M-Absence: Analysis and Design using Unified Modelling Language (UML)

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Abstract. The development of cellular technology is very fast; this has led to technological advances in all fields where one of them is education. E-absent is an Android-based technology that serves to help student guardians report or notify student absence to the teacher and enter the necessary documents into the system. Then the teacher will send the subject matter and lesson assignments to students when students are absent, so students do not miss the lesson. This paper discusses system analysis and design using the Unified Modelling Language (UML), which makes it easier to describe the system as a whole. And the results of this study are an e-absence model that fits the needs of the school.

1. Introduction
Cellular technology that is supported by fast internet access is no longer an obstacle to the transmission of very large information. This technology has changed the way humans work individually such as buying, selling, watching, etc. It can all be done anytime and anywhere and only uses a smartphone [3]. Where Ericsson Mobility (NASDAQ: ERIC) reports [4] about the faster growth of cell phone usage which will reach 9.3 billion in 2019, and for smartphones ranges of more than 60 percent, which is around 5.6 billion. This technology improvement also affects the education sector, where Google's digital content services, namely Google Play Store, there are 8.29% of all active applications are educational applications [5].

The number of mobile applications in the field of education shows that these applications have benefits and can help in the learning process. In this paper, we learn about the problems of education especially in schools about reports of student absence. The mobile application that is created later will be called M-Absence.

School is one of the places where education is carried out, to regulate its implementation; it takes discipline to achieve its goals, which results in students who have achievements. If students cannot attend the learning process, students are required to follow the rule that students must make permission not to go to school through their parents and provide supporting documents for their absence. But the problem is that requests for permission for student absenteeism are often manipulated, such as forgery of doctor's letters, forgery of parental permission by falsifying parents' signatures, etc. And the result of the absence of students is that students have reasons not to do homework and do not understand the subject when they are not in class. Therefore, a secure and reliable licensing system is needed, and can also provide access to learning for students even if they are not present in the class.

M-Absence is an Android-based technology that serves to help parents report or notify students of absence from the teacher, and parents can directly enter the required documents. The teacher will send lesson assignments and subjects to students when students are absent so students do not miss the
lesson. To facilitate the creation of this application, the first thing to do is to analyze and design the system. In this paper, the tool used to design is the Unified Modeling Language (UML), which makes it easier to describe the system so that the attendance model is, formed that fits the needs of the school.

2. Literature Review

2.1 Absence

Absence is the collection of data about the existence of someone in an organization or institution. Usually, attendance is used to see a performance and as a consideration in one's judgment. While in the field of education, student attendance is used as a factor in the assessment of improving student learning.

The presence of students plays an important role for the process of teaching and learning activities and is one of the educational supporters who can support or motivate every activity carried out in it. The presence of students can also be used as a means of information in the field of discipline for parents of students, so they can find out the presence of their children at school and foster feelings of calm and trust in school [2].

At present, there are 2 systems of absence, namely a manual system where there is no data collection using only paper media. And computer systems, such as cellphone use, fingerprints, etc. Researchs on digital attendance systems can be seen in table1.

| Author          | Result                                                                 |
|-----------------|------------------------------------------------------------------------|
| [6], [7], [8], [9], [10] | the face is made as a presence, so cheating in absenteeism can be reduced |
| [11], [12], [1], [2], [13], [14], [15] | the use of fingerprints for attendance increases student attendance |
| [16],[17], [18], [19] | attendance with the web, usually used if the system works with long distances and flexible |
| [20], [21], [22] | the use of android technology for attendance, not only facilitates attendance but can combine all other attendance technology. |

2.2 Mobile Application

Mobile applications run on hardware called cellphones or smartphones, where these applications can be accessed anytime and anywhere. Now, every day everyone uses a mobile application that is only to communicate, surf the internet, manage files, play, etc. to process their business [23].

At present, mobile applications are the highest technology that is in great demand throughout the world, especially in large cities [24]. This technology is claimed to be one of the best mechanisms as a tool to help the daily activities of the community, especially for parents [25], when applied to the education sector it can bridge the gap between formal and non-formal learning. so students can get the special skills needed [26], or other problems in the world of education.

The mobile application created for learning is called mobile learning, which is a tool for interacting in cooperative learning [27], so that it can obtain feedback directly anywhere, anytime and under any conditions possible to learn [9]. Thus, a mobile application for education is one of the tools used to help all parties to improve student learning effectiveness so that they get the desired value.

2.3 Unified Modeling Language

Modeling language developed from the Booch method, the OOSE method, and the OMT method, which is used to model object-based technology, called Unified Modeling Language (UML) [28]. With UML, software models can be designed in graphic form so that models are easily visualized, illustrated, constructed and documented [29].

One of the functions of UML is to describe the behavior of the system or a series of changes that occur in a system. This consists of use case diagrams and activity diagrams. Use case diagrams are used to
describe interactions between actors while diagram activities describe the business processes of the system or menus in software.

There are several main characteristics in UML, such as the following [30]: 1) UML is an object oriented approach collected from Booch, OOSE, OMT ideas, which is the best method in computer science; 2) There are some ideas that need to be verified, so that UML is included in the development period; 3) In UML there is no concept for the process. UML is only a method modelling; 4) UML provides freedom in choosing a modeling technique that is tailored to the project at hand; 5) Even though UML does not have a concept for the process, the application must still have the architecture as the center.

3. Methodology
This paper uses a qualitative approach, with work steps can be seen in Figure 1.

The first step is to collect data about reporting permits from parents to teachers, where the methods used are literature review and interviews directly with teachers and parents of students. After the data is collected, the current system is obtained as shown in Figure 2. The analysis step is used to find out about system weaknesses. The system design step, the system will be designed using UML by improving the existing system then adding features that can improve student learning effectiveness.

4. Result and Discussion

4.1 Design M-Absence using UML
In designing M-Absence, the concept of the current model must be known so that the weaknesses of the model can be understood and can be improved. Figure 2 shows the model of permission requests from parents to teachers in general, where parents will ask permission from the teacher through communication tools, can use cellphones, social media or come directly to the school. Then the teacher will make a note about the student's permission and show the book is there. While companion documents, such as the doctor's permission, will only be seen by the teacher without being made into an archive. Documents must be given when asking for permission, but the fact is given by the parent when the student has re-entered. This allows documents to be lost. Meanwhile, the absence of students...
causes students to miss the lesson, this will have an impact on students' mastery of the lesson will decrease and cause the value of the lesson also decreases.

![Diagram of Conceptual Model of reporting permission from parents to teachers]

**Figure 2.** Conceptual Model of reporting permission from parents to teachers

With this explanation, reporting absent students still have problems in documenting permit documents and students do not get subjects and homework when they are absent. So that M-Absence is designed based on the problem using the use case diagram shown in Figure 3. Figure 3 shows the M-Absence use case diagram, which consists of 2 actors, namely parents and teachers. The initial process starts from the parent's "login" to identify the parent's identity, the "absent" process is related to the student's permission request, the "subject matter" process will provide the subject and homeworkers when the student is absent and finally the "Absence Report" process is the recapitulation of the student absence report with output in the form of absence reports and subjects that were not followed during absence. This report is reported once a month.

![Diagram of Use Case Diagram M-Absence]

**Figure 3.** Use Case Diagram M-Absence

4.2 Process and Function Flow
Illustration of the sequence of activities in M-absence, which consists of the activities of parents, systems, and teachers. Where the activity starts from parents who open the M-absence application then proceed with system and teacher activities as shown in Figure 4.
5. Conclusion
The development of cellular technology is very fast; this has led to technological advances in all fields where one of them is education. M-Absence design provides an overview of the M-absence application when implemented, namely, the way parents make requests for permission to the school or teacher quickly and reliably. Students can be more effective in learning even when they are not in a class because the subjects left behind can be obtained right away.

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