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## IMPLEMENTATION OF THE PIECES METHOD IN THE STUDENT ASSESSMENT SYSTEM OF SMPN 201 JAKARTA

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### ABSTRACT

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*The development of technology has developed very rapidly along with the many human needs. Web technology systems are one of the most frequently used applications in everyday human life. Assessment in the learning process is important, so that good value data processing will produce report cards as a good evaluation result, besides that the results of value data processing will be used as one of the benchmarks for the success of students taking education in school. This study aims to implement the PIECES method at the stage of developing a student assessment system at SMPN 201 Jakarta in the form of a web application. PIECES analysis consists of Performance, Information, Economy, Control, Efficiency and Service. The conclusion of the research is that the application of a multi-user student assessment data system application at SMPN 201 Jakarta can improve work services and time efficiency in terms of processing student grade data. The student assessment data processing system using analysis using the PIECES method in a multi-user manner aims to make a computerized system in schools able to integrate all recording activities that are carried out manually and require office stationery (ATK) to be minimized.*

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### KEYWORDS

System, Web, Data, Value, Analysis, PIECES



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## INTRODUCTION

Along with the many human needs. Web technology systems are becoming one of the most commonly used applications in everyday human life. By using a computer as a tool that is able to store and manage data quickly, precisely and accurately.

This makes the development of technology a major role and much needed (Haerani & Robiyanto, 2019). Technology and information are two of several things that cannot be separated in human life at least until now technology and information become one of the important factors to be a support in everyday life other than because it is considered as a necessity also because of the demands of the times that always prioritize about the speed and progress of information technology (Padeli, Mulyati, Faisal, & Debora, 2020).

Value is the achievement of learners' learning outcomes in a communicative manner in one semester. Commutative means the alignment of the average daily repeat value, midterm repeat, and end-of-semester repeat. At this time almost all educational institutions or institutions both public and private are careful in processing student value data, because of the importance of the values that will be issued to determine achievement for students and as a benchmark for the level of ability or intelligence of students in learning (Maria & Muawanah, 2018). Assessment in the learning process is important, so that good value data processing will produce raport values as a result of good evaluation as well, in addition, the results of processing value data will be used as one of the benchmarks for students' success in school (Sumbaryadi & Christo, 2019).

To get results from good value data processing one of them by utilizing existing and emerging technologies today or in other words make the student value data processing system computerized in this case web-based. In addition to the results obtained from the data process more accurately, using a web-based computerized system can also facilitate the performance of the teacher board that manages student value data in schools at SMP Negeri 201 located at Jl. Kayu Besar In No.2, RT.2 / RW.11, Cengkareng Timur, Cengkareng Subdistrict, West Jakarta City, DKI Jakarta. With this information system is expected to facilitate both subject teachers, classroom guardians and related parties in the preparation of student assessment documents effectively and efficiently. Then the reason web-based information systems are used in the processing of value data is also stated by Suryandani "the reason web-based information systems are used is the ease in how to access it, namely by accessing through a browser on a computer device or telephone device. Based on the analysis of the above problems, there needs to be an integrated value data processing system so that the processing of student value data can be done quickly, precisely, and accurately. So that the processing of data values and presentation of information can be done effectively and efficiently. In addition to the research to be conducted, the author gave a research title on "Implementation of Pieces Methods in Student Assessment System at SMPN 201 Jakarta".

The 1st (one) study entitled "Measurement of E-learning Quality at STMIK STIKOM Bali with PIECES Framework Method" resulted in research where, the measuring tool used is a likert scale with a positive statement that has a value of 1-5 with answers strongly agreed, agreed, neutral, disagreed, and strongly disagreed. With the conduct of e-learning quality measurement research will be known the quality value of elearning with the PIECES framework method based on respondents' answers (Ramayasa, 2016).

The 2nd (two) study entitled "Evaluation of Implementation of Hospital E-Prescribing Module With PIECES Method" concluded that As many as four attributes reached a maximum score (100%) meaning that it was in accordance with the needs of

the user, but as many as two attributes have an effectiveness score that is not optimal meaning there are still problems, namely on performance attributes (57.14%) and information (66.67%) (Arifin, Muhimmah, & Firdianingsih, 2017).

The 3rd (three) study entitled "Analysis in Measuring Service Quality Against Consumer Satisfaction Using THE PIECES Method" concludes that the analysis of the PIECES method provides an overview of the company in looking at the value of each employee in providing services based on performance indicators, indicator information, economic indicators, indicator control, efficiency indicators and indicator services (Asbar & Saptari, 2017).

## RESEARCH METHOD

This type of research is descriptive qualitative using a design model. In this case the author uses the codeigniter framework to make it easier to group program code. Codeigniter is an open source web application framework used to build web applications. The main purpose of developing codeigniter is to help developers in working on applications faster than writing all code from scratch and codeigniter is one of the fastest php frameworks currently available (Romadhon & Desmulyati, 2019).

XAMPP is an application that functions as a stand-alone server (localhost), which consists of several programs including: Apache HTTP Server, MySQL database and language translator written in PHP and Perl programming languages. The name XAMPP itself stands for X four operating systems, which include Apache, MySQL, PHP and Perl. This program is available under the GNU (General Public License), is an easy-to-use web server that can display dynamic web pages (Gao, Cheng, He, Susilo, & Li, 2018).

The technique for testing to be carried out is using black box testing. Focusing on testing the functional requirements of the software, to obtain a set of input conditions that match the functional requirements of a program. Black box testing is testing the fundamental aspects of the system without paying attention to the software's internal logical structure (Audrilia & Budiman, 2020).

## RESULT AND DISCUSSION

### A. Analysis and Design

#### 1. System Analysis

##### a. Problem Analysis

The student assessment system in SMPN 201 Jakarta has actually used a computer but has not been computerized, meaning that data relating to student scores in the form of report cards conducted by SMPN 201 Jakarta has been using a computer. However, to be able to record, edit and process existing data is still very difficult and requires a long time because the data is not well organized. For the data input process, the administrator enters the data into the fields that have been created in Microsoft Excel. However, to be able to edit and change the desired data, the administrator must search for the existing data one by one. This of course takes a long time, so the effectiveness and accuracy of the data is not guaranteed. The steps in the systems analysis stage are almost the same as the steps taken in defining the system project to be developed at the systems planning stage.

The difference lies in the scope of work. Therefore, at the system analysis stage, the first step that must be carried out by system analysis is first identify the problem (Xiao & Watson, 2019).

b. Identify the Cause of the Problem

This problem arises due to several factors, namely as follows:

1) In the overall student score data management section, it is still done manually.

2) In the assessment system section there is no program that supports the work process.

c. Troubleshooting Identification and Troubleshooting

Based on the analysis of the identification of the causes of the existing problems, it was found that the identification of the problem points at SMPN 201 Jakarta, namely supporting student assessment activities still using the Ms. Office (Ms. Word, Ms. Excel and Ms. Powerpoint) while the parties involved in the activities of the student assessment system are:

1) Academic/Administrative Section Assigned and responsible for processing all student data, lesson schedules, teacher data, homeroom data and student grades.

2) Teacher's Section, in charge of and responsible for inputting and editing student score data.

3) Homeroom Section, tasked and responsible for processing student grade data per class

d. System Requirements Analysis

A. Functional Needs

Based on the explanation above, we need a system that can solve the existing problems. The new system required should be able to handle the following.

1. The need for an adequate student assessment information system accelerates data processing and improves the quality of the information produced.

2. The effectiveness of data processing of student scores in several places requires fast transactions.

3. The computer network allows for fast communication between the principal, teachers and school staff.

4. The computer network system provides data protection. The guarantee of data security is provided through setting user access rights and passwords as well as hard disk management techniques so that data gets good protection and can be accessed by the owner.

5. With a computer network, each user can share one or more file systems (file sharing) so as to facilitate data exchange, time and cost efficiency.

B. Non-Functional Needs

1. Hardware

The existing hardware is in the form of a computer, to support the course of the student assessment system at SMPN 201 Jakarta which will be built. The

hardware used in building this system is as follows.

- a. 1 PC Core-i5 Gen 8
- b. Memory 4GB
- c. 500MB SSD
- d. Display Monitor
- e. Wireless Keyboard and Mouse

## 2. Software

The specifications of the software that will be used in building this system are as follows.

- a. Windows Pro 10-64 Bit
- b. Visual Studio Code
- c. XAMPP Software
- d. Chrome
- e. Running System Analysis

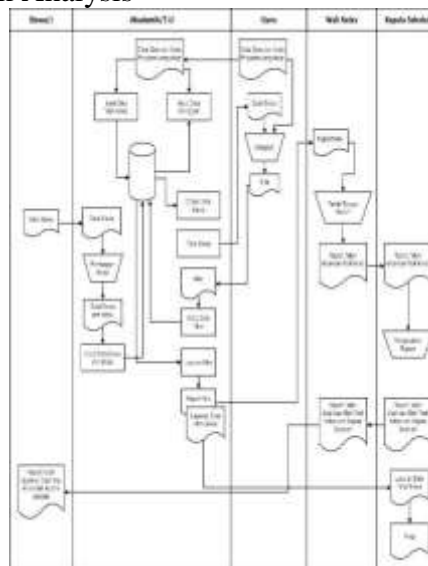


Figure 1. Running Flowmap

The results of the flowmap design can be seen in Figure 1 above, where the flowmap description of the existing system in the student assessment system at SMPN 201 Jakarta. The chart describes the sequence of procedures and shows what the system and users do.

## 2. PIECES analysis

### a. Performance

Performance or performance problems occur when the tasks performed by the system reach the target. Performance is measured by the amount of production and response time. Total production is the amount of work carried out during a certain period of time. Response time is the average delay between a transaction and the response given to that transaction. The Performance analysis is: On the system that is being used, it is only done manually so that the administrator will do the same job over and over again so that the administrator's performance

cannot be maximized (Mozafari, Curino, Jindal, & Madden, 2013). In the proposed system, a computerized system will be built and stored in an integrated storage database so that the assessment data system is not repeated. The system applied uses a web-based system that can help improve the performance of the student assessment data system.

b. Information

Information is an important commodity for end users. Because the information that will be generated can meet the wishes of users and can also overcome existing problems (Sieber & Johnson, 2015). This information can also be used by internal or external parties. The information analysis is: In the existing system, the information provided is about reporting data in the form of reports. In the proposed system, this assessment data system will facilitate the form of reporting student assessment data as needed.

c. Economy

Economy or economy is the most common motivation for an institution. The cornerstone for most managers is low cost. The Economic analysis is: The system to be built will have a good economic impact because the new system will reduce the costs previously incurred. One of them is the cost of using paper in the form of so many documents when you have to make reports.

d. Control

Control or the term more to control. That is, the tasks of an information system need to be monitored and corrected if substandard performance is found. Controls are used to improve system performance, prevent or detect abuse or system errors and ensure data security (Oakland, 2014). The control analysis is: In the system that is being used, control problems such as input of student scores are not only controlled by the admin but will be managed directly by the subject teacher, so that the input value has really gone through verification.

e. Efficiency

Efficiency or efficiency is related to how these resources are used with minimal waste. Therefore, the problem of efficiency requires an increase in output and yield. Because the existing system can be used properly and has also been able to produce output as expected. The efficiency analysis is as follows: The proposed system will make the student score data assessment data system efficient because it is supported by database storage media (Gómez, Huete, Hoyos, Perez, & Grigori, 2013).

f. Service

Service or better known as good service can reflect whether an institution is good or not, so that service must also be taken into account properly.

## **B. System Implementation and Testing**

### **1. System Implementation**

Implementation is the stage where we can see a picture of the analysis that we make into the real world, so that it will be known whether the implementation of the system created can actually produce the desired goals.

### **2. System Application Design Results**

The following are some of the results of the system design that has been made to meet user needs at SMPN 201 Jakarta in the process of student

assessment

data

systems.



Figure 2. Initial Login Page

In Figure 2 above is the initial page for the Administrator and User actor (Teachers and Students) when accessing the main page. This page consists of username and password fields that need to be inputted so that Admin and Users (Teachers and Students) can enter the main system page.

#### A. Administrator Access Page

The following are some of the results of the system design on the administrator access page as follows.

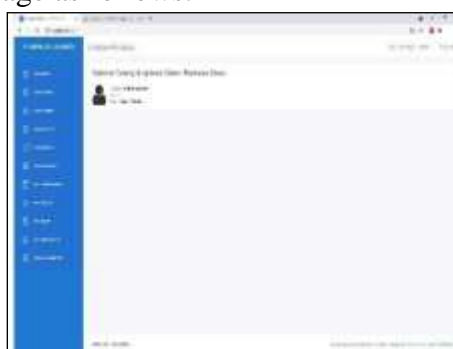


Figure 3. Main Page

In Figure 3 above is the main page (dashboard) which contains menus that can be accessed by Administrator users. This page Administrator can manage and process grades data, teacher data, student data, subject data, such as editing, deleting and saving data, as well as changing access username and password.



Figure 4. Teacher Data Menu



In Figure 4 above is the "Teacher Data" menu page, where this page the Administrator can input teacher data, delete, edit and update.

**B. User Access Page (Teacher)**

The following are some of the results of the system design on the user access page as a teacher as follows.



Figure 5. Teacher (User) page

In Figure 5 above is an access page on the teacher as user access where this page the teacher can input data on student scores and subjects.

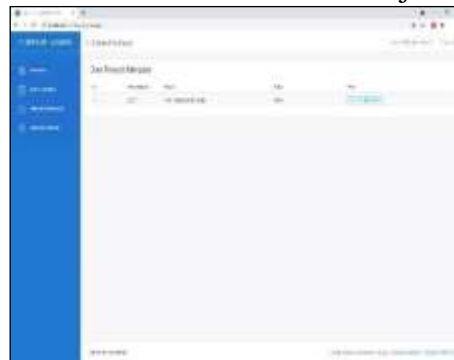


Figure 6. Teacher's Teaching History

In Figure 6 above is an access page for the teacher as user access where this page contains a menu of the teacher's teaching history while at SMPN 201 Jakarta.

**C. User Access Page (Students)**

The following is a display of the results of the system design on the user access page as a student below.

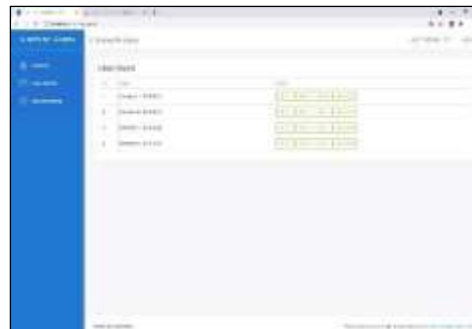


Figure 7. Student Menu (User)

In Figure 7 above is an access page for Students as user access where this page only has a Home menu, View Student Assessment Reports and Change Password for student accounts. The display above is one of the View Reports menu on the Student user access page.

D. Change Password Page

The following is one of the views on the Administrator, Teacher and Student access page menu. This page is a page where admins and users can change their username and password for login access.



Figure 8. Menu Settings

3. Black Box System Testing

Functional testing that is more commonly used is the Black Box Testing method whose role is to test software (applications) without knowing the internal structure of the code or program. In this test, the tester only knows what the program should do, but does not know how to do it. In black box testing, testing is carried out based on detailed information from the application, such as the appearance of the application, the functions that exist in the application, and the suitability of the function flow with the functions required by the user. Black box testing is more about testing the appearance (interface) of the application to make it easier for users to use. This test does not view and test the source code of the program. The following Black Box testing is described in the table below.

Table 1. Administrator Test

No	Skenario Pengujian	Hasil Yang Diharapkan	Hasil Pengujian	Keterangan
1	Login Sistem Administrator	Username dan Password Sesuai	Tampil halaman utama Admin sistem	Berhasil
2	Gagal Login	Username dan Password Tidak Sesuai	Tampil Peringatan "Harap isi bidang ini"	Berhasil
3	Tampilan Halaman Utama Administrator	Menampilkan fitur-fitur menu halaman Administrator	Tampilan menu di sisi kiri	Berhasil
4	Fitur Menu Halaman Administrator	Dapat melakukan edit, hapus, tambah dan simpan data nilai siswa dan guru	Data telah di-update	Berhasil
5	Halaman Ubah Password	Menampilkan halaman ubah alias username dan password Administrator	username dan password telah di-update	Berhasil
6	Logout Halaman Administrator	Akan logout dan kembali ke halaman login awal sistem	Tampilan halaman login sistem	Berhasil

Table 2. Testing for Users

No	Pengujian	Hasil Yang Diharapkan	Hasil Pengujian	Keterangan
1	<i>Login Sistem User</i>	<i>Username dan Password Sesuai</i>	Tampil halaman utama <i>user</i>	Berhasil
2	<i>Gagal Login</i>	<i>Username dan Password Tidak Sesuai</i>	Tampil Peringatan "Harap isi bidang ini"	Berhasil
3	<i>Halaman Ubah Password</i>	Menampilkan halaman ubah akses <i>username dan password user</i>	<i>username dan password</i> telah di-update	Berhasil
4	<i>Logout Halaman User</i>	Akun <i>logout</i> dan kembali ke halaman <i>login</i> awal sistem	Tampilan halaman <i>login</i> sistem	Berhasil

## CONCLUSION

The following conclusions are based on the data obtained from the results of the research that has been carried out, namely that the application has been successfully built and is recommended for use in the student assessment system at SMPN 201 Jakarta. The application of a multi-user student assessment data system application at SMPN 201 Jakarta can improve work services and time efficiency in terms of processing student score data. The student assessment data processing system uses analysis using the PIECES (Performance, Information, Economy, Control, Efficiency and Service) method in a multi-user manner aimed at making computerization of school activities able to integrate all school activities.

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## Sara Yemima Br Ambarita

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