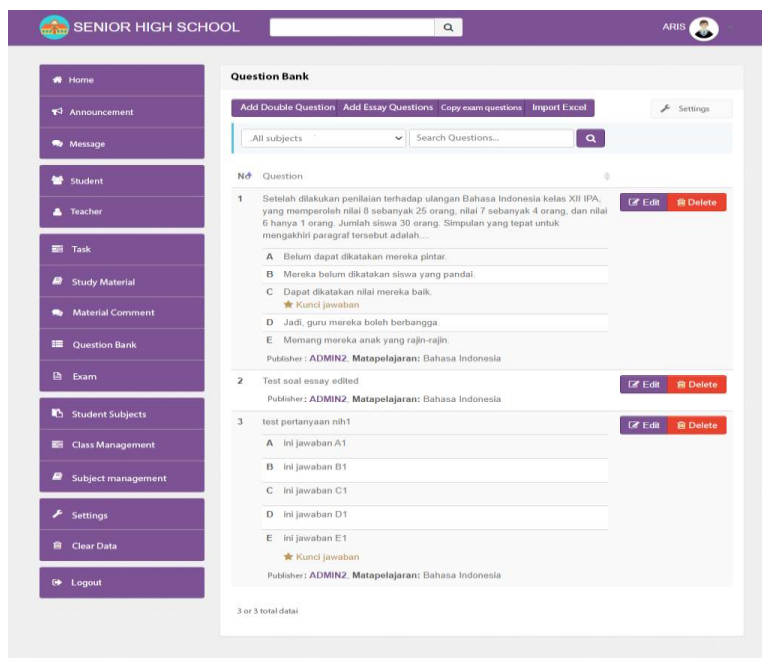


Figure 9. Question bank page of integrated school learning information system

6. Exam (test) page

The exam (test) page serves to upload exams to the integrated school learning information system. Uploaded exams will be grouped by class and subject.

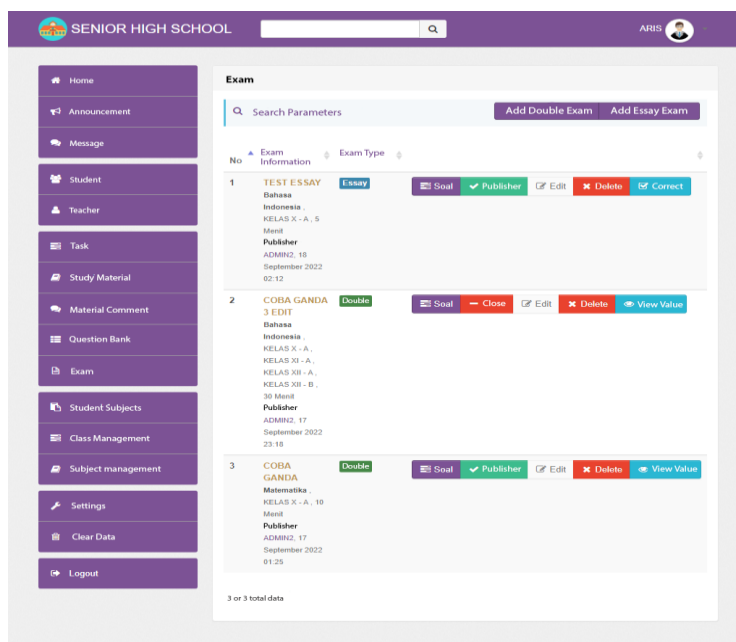


Figure 10. Exam (test) page of integrated school learning information system

Conclusion

Based on the results and discussion above, the conclusions in this study are as follows:

1. Design of an integrated school learning information system using the CodeIgniter framework can improve the quality of learning, support administrative processes in schools, and assist in evaluating and improving the abilities and knowledge of each student.
2. The design of the school's academic information system uses the PHP programming language and MySQL as the database. The design of the school learning information system model uses the Unified Modeling Language (UML).
3. The design of an integrated school learning information system can support the learning process by covering various features, namely e-modules, e-daily tasks, question banks, e-tests, e-reports, and e-monitoring.

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