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Designing and Developing A Teaching Scheduling Information System and A Mobile-Based Processing System: A Case Study in SMK Negeri 1 Tulang Bawang Tengah

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ABSTRACT

The teaching scheduling system and value data processing used up to this point at SMK 1 Tulang Bawang Tengah are still not IT-based, which causes numerous errors, including schedules, changes to schedules that are inaccurate in real time, and the lengthy process of entering schedules, making it very difficult for staff. The schedule needs to be adequately organised, so we need an innovative method. The research that resulted in the development of this system was conducted using the waterfall methodology. The learning scheduling application and value data processing at SMK Negeri 1 Tulang Bawang Tengah were designed and developed utilising the waterfall technique, comprising four stages: analysis, design, coding, and testing. The results of black box testing applied to application testing show that the design matches expectations.

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INTRODUCTION

In this era of globalization, mastery of technology is one of the characteristics of the development of a country. If a country has a high level of technological capability, then it can be called a developed country, and a country that cannot adapt to technological developments is generally referred to as a grounded country (Dewi, et al, 2022). Information system technology that exists today can process information and produce the information we need easily, accurately, and efficiently in a timely manner, so that the expenses obtained become more efficient (Aminuddin, et al, 2022).

At this time, technological features such as smartphones are growing rapidly in people's lives. The various functions and attractiveness of smartphones that are currently available are not only used for the communication process, but are also required to support all activities in modern times like today. The development of smartphone devices itself has been widely supported by various operating systems, such as iOS, Windows Phone, Symbian, BlackBerry, Android, and other operating systems, but the most used OS device in the community is Android. Android is an operating system for Linux-based mobile devices that includes an operating system, middleware and applications. Android was developed jointly by Google, HTC,

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Intel, Motorola, Qualcomm, T-Mobile, NVIDIA who are members of the OHA (Open Hedset Alliance) with the aim of creating an open standard for mobile devices (Adi, et al, 2021). One of the advantages of Android compared to other smartphone operating systems is that Android is open source code so that one can customize features that do not yet exist in the Android operating system according to their wishes. The quality of information depends on three things, namely information must be accurate, timely, and relevant (Mardhiyah, 2019). To achieve these three criteria, a good management information system is needed.

Information systems contain parts called building blocks, which include input, model, and output parts. All these components are interrelated to form a unit to achieve the goal (Yulita et al, 2021). Handling student achievement is part of schooling and learning activities, plays an important role in education, and is a tool for measuring student achievement. Good processing and management make processing value data easier, faster and more accurate (Adi, 2020). A transcript is a table containing the value of a student's study skills and grades at school, and serves as an official teacher's certificate for parents who are obligated to accept it. The transcript itself is one of the commitments the school makes to the community to the intelligence of its students in the form of comprehensive assessment results (Jarti & Hutabri, 2019). CodeIgniter is a PHP framework based on the View Controller (MVC) model (Rusli, et al, 2021). Website is a collection of pages that are linked with other files that are linked to each other. The website has a page called the home page. The start page is the start page that appears when someone opens a web (Damayanti, 2014). The method used in the process of developing this information system is the System Development Life Cycle (SDLC), in developing the SDLC the author uses the waterfall method in designing information systems. There are several stages that describe the information system development activities contained in the waterfall method. The waterfall method is one form of system development that is widely used by software developers. In making the system carried out sequentially (Kusuma et al, 2016).

SMK Negeri 1 Tulang Bawang Tengah which is one of the educational places located in Tulang Bawang Barat Regency which has seven majors, namely Food Crops and Horticulture Agribusiness, Plantation Plant Agribusiness, Freshwater Agribusiness Agribusiness, Poultry Livestock Agribusiness, Light Vehicle Engineering, Computer Engineering and Network, and Motorcycle Business Engineering. The scheduling and value data management activities are currently being carried out by SMK Negeri 1 Tulang Bawang Tengah using the Microsoft Excel number processing application. So far, the Microsoft Excel application has been quite helpful in the process of preparing the schedule, but as the number of majors and subjects increases, there is a problem that often slows down the process of preparing teaching and learning schedules. One of the problems that arise is, there is often a buildup of teaching schedules which causes one teacher to be placed in two different classes at the same time.

This could have happened because there was no warning from the system in the event of a schedule buildup, because basically the Microsoft Excel application was intended to process numbers, not schedule processing. In addition, using the Microsoft Excel application is not effective in connecting the schedule with the grades given by each tutor. Therefore, it is necessary to develop a mobile-based information system design for teaching scheduling and value data processing at SMK Negeri 1 Tulang Bawang Tengah.

METHODS

The method used in this research is to use the development of the waterfall method. A waterfall approach is a continuous software development process in which progress flows down continuously (like a waterfall) through planning, modeling, implementation (build), and testing phases. Waterfall has several interrelated stages in its development process, namely requirements (requirements analysis), system design (system design), coding and testing, program implementation, maintenance (Samala, et al, 2020). The research method flow of waterfall development is shown in Figure 1.

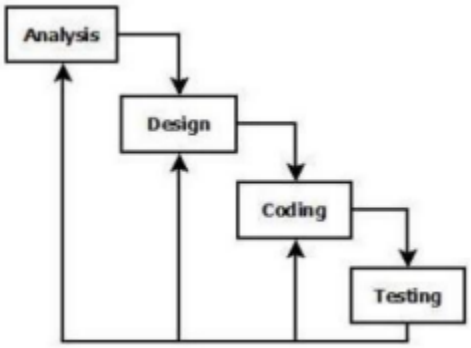

Figure 1. Waterfall method

RESULTS

System Analysis

To make it easier to identify the current system, the following is a mapping chart that the researcher made regarding the current schedule preparation system.

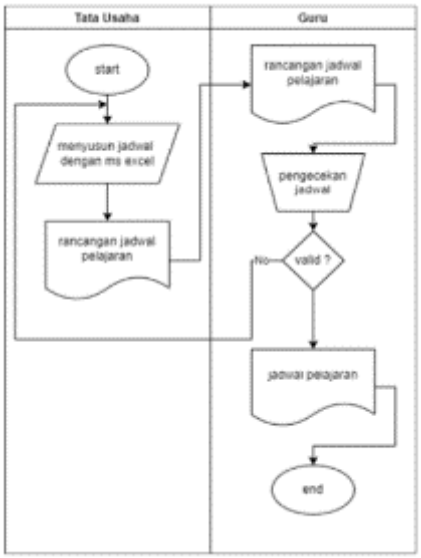

Figure 2. Mapping Chart Running System

Based on the picture above, it can be seen that the administrative section compiles a teaching and learning schedule for all classes in each department, then when it is finished, the schedule design is sent to each teacher to check the schedule, if no errors occur then the design The schedule can be used as a schedule for teaching and learning reference for 1 academic year, but if there are errors such as mistakes in plotting the teacher with subjects, or there is a buildup of teaching and learning schedules, the teacher reports to the administrative section for repairs.

In order to analyze the weaknesses that exist in the system running optimally, researchers use an analysis using the PIECES method (Performance, Information, Economy, Control, Efficiency and Service), using the PIECES method we can find out the weaknesses of the running system based on aspects such as performance aspects, information aspects , economic aspects, security aspects, efficiency aspects, and service aspects.

Design

After getting an overview or design of the system to be built, the next step is to load the system framework in the form of a design, either an image or a structure from the database that will be used. At this stage the researcher makes a system design using UML (Unified Modeling Language).

UML is a description of the process that can be carried out by the system in accordance with what is ordered by the user. The UML designs that the researchers made are use case diagrams, activity diagrams and class diagrams.

Use case diagram is the relationship between actors and activities that can be done in the system that is built. The use case diagram that the researcher made can be seen in Figure 3.

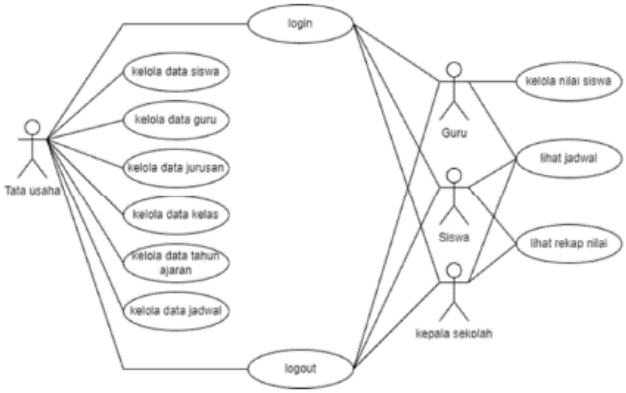

Figure 3. Usecase Diagram Design

The above use case design is made based on functional requirements that have been determined in the previous stage, where administrative actors can manage data for teachers, students, majors, classes, school years and lesson schedules. Meanwhile, teacher actors can only manage student grade data and view their own schedule, besides that student actors can only view schedule data and their own grades, and finally the principal actor can only view overall schedule data and student grade recaps.

Coding

In the design of the system to be built, at this stage the researcher carries out the process of translating the design form into a system that can be used properly using a programming language which is often called coding. The coding process that the researchers did uses the help of the sublime text 3 application as a text editor and the xampp application which functions as a webserver to run the application that was built. The MySQL Database System supports several features such as multithreaded, multi-user and SQL Database Management System (DBMS) (Permata, et al, 2018). MySQL database is MySQL is a database server program that is able to receive and send data very quickly, multi-user and uses standard SQL (Structured Query Language) commands and is used both as a client and server. Xampp is an application that can turn our computer into a server. Xampp's usefulness is to create your own local network in the sense that you can create websites offline for trial and error on your own computer. researchers built using the PHP programming language and the codeigniter framework.

Testing

This test is carried out using the BlackBox Testing method which focuses on the functionality of the system running as needed or not. This test was carried out by 4 different users, namely admins, teachers, students, and also the principal/waka of the curriculum.

Table 1. Admin Level System Testing

No	Pengujian	Masukan	Hasil
1.	Menguji halaman *login*	*Username* dan *password*	Halaman *login* berjalan sebagai mana mestinya
2.	Mengelola data mata pelajaran	Menambahkan, mengubah serta menghapus data mata pelajaran	Halaman kelola data mata pelajaran berjalan sebagai mana mestinya
3.	Mengelola data siswa	Menambahkan, mengubah serta menghapus data siswa	Halaman kelola data mata siswa berjalan sebagai mana mestinya
4.	Mengelola data guru	Menambahkan, mengubah serta menghapus data guru	Halaman kelola data guru pelajaran berjalan sebagai mana mestinya
5.	Mengelola data tahun ajaran	Menambahkan, mengubah,menghapus, mengaktifkan serta menonaktifkan data tahun ajran	Halaman kelola tahun ajaran berjalan sebagai mana mestinya
8.	Mengelola data jadwal	Menambahkan, mengubah serta menghapus data jadwal	Halaman kelola data jadwal berjalan sebagai mana mestinya
9.	Melihat data nilai	Melihat data nilai	Halaman melihat data nilai berjalan sebagai mana mestinya

Table 2. Teacher Level System Test

No	Pengujian	Masukan	Hasil
1.	Menguji halaman *login*	*Username* dan *password*	Halaman login berjalan sebagai mana mestinya
2.	Melihat data jadwal	Melihat data jadwal sesuai dengan guru yang dsedang *login*	Halaman melihat data jadwal berjalan sebagai mana mestinya
3.	Mengelola data nilai	Mengelola data nilai	Halaman mengelola data nilai berjalan sebagai mana mestinya

Table 3. Student Level System Test

No	Pengujian	Masukan	Hasil
1.	Menguji halaman *login*	*Username* dan *password*	Halaman *login* berjalan sebagai mana mestinya
2.	Melihat data jadwal	Melihat data jadwal sesuai dengan siswa yang dsedang *login*	Halaman melihat data jadwal berjalan sebagai mana mestinya
3.	Melihat data nilai	Melihat data nilai	Halaman melihat data nilai berjalan sebagai mana mestinya

Table 4. Testing the Principal Level System/Vice Curriculum

No	Pengujian	Masukan	Hasil
1.	Menguji halaman *login*	*Username* dan *password*	Halaman *login* berjalan sebagai mana mestinya
2.	Melihat data jadwal	Melihat data jadwal keseluruhan	Halaman melihat data jadwal berjalan sebagai mana mestinya
3.	Melihat data nilai	Melihat data nilai	Halaman melihat data nilai berjalan sebagai mana mestinya

DISCUSSION

The following are the results of the design of the teaching scheduling application system and value data

processing at SMK Negeri 1 Tulang Bawang Tengah until the final display.

1. Login Page Design

Figure 4. Login View

Before the user can see the information in the system, the user must login with the username and password that has been given by the admin. This serves to prevent people outside the school from seeing information that can only be consumed by the school, besides that the login page functions to determine the level of the user and which user is currently logged in because it will be closely related to the information displayed.

2. Admin Page View

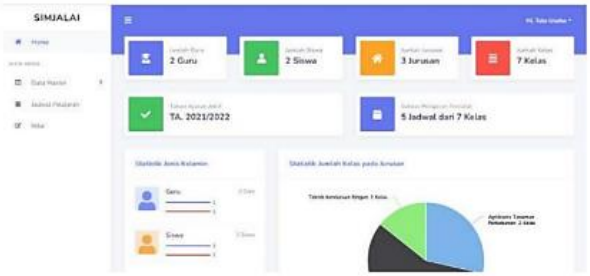

Figure 5. Administrative User Dashboard Page

The administrative user level dashboard display, in which there is some information displayed, such as the number of teachers, the number of students, the number of majors, the number of classes, the active school year and the number of schedules that have been entered. In addition, there are also 2 graphs, the first is a graph of the number of teachers and students by gender, and a graph of the number of classes based on the existing majors.

3. Teacher's Page View

Figure 6. Display of Teacher User Lesson Schedule Data

The picture above is a picture of the lesson schedule data that is at the teacher level user, in this section the user can see the lesson schedule data.

Figure 7. Display of Teacher User Value Data

The display of the value management menu at the teacher level, on this menu the teacher can manage the value data of each student in the subjects taught in the current semester.

4. *Student* Page View

Figure 8. Display of Lesson Schedule Data

Image of lesson schedule data that is at the student level user, in this section the user can see the lesson schedule data.

Figure 9. Display of Student User Recap Data

The picture above is an image of the recap of value data at the student level user, in this section the user can see the value recap data.

From the results of the schedule and value management system design at SMKN 1 Tulang Bawang Tengah and based on the results of the satisfaction questionnaire that has been given that the average value given is 19.47 from a maximum value of 25, it can be concluded that most users who have tried using feel satisfied and helped by the built schedule and value management system

CONCLUSION

Based on the findings and analysis of the design of a mobile-based information system on teaching scheduling and value data processing as described previously, it can be concluded that the design of a mobile-based information system design application on teaching scheduling and value data processing at SMK Negeri 1 Tulang Bawang Tengah is appropriate, helping the school staff enhance the ordering process and management of grade information. With this, it is envisaged that the application developed would be accessible at all times and from anywhere. The deployment of the schedule is anticipated to enable quick, accurate scheduling of instruction and value data processing with a minimum number of design flaws.

REFERENCES

Adi, N. H. (2020). Penerapan Sistem Informasi Layanan Posyandu Guna Mendukung Pelaporan Data Perkembangan Bayi Dan Balita. *JR: Jurnal Responsive Teknik Informatika*, *4*(02), 40-48.

Adi, N. H., Veza, O., Simatupang, W., Irfan, D., Muskhir, M., Riyanda, A. R., & Daphiza, D. (2021). Development of Android-Based Interactive Learning Media on Listening, Imitating, and Reciting Materials for PAUD Students. *Jurnal Pendidikan MIPA*, *22*(2), 279-291.

Aminuddin, F. H., Riyanda, A. R., & Djauhari, T. (2022). Sistem Pendukung Keputusan Penentuan Wali Kelas Berdasarkan Prestasi Guru Dengan Metode Analytical Hierarchy Process (AHP) Berbasis Web. *Jurnal Media Informatika Budidarma*, *6*(1), 728-737.

Damayanti, D. (2014). Sihapes (Sistem Informasi Hasil Penilaian Siswa) Bagi Sekolah Menengah Pertama Di Smp Negeri 7 Semarang. *Edu Komputika Journal*, *1*(2).

Dewi, I. P., Ambiyar, A., Riyanda, A. R., Fadilla, R., & Adi, N. H. (2022). Design and Build a Student Value Processing Information System (eRapor):(Case study: SMKN 1 Kecamatan Luak). *Sinkron: jurnal dan penelitian teknik informatika*, *7*(2), 439-446.

Jarti, N., & Hutabri, E. (2019). Implementasi Sistem Informasi Pengolahan Data Obat Pada Apotek Mega Utama Dengan Bahasa Pemrograman Java. *JR: Jurnal Responsive Teknik Informatika*, *3*(01), 71-80.

Kusuma, W. A., Noviasari, V., & Marthasari, G. I. (2016). Analisis Usability dalam User Experience pada sistem KRS online UMM menggunakan USE Questionnaire. *Jurnal Nasional Teknik Elektro dan Teknologi Informasi (JNTETI)*, *5*(4), 294-301.

Mardhiyah, A. G. (2019). Konsep Dasar Sistem Informasi Manajemen Dan Evaluasi Perkuliahan Dalam Sistem Informasi Manajemen.

Permata, D., Tasrif, E., & Dewi, I. P. (2018). Perancangan sistem informasi pemesanan wedding organizer di Kota Padang. *Voteteknika (Vocational Teknik Elektronika Dan Informatika)*, *6*(1).

Rusli, M., Djauhari, T., & Aminuddin, F. H. (2021). Sistem Informasi Pembelajaran Interaktif Mata Pelajaran Simulasi Digital Pada SMK Revany Indra Putra. *Jurnal Sistem Komputer dan Informatika (JSON)*, *3*(2), 134-140.

Samala, A. D., Fajri, B. R., Informatika, P. T., Teknik, F., Padang, U. N., & Padang, K. (2020). Rancang Bangun Aplikasi E-Sertifikat Berbasis Web Menggunakan Metode Pengembangan Waterfall. *vol*, *13*, 147-156

Yulita, W., Algifari, M. H., Rinaldi, D., & Praseptiawan, M. (2021). Analisis dan Rancangan User Experience Website OAIL Menggunakan Metode Task Centered System Design (TCSD). *J-SAKTI (Jurnal Sains Komputer dan Informatika)*, *5*(2), 879-886.