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Academic Information System on The Prince Jayakarta Junior High School Student Assessment System

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Abstract

Information technology has supported the development of quality school services throughout the world. However, there are still many schools that have not used it optimally, especially in Indonesia, for example at Prince Jayakarta Bekasi Middle School. As in general, schools only use Ms. Word and Ms. applications . Excel. This resulted in different assessment formats and errors when filling in grades into the report card format. The academic information system application developed in this study uses the PHP, HTML, and MySQL programming languages and is named SIAP, which means eighteen academic information systems. The purpose of making this application is so that students / parents of students can receive school assessment information in a precise, fast and accurate manner. Teachers can also use the facility to process student scores so that they are well integrated and summarized as data for the Principal to make policies. This application can be opened on any browser platform, making it easier for users to access it anywhere and anytime.

Keywords: Academic Information System; Student Assessment System; Information technology

1. Introduction

Information technology has supported the development of quality school services throughout the world. However, there are still many schools that have not used it optimally, especially in Indonesia, for example at Prince Jayakarta Bekasi Middle School. As in general, schools only use Ms.Word and Ms. applications. Excel. This resulted in different assessment formats and errors when filling in grades into the report card format.

The application is used for student assessment and has not been well integrated. As is well known, currently almost all schools use the 2013 curriculum or what is commonly called K-13 (Kementrian Pendidikan dan Kebudayaan, 2018). Many teachers still have difficulty giving assessments to filling in student report card formats. Errors often occur due to different assessment formats. The difference in the format of the assessment in the file between the homeroom teacher and the teacher makes it difficult for the homeroom teacher to transfer it to the report card format, thus extending the process of making the report cards for each student.

In addition, in making reports on the results of student scores it also takes quite a long time because it is necessary to rearrange the reports provided by each homeroom teacher. This resulted in the information needed by students in academic matters late (Ardiansyah et al., 2020). A lot of research discusses the development and utilization of academic information systems in processing grades for the junior high school (SMP) level up to university. Among them in a school environment at the same level as junior high school to senior high school (SMA) the existing research was carried out by Dian developing an academic information system that

could process student grades at MAN 4 schools using the waterfall method (Ardiansyah et al., 2020), then by Imelda create an academic information system in SMK schools (Pangaribuan & Subakti, 2019) and Solahudin who designed an information system at a junior high school level madrasah tsanawiyah (Solahudin, 2021) the design they did using the waterfall method. Other researchers who did it for the tertiary level (PT) included Fatoni who conducted research on architecture academic information systems at private universities using the EAP method (Fatoni & Antoni, 2021), Lubanranja who conducted research on the design of academic information systems intended for high schools (Lumbanraja, 2018), and Merliayana who researched academic information systems for Hindu religious institutes (Merliana & Putra, 2021). There is still little research on the development or use of web-based academic information systems at the junior high school level.

From previous studies, almost all are web-based. With a web-based academic information system, it can be accessed easily and can use various browsers on computers and smartphones and can also facilitate academic management (Solahudin, 2021). With the availability of an academic information system as a service support that provides academic services in processing grades that are satisfactory, reliable and well integrated (Fitriana & Bakri, 2019). This is because web-based is easier to learn and easier to develop further. On a web it is also necessary to use other languages in order to be able to create data processing flows, including using PHP, MySQL is a DMBS that can be used by multiusers and multithreads (Ardiansyah et al., 2020). According to a study, MySQL occupies the second rank of various relational databases, this is because MySQL is easier to use and can be studied directly as well as a relational database system (Nuraeni, 2018) (Pratiwi et al., 2020).

2. Research Methods

In this study, the initial activity carried out was to obtain data and information regarding the process of processing student grades to achieve the formation of a student score report card through interviews and several ministerial regulations regarding the assessment system based on educational level. The method used in system development includes several stages as shown in Figure 1.

According to the Minister of Education and Culture Regulation No. 35 Years 20 18 (Kementrian Pendidikan dan Kebudayaan, 2018), student assessment consists of three aspects, namely:

1. Attitude Aspect (social and spiritual) : Assessment of attitude aspects is carried out through observation orobservations whose reporting is the responsibility of the homeroom teacher or class teacher.
2. Knowledge Aspect : Assessment of knowledge aspects is carried out through written tests, oral tests, andassignments according to the competencies of the subjects being assessed.
3. Skill Aspect : Assessment of skills aspects is carried out through practices, products, projects, portfolios, andother techniques in accordance with the competencies of the subjects being assessed.

Based on these three aspects, the knowledge and skill aspects have calculations used by Prince Jayakarta Middle School as in the following equation (1-8).

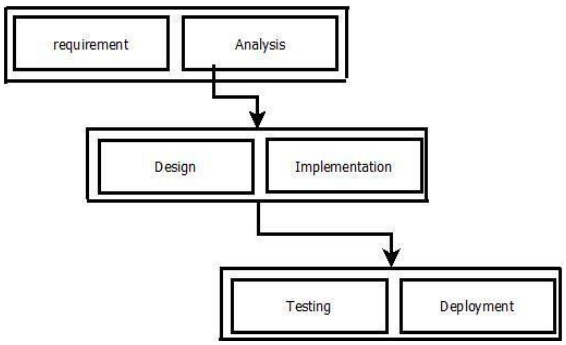


Figure 1. System development stages

$$X_{kompetensi} = Tulis+Observasi+Tugas \quad (1)$$
$$Nkompetensi = |Xkompetensi \geq (KKM)|6 \quad (2)$$
$$NH = \sum(Skompetensi)n\ n=1 \quad (3)$$
$$NilaiTotal=(NH * bobotNH)+ (N_{UTS} * bobotUTS)+ (N_{UAS} * bobotUAS) \quad (4)$$
$$X_{kompetensi} = Praktek+Proyek+Produk+Portofolio+Tertulis \quad (5)$$
$$Nkompetensi = |Xkompetensi| \quad (6)$$
$$Nkompetensi = |Xkompetensi| \quad (7)$$
$$N_{kompetensi} = |(KKM)| \quad (8)$$

In assessing the knowledge aspect, the order of calculating scores starts from equation 1, where each subject has a minimum of one competency, and a maximum of six competencies. Each competency has an average score of written test scores, observation scores, and assignment scores. Continue in equation 2, if the average competency score exceeds the minimum completeness criteria (KKM), then the competency score is taken from equation 1. If the average competency score is not greater than the KKM score, then you must take part in the remedy. And the competency score that will be calculated is the KKM score as in equation 7. The average value of each competency will be searched again and become the daily value as in equation 3. The total value of the knowledge

aspect combines daily scores with midterm exam scores and exam scores the end of the semester, where each value is multiplied by the weight of the value determined by each teaching teacher using equation 4.

For the assessment of the skill aspect, as in the knowledge aspect, it has the same number of competencies , consisting of practice value, project value, product value, portfolio value and written score which is formulated as equation 5. From the value of each competency, the average will be found and the value daily, and the total value for the skill aspect is calculated by equation 3 where the daily value for the skill aspect will be the total value.

The results of the assessment of the achievement of aspects of knowledge and skills are conveyed in the form of numbers and descriptions. Determination of KKM that must be achieved through a board of educators meeting. After all the assessment processes have been carried out, the scores for all subjects in the aspects of knowledge and skills are combined into a list of set values (DKN).

To simplify the process, changes were made to digitize all processes so that student values given by the teacher were accurate, on time when needed, and in a consistent format, so in this study an application was built called SIAP (Pangjay Information System). Ready applications can assist school principals, teachers, and students in providing information about academics that can be accessed easily, improve the quality of work of the institution's educational services, as a support for decision making, as a tool for solving problems, and assisting the operations of school organizations (Lumbanraja, 2018). In addition, the information obtained from the application is used as a reference by the principal in making policies.

Collect data and information directly from the research location by conducting interviews or direct interviews with the academic section, in this case the curriculum section (Haq & Nuryuliani, 2019). There are several conditions found and encountered in the process of collecting student scores:

1. It is difficult to make direct changes between the scores collected from the teaching teacher to the homeroomteacher so that it takes quite a long time to trace if there is an error in giving grades to student report cards.
2. There are frequent errors in inputting grades from the teacher to the homeroom teacher and also the use of manyformulas in Microsoft Excel, it will be difficult to transfer to the Microsoft Excel format that is owned by the teacher, so that it takes longer to process the grades to check whether they are appropriate.
3. The homeroom teacher's work increases in preparing report cards, because when the grades received from theteacher often change the numbers in one file, it is necessary to re-check when the report cards are printed.
4. Reports that are often shown to the principal cannot be given immediately and take quite a long time. Becauseeach homeroom teacher has a different file format, when it is made into a Microsoft Excel file that is given to the school principal, it is necessary to remove the formulas first in the excel file owned by the homeroom teacher, then copy and paste them back into another excel, it will take a lot of time and very accurate.

From the conditions that have been mentioned, several functional system and non-functional non-system requirements are obtained. The following is the required system functionality:

1. The system can be opened in various types of browsers and types operating system .
2. This system can input student, teacher/staff data, schedules, and student grades at Prince Jayakarta MiddleSchool.
3. This system can display student, teacher/staff data, schedules, and student grades at Prince Jayakarta MiddleSchool.
4. This system provides features for changing and deleting student, teacher/staff data, schedules, and studentgrades at Prince Jayakarta Middle School.
5. This system can display reports on the grades of Prince Jayakarta Middle School students.

The non-functional requirements of the developed system are:

1. Accessible without limit of users, within 24 hours (1 day)
2. Systems / applications are made with web responsive properties , so they can be opened not only via a computer/ PC, but can be opened via a mobile phone that has a browser
3. To maintain the security of existing data, different access rights are given at the user level (students, teachers/homeroom teachers, school principals).

3. Results and Discussion

At the design and implementation stage, determine which users can access this application in the form of images, as well as describe the processes that each user goes through. There are four users that have been determined, namely teachers/homeroom teachers, administrators, students and school principals. Process descriptions use the Unified Modeling Language (UML) , including use case diagrams, activity diagrams, and class diagrams. By using UML, users will better understand the workflow of the system and are also useful in

carrying out further development for application developers (Abdillah & Kurniawan, 2019).

From Figure 2, it can be seen that the parts described by use cases can be accessed by four actors or users. The student section is only limited to viewing student data, schedules, and viewing grades that have been input by the teacher. The teacher section can only see teacher data, schedules, and input student scores. The admin section can access everything in its entirety such as input, update or delete, but for student grades the admin can only view it, cannot input, change, or delete. The school principal is given access to only be able to see the entire contents of the information system created.

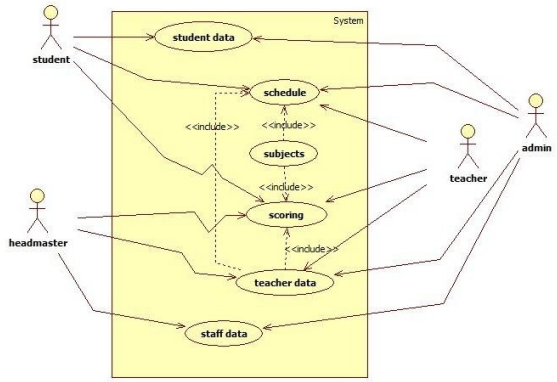


Figure 2. Usecase Diagram

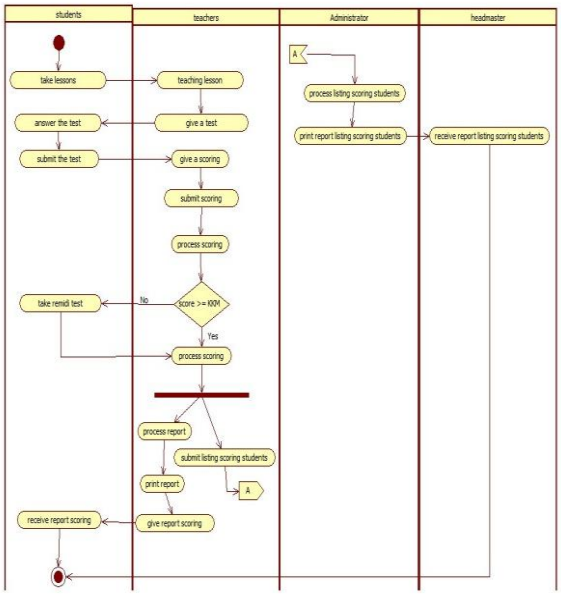


Figure 3. Activity Diagram

Figure 3 is an illustration of the process of acquiring grades until a report listing student grades is formed and becomes a reference for the operation of this information system, starting when students follow the lessons given by the teacher. The teacher will give a test, which will be answered by the students and will be given a value by the teacher. The teacher processes the scores of students who have taken the exam, so they can process report cards and submit a list of grades to the administration. From the administration section it will process it again and turn it into a report which will be submitted to the school principal for review regarding student grades.

The database that is formed has an overview like Figure 4. Each table is related to each other and has relationships. Each table has a primary key so that data redundancy does not occur, the primary key appears with random values, making it easier to collect data within the school. Each entity has cardinality rules, one of which is between the subject and teacher entities. Explanations on the subject and teacher entities will form a new entity, namely the schedule. Between the subject entity and the teacher entity there is a cardinality where one teacher can teach one subject, and many teachers teach in one subject.

Implementation in the hypertext preprocessor (PHP) programming language code which will process the data and send it back to the webbrowser which will become HTML code (Ardiansyah et al., 2020). So that HTML is also used as a language that enhances appearance by PHP in describing the appearance structure of a website. In implementing PHP, you need to install a webserver, so you can ensure websites made with PHP and MySQL can run on client and server computers using a browser (Pangaribuan & Subakti, 2019).

Furthermore, in the testing phase, a web can be accessed through online networks and local networks, and can be accessed widely, and there are also desktop applications that are usually only accessible with desktops, which are developed into web technology. Later the desktop application can be accessed with a web browser like the web in general. However, in accessing these desktop applications, a special web browser must provide the API used in the framework when building the application (Ramdan, 2020).

The SIAP application is tested using the black box testing method. Black box testing is carried out to determine the quality and weaknesses of the software being developed to be further evaluated for improvements according to the functional requirements of the system. In READY, all functions on the buttons or options provided can run to produce output according to the input given. Such as the login button function, the button function for storing student data, the button function when inputting student values, and other buttons provided in the application.

The SIAP deployment process goes through a hosting process, where the URL is certain and does not change, is not burdened with sufficient memory requirements to be accessed by many people, and can be accessed at various times regardless of time and number of users. After the deployment process, another test is carried out using black box testing, the test results from black box testing are in table 1.

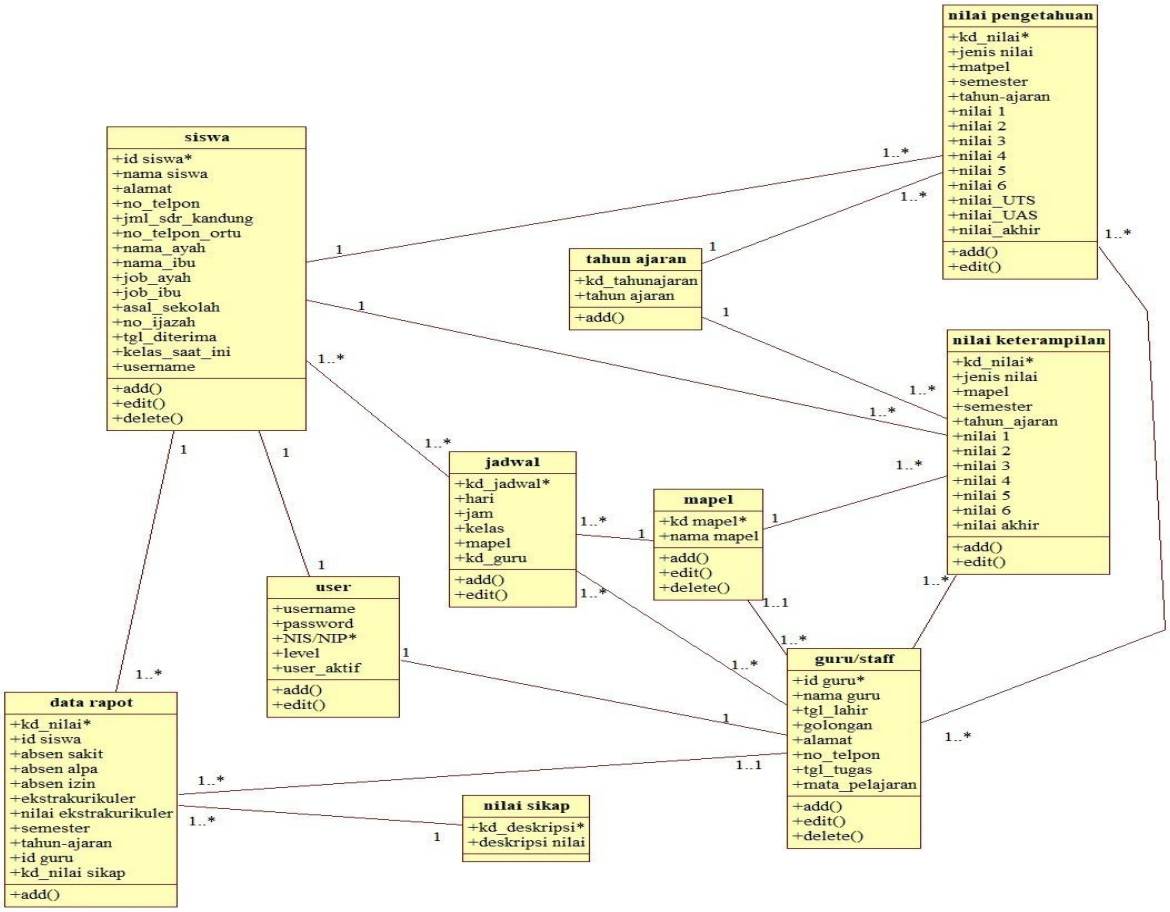
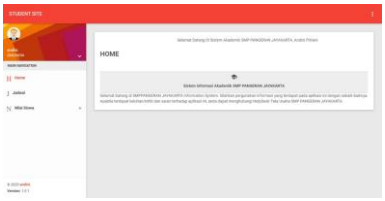
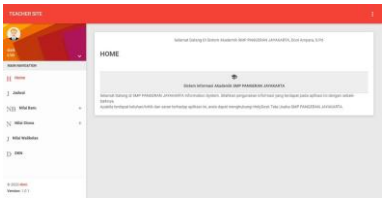
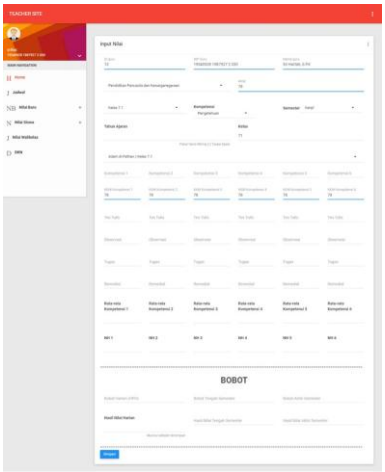
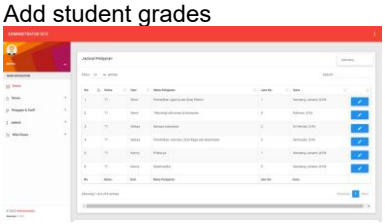
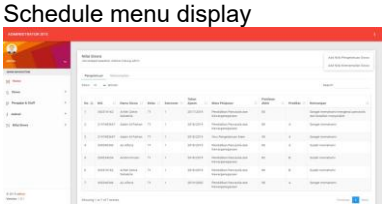
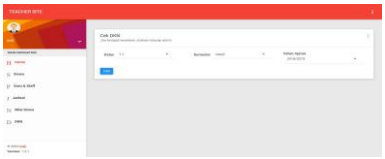


Figure 4. Class Diagram

Table 1. Blackbox testing result

Activity	Test Cases	output	Result	View
Acess the website that has been create and access the SIAP application section	Access the given do main and redirect open the login form	Display the first landing page and the login page	Valid	
User login according to the level given (administrator)	Type in the username and password that has been given according to the level	Displays the appearance of the login form, validates the username and password, and enters the main page according to the level.	Valid	

Activity	Test Cases	output	Result	View
User login according to the level given (student, teacher/)	Type in the username and password that has been given according to the level	Displays the appearance of the login form, validates the username and password, and enters the main page according to the level.	Valid	 Student View  Teacher view
Users as teacher/homeroom teachers can process (view, delete, add, update) the processing of student grades	Enter student grades	Access the value data, display the value form, and save the value that has been entered	Valid	 Add student grades
Users as admin can perform (view, delete, add, update) on schedule data	Updatting schedule data	Access the schedule data	Valid	 Schedule menu display
Users as admin can (View, update) student grade data	Updating student value data	Access and display student grade data	Valid	 The display of the student value menu on the admin
Users as school principals can view a list of student grades in the form of a report	Enter the year and semester value report	Displays a data list of the appropriate set of student scores	Valid	 

4. Conclusion

A good information system can be accessed flexibly and without limits, just like website users. Making it easier for users who have limitations both in terms of devices, networks or limited costs. From the academic information system that has been created, it is very important to use it in the school environment, because it makes it easier for all stakeholders in the school environment to communicate quickly and in an integrated manner. Until now, there are still not many junior high schools (SMP) that use webiste-based academic information systems, so that errors are still often found in processing grades and they also appear to be less tidy in managing school administration, and it becomes less integrated. In building this academic information system, several programming languages and applications are needed including visual studio code, PHP, MySQL, and others.

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