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E-Service Quality Application for Teacher Performance Assessment Using the ServQual Method

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Abstract
Teacher performance assessment is a crucial aspect of improving the quality of education. However, manual assessment processes are often inefficient and time-consuming. Therefore, this study develops an E-Service Quality application aimed at evaluating teacher performance more effectively using the SERVQUAL method. The SERVQUAL method is used to measure service quality based on five key dimensions: tangibles, reliability, responsiveness, assurance, and empathy. This application allows educational staff to assess teacher performance based on predefined indicators. The collected data is then analyzed to identify gaps between user expectations and the received service quality. The research results indicate that the implementation of the E-Service Quality application can enhance transparency and objectivity in teacher performance assessment. Additionally, this application provides faster and more accurate result, making it a valuable tool for decision-making in improving teaching quality.

Keywords: E-Service Quality; Teacher Performance Assessment; SERVQUAL Method; Service Quality; Education Evaluation
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SDGs: Quality Education (4); Peace, Justice and Strong Institutions (16); Industry, Innovation and Infrastructure (9)

1.0 INTRODUCTION

Human Resources (HR) are not just employees or workers. HR are individuals who are the main drivers of an organization, whether an institution, agency, or company. They are valuable assets that determine the achievement of goals and progress of the organization. Educators are individuals who play a role in the education process, educators are the main actors in educating, teaching, guiding, directing, training, assessing, and distributing students, both in formal and non-formal education units.

The role and responsibilities of educators are stated in various laws and regulations, such as Law Number 14 of 2005 concerning Teachers and Education Personnel and Government Regulation Number 19 of 2016 concerning National Education Standards. To maximize the potential of Educators, effective management is needed. One of them is Performance Assessment, namely periodically broadcasting the performance of educators and the objectives needed to determine the extent of their contribution to achieving organizational goals. With good performance assessments, organizations can identify strengths and weaknesses so that appropriate development can be provided. SMK Dharma Loka merupakan salah satu Sekolah Menengah Kejuruan yang ada di Pekanbaru, berlokasi di jalan Soekarno – Hatta Gang Permata I / 99.

In SMK Dharma Loka, manual evaluation is still carried out by means of an evaluation period, there is an assessor who will assess the performance of the educator's energy by coming to the class to supervise the educator's energy one by one with a relatively short time span then after it is deemed sufficient the assessor will continue to the next class. This method is considered less effective in the evaluation process, because when the assessor comes to supervise in the classroom, it is likely that the teacher will improve the quality of his/her teaching and learning only when the assessor is supervising and when the assessor has finished assessing, the quality of the teacher's learning will decrease as if it was only good when there was an assessor. The results obtained from the assessment manual that does not have standards will produce inconsistent assessment results.

However, the evaluation process is considered more effective if carried out by students at the school because students experience and feel during the learning process with teachers for 1 semester.

Along with the development of information systems, information systems can be used to assist work in conducting performance assessment evaluations, one of which is a questionnaire-based information system. A questionnaire-based information system is a useful tool for collecting data and information from many people in a structured and systematic manner. The teacher assessment system is a systematic process to measure the performance and professionalism of a teacher in carrying it out. This assessment aims to provide feedback, identify areas that need improvement, and support the development of teacher professionalism. A good teacher assessment system is the key to improving the quality of education. With an effective assessment system, teachers can continue to develop themselves and provide the best for students.

The study aims to develop a questionnaire-based information system using the service quality method. The Service Quality method, better known as Servqual, is an instrument for measuring the quality of service in a service organization. The basic concept focuses on how customer expectations of a service compare to the reality they receive. In other words, Servqual measures the level of gap between customer expectations and experiences. (Hamidani et al., 2020).

The Service Quality (Servqual) method has several advantages, namely to measure customer satisfaction with service. The main advantage of Servqual is its ability to identify the difference between customer expectations and the reality of the service they receive. This allows companies or organizations to know which areas need to be improved to increase customer satisfaction. This method not only measures overall satisfaction, but also assesses important attributes such as friendliness, speed of service, and ease of transactions.

The research (Sagala et al., 2024) discusses efforts or strategies to improve teacher performance using the Library study method, where the factors that influence improving the quality of education are innovative teaching methods, the use of sophisticated educational technology, a curriculum that is relevant and in accordance with the needs of the modern era, and fair and transparent educational assessment. Research (Widiyanto, 2022) examines teacher assessments that are still carried out manually without an information system, so there is a possibility of a lot of data accumulation and data loss, with the existence of a new information system. Research (Sitanggang et al., 2022), (Ramadhan & Ramos, 2022), and (Macpal et al., 2023) examines that the existence of a teacher assessment system can help schools make decisions quickly and accurately in order to maintain teacher performance.

2.0 LITERATURE REVIEW

Teacher Performance Assessment

Teacher performance assessment is an evaluation process that aims to assess the extent to which a teacher has carried out his duties and responsibilities in the learning process. Performance assessment is carried out to obtain the best human resources and reduce performance achievements below standard (Indrawan & Oktarina, 2022). Through this assessment, the strengths and weaknesses of a teacher can be identified, so that appropriate support can be given to improve their performance.

According to (Muslimin, 2020), Teacher performance assessment is an evaluation process that aims to assess a teacher's ability to carry out his duties as a teacher. Through the assessment, it can be identified whether the teacher has met the established competency standards. Teacher performance assessment usually includes an assessment of several aspects, such as:

1. Pedagogical knowledge
   The teacher's understanding of learning theory, learning strategies, and curriculum.
2. Teaching skills
   The teacher's ability to deliver subject matter, manage the class, and interact with students.
3. Professional attitude
   The teacher's commitment to his profession, work ethic, and ability to work together with colleagues.
4. Student learning outcomes
   The achievement of students taught by the teacher.

The main purpose of teacher performance assessment is to ensure optimal quality of education. Through this evaluation process, it is expected to identify whether a teacher has met the established competency standards. Thus, teacher performance assessment functions as a mechanism to improve teacher professionalism, maintain the quality of learning, and ensure that every student receives a quality education. In addition, competency tests also play an important role in strengthening teacher accountability to their profession and in supporting the development of a curriculum that is relevant to student needs and developments in the era.

ServQual Method

The ServQual method is a measurement model that refers to five dimensions of service, namely tangibles (physical evidence such as facilities and equipment), responsiveness (responsiveness in serving customers), reliability (reliability in providing promised services), assurance (assurance of competence and trust), and empathy (ability to understand and care about customers) (Wibowo & Muflihah, 2022). One of the strengths of this method is its ability to measure the level of gap between customer expectations and the reality they experience. That way, we can take the right steps to reduce the gap (Saryoko et al., 2019). Steps in the SERVQUAL method:

1. Identify Dimensions
   There are five main dimensions in SERVQUAL, namely:
   a. Tangibles (Physical Evidence): Physical aspects related to the company, such as facilities, equipment, and appearance.
   b. Reliability (Reliability): The ability to provide promised services accurately and reliably.
   c. Responsiveness (Responsiveness): Willingness and speed in providing services.
   d. Assurance (Guarantee): Knowledge, ability, politeness, and trustworthiness.
   e. Empathy (Empathy): Attention given to individuals and the ability to understand needs.
2. Create a Questionnaire
   a. Compile Questions: Create questions that measure both expectations and perceptions of each selected dimension.
   b. Use a Likert Scale: The Likert Scale is a scale commonly used to measure the level of agreement or disagreement. Example: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree.
3. Distribute the Questionnaire
   a. Select a sample: Select a representative sample. It can be done through an online questionnaire, via email, or in person.
   b. Make sure the questionnaire is easy to fill out: Design a simple and easy-to-understand questionnaire.
4. Data Analysis
   a. Gap Calculation: Calculate the difference between the average customer expectation score and the average customer perception score for each dimension. A positive gap indicates that customer perception is better than expectations, while a negative gap indicates the opposite.
   b. Descriptive Analysis: Conduct a descriptive analysis to determine the distribution of scores on each dimension.
5. Interpretation of Results
   a. Identify dimensions with the largest gaps: Dimensions with the largest gaps indicate areas that need improvement.
   b. Prioritize areas for improvement: Determine which areas need the most improvement based on their level of importance.

3.0 METHODOLOGY

The first stage in this study is that the researcher conducts observations at school for some time during the assessment activities so that the researcher can find weaknesses in the manual assessment, then distributes questionnaires to the research objects, namely students at school to obtain research data. After it is considered sufficient to conduct observations, the researcher collects data through the questionnaire that was in the previous section, then the researcher processes the data which will then be tested by calculating manually using the Ms. Excel program in analyzing data and calculating to find the difference value based on each servqual dimension for each teacher. The researcher will design the system using the PHP programming language and implement the servqual method and test it. If successful, the researcher has succeeded in conducting the research. The method used in this study is the waterfall method. The waterfall method is one of the most classic and linear software development models. The waterfall method consists of several important stages, namely planning, analysis, design, coding, testing, and maintenance. The functions of these stages are as follows:

1. Planning stage
   The main objective at this stage is to thoroughly understand what is to be achieved with the software to be created. Researchers will collect all the information needed to create a design that suits user needs.
2. Analysis stage
   The main objective of this stage is to transform raw data into meaningful information. Thus, we can identify patterns and needs that will be the basis for system design.
3. Design stage

The main objective of this stage is to transform the results of the analysis into a concrete technical design. This design will be a blueprint for building a system that suits the needs that have been identified.

4. Implementation stage (coding)
   The main objective of this stage is to bring the system design to life into a program that can run. This process involves writing code using an appropriate programming language.
5. Testing stage
   The main objective of this stage is to find and fix errors that may exist in the program. Testing is done by running various scenarios to ensure all features work properly.
6. Maintenance stage
   The main purpose of this stage is to ensure the quality of the program by fixing all errors found during testing. The repair process will be repeated until the program reaches the desired level of perfection.

The ServQual method is a measurement model that refers to five service dimensions, namely tangibles (physical evidence such as facilities and equipment), responsiveness (responsiveness in serving customers), reliability (reliability in providing promised services), assurance (assurance of competence and trust), and empathy (ability to understand and care about customers) (Wibowo & Muflihah, 2022). One of the strengths of this method is its ability to measure the level of gap between customer expectations and the reality they experience. That way, we can take the right steps to reduce the gap (Saryoko et al., 2019).

ServQual analysis uses a Likert scale to quantitatively measure customer expectations and perceptions of five main quality dimensions, namely reliability, responsiveness, assurance, empathy, and physical evidence. By comparing expectation and perception scores, this model identifies gaps that indicate areas where service performance has not met customer expectations. The results of the SERVQUAL analysis can be used as a basis for formulating more effective service quality improvement strategies, so as to increase customer satisfaction and brand loyalty.

1. Calculation steps using servqual are:

$$\sum x = ((\sum STTx1) + (\sum TTx2) + \sum CTx3) + \sum Tx4) + \sum STx5) \quad (1)$$

Where:
∑x : total weight of answer to question i
∑STT : number of people who choose the answer very unfulfilled
∑TT : number of people who choose the answer not fulfilled
∑CT : number of people who choose the answer quite fulfilled
∑T : number of people who choose the answer fulfilled
∑ST : number of people who choose the answer very fulfilled
1,2,3,4,5 : score for the linkert scale

2. Calculate the average result of respondents' answers with the statement of hope using the following formula:

$$\bar{xi} = \frac{\sum X}{n} \quad (2)$$

Where:
$\bar{(xi)}$: average respondent's answer to the statement of hope to - i
∑X : total weight of answer to the question of hope attribute to –i
n : number of respondents

3. Calculating the actual results or perceptions of teacher performance using the same equation as point 1 to find the expected or expected results
4. Calculating the average results of respondents' answers to the statement of reality using the same equation as point 2 to find the results of the average expected results
5. Determining the quality results of a service attribute or the results of the servqual gap using the following equation:

$$SQi = \overline{Xi} - \overline{Yi} \quad (3)$$

Where:
SQi : value of the i-th attribute gap
$\bar{(Xi)}$: average value of the i-th attribute reality
$\bar{(Yi)}$: average value of the i-th expectation

The greater the gap or gap resulting from a servqual gap calculation, the lower the quality of the teacher's performance. Therefore, the priority of improving the quality of teacher performance is carried out from this gap. Conversely, the smaller the gap value, the better the quality of the teacher's performance.

SMK Dharma Loka Pekanbaru has 20 teachers who teach, the researcher will take an example of 1 teacher to evaluate the assessment using the servqual method. The initial stage of this research begins with determining the attributes of the questions that will be the reference in compiling the data collection instrument in the form

of a questionnaire. Identification of the attributes needed are the five dimensions of ServQual, namely Tangibles, Reliability, Responsiveness, Assurance, and Empathy. Examples of questions can be seen in the table 1.

Table 1. SERVQUAL Dimensions

Dimension	No.	List of Questions
Tangibles	1	School Facilities Are Used Effectively By Teachers To Improve Learning Quality.
Tangibles	2	Teachers Wear Neat, Clean Clothes and Behave Politely
Reliability	3	Teachers Are Present and On Time According to the Learning Schedule
Reliability	4	Teachers Fulfill Teaching Hours According to the Schedule Arranged by the School
Empathy	5	Teachers Pay Attention to and Help Students Who Do Not Understand During Learning Hours
Empathy	6	Teachers Are Always Open to Listening and Understanding the Difficulties Experienced by Students.
Assurance	7	Teachers Can Deliver Material Well and Can Be Understood by Students
Assurance	8	Teachers Give Students the Opportunity to Ask Questions During Learning Hours
Responsiveness	9	Teachers Can Manage Classes Well During Learning Hours
Responsiveness	10	Teachers Respond to Questions Asked by Students Appropriately and Can Be Understood

The next stage is processing the questionnaire data that has previously been filled in by the research object and calculating the average value of teacher performance perception in the learning process, which can be seen in the table below.

The calculation of the average value of teacher performance perception is carried out to measure the level of teacher performance in the learning process. The calculation is obtained by adding up each question attribute value and then dividing it by the number of respondents, where the respondents in this study were 100 students. Here is an example of a calculation to find the average score of teacher performance perception values:

Find the total weight of the answer to the question using the formula:

$$\sum x = \left((\sum STTx1) + (\sum TTx2) + \sum CTx3\right) + \sum Tx4) + \sum STx5) \quad (1)$$

Then the results obtained will be found the average value using the formula:

$$\bar{x} = \frac{\sum X}{n} \quad (2)$$

The next stage determines the quality results or results of the servqual gap by reducing the overall average value of the perception value and the average value of expectations using the following equation:

$$SQi = \bar{x} - \bar{y} \quad (3)$$

When the final results have been obtained, we will look at them based on the assessment categories, as follows:

Table 2 Assessment Category

Yield	Value	Gap
A	+10	Satisfactory
B	-10 to 10	quite satisfactory
C	- 10	Required training / teacher review

4.0 RESULTS AND DISCUSSION

Old System Flow

Analysis of the information system running at SMK Dharma Loka which starts from the supervisor going around supervising teacher performance while filling out the assessment form, after the assessment form is filled in, the data will be processed into an evaluation score that will be given to the teacher to be signed. After the evaluation score is signed by the teacher, the supervisor will summarize the evaluation results and make an evaluation report to the principal.

Figure 1. use case diagram

Figure 1 illustrates an old IS use case diagram. Starting from the supervisor actor filling out the assessment form, after the assessment form is filled in the data is processed into a value evaluation, then the supervisor will ask the teacher to sign the value evaluation and after being signed, the supervisor will make an evaluation report that will be given to the principal.

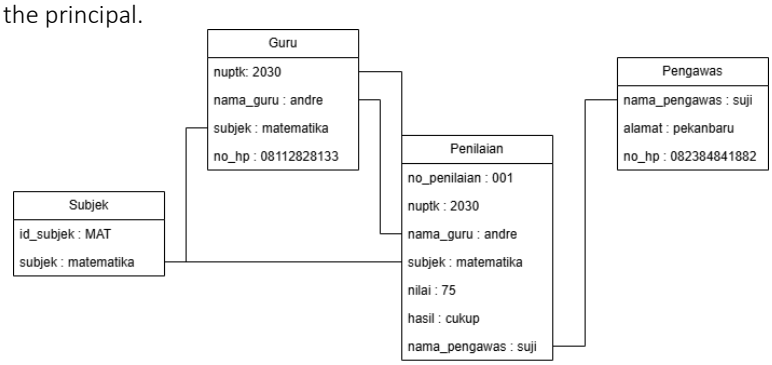

Figure 2. Object diagram

New System Flow

Figure 3. Object diagram

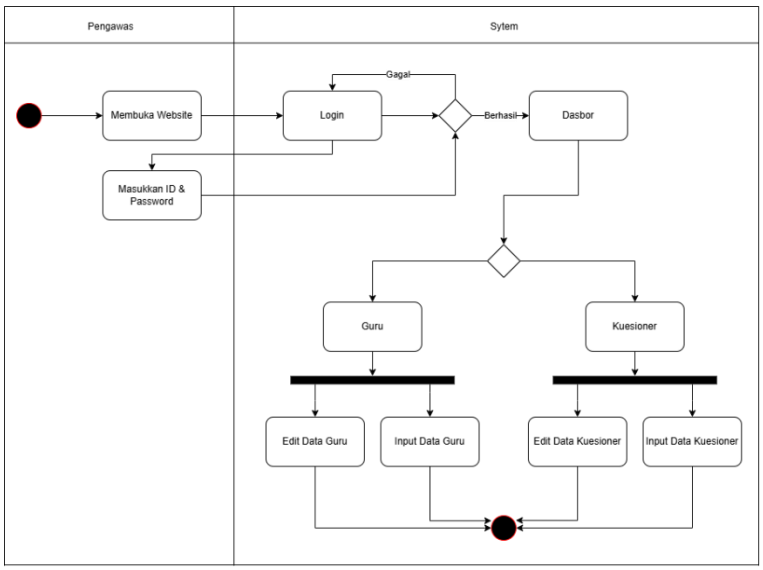

Figure 4. Supervisor's New Activity Diagram

The first activity begins by accessing the website, then logging in, if the password is wrong then return to the login page, if correct then the supervisor enters the main menu which contains the Teacher Menu and Questionnaire Menu. The supervisor can input and edit teacher and questionnaire data, the supervisor can log out marked with an end point with a small shaded circle symbol that is given a large red circle.

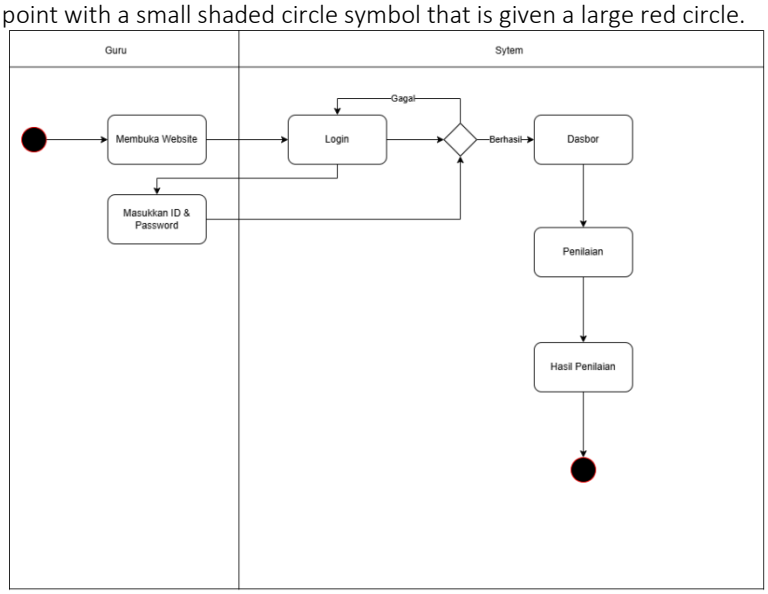

Figure 5. Teacher's New Activity Diagram

The first activity begins by accessing the website, then logging in, if the password is wrong then return to the login page, if correct then the teacher enters the main menu which contains the Assessment Menu. The teacher can see the assessment results obtained; the teacher can log out marked with an end point with a small shaded circle symbol that is given a large red circle.

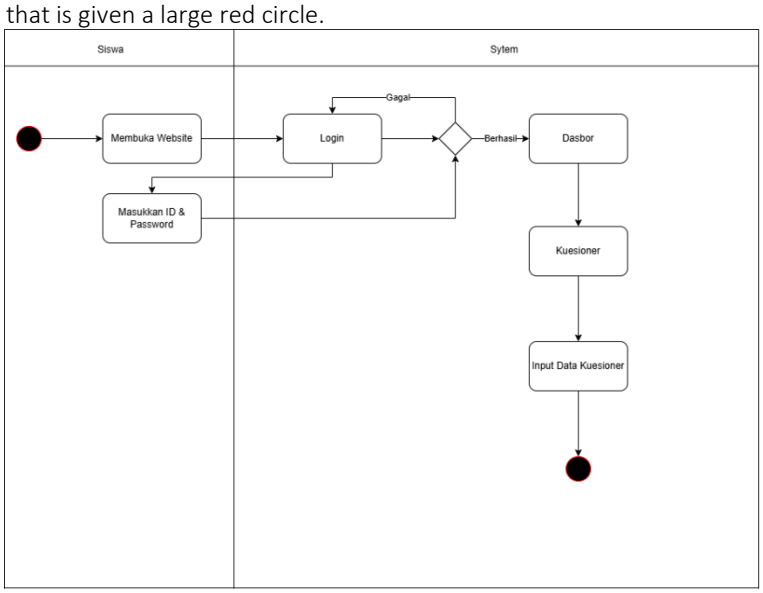

Figure 6. Student's New Activity Diagram

The first activity begins by accessing the website, then logging in, if the password is wrong then return to the login page, if correct then students enter the main menu which contains the Questionnaire Menu. Students can fill out the teacher assessment questionnaire, students can log out marked with an end point with a small shaded circle symbol that is given a large red circle.

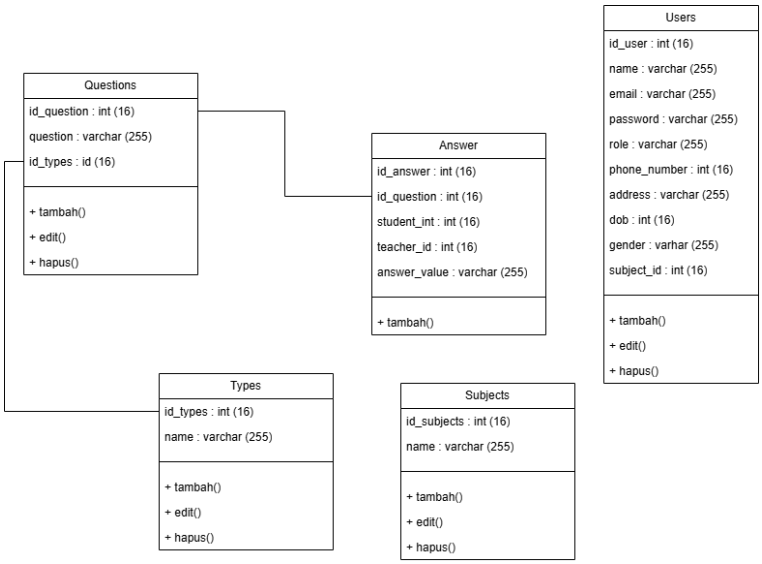

Figure 7. Class Diagram

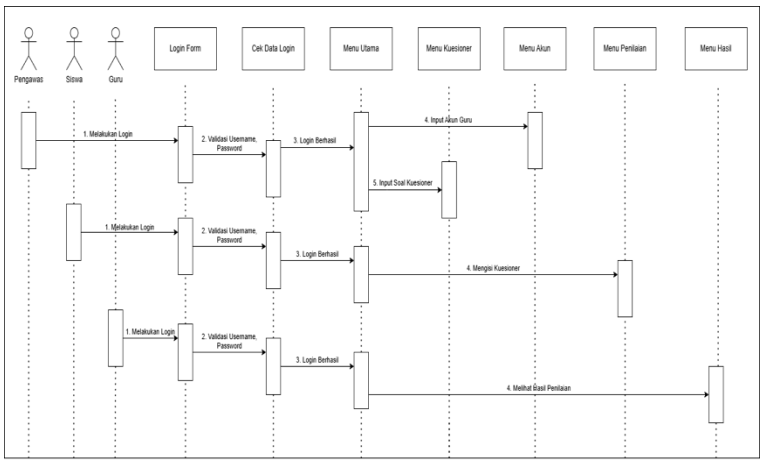

Figure 8. Sequence Diagram

Implementation Results Page

1. Login Page

   This login page is the first page that appears when the web is accessed.

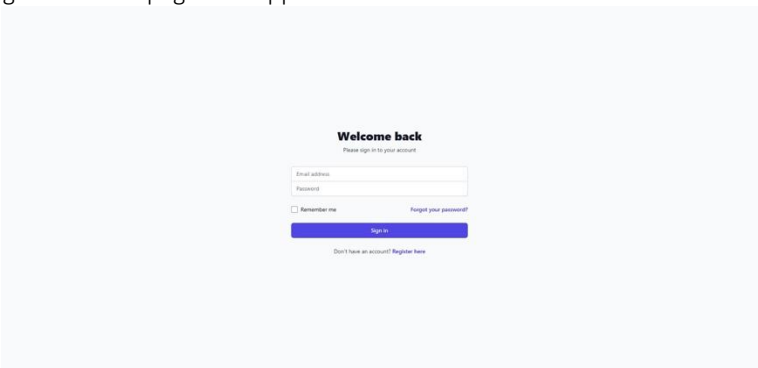

Figure 9. Login Page

2. Supervisor Page

   Admin Page is a page used by admin to input teacher, student and questionnaire data. Admin can also make changes and delete teacher, student and questionnaire data.

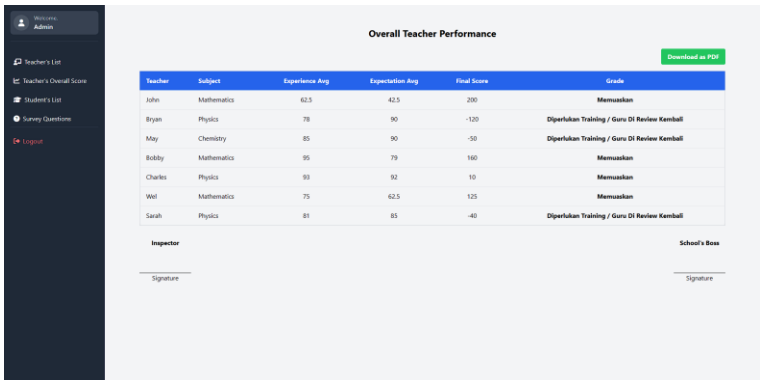

Figure 10. Supervisor Page

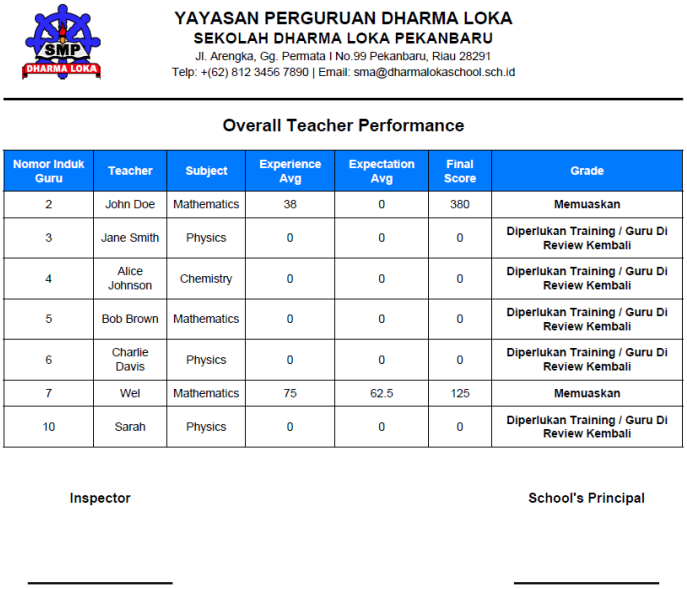

Figure 11. PDF Teacher Performance

3. Teacher Page

Teacher Page is a page that teachers use to view assessment results.

Figure 12. Teacher Page

4. Student Page

The Student Page is a page that students use to fill out questionnaire questions for teacher assessment.

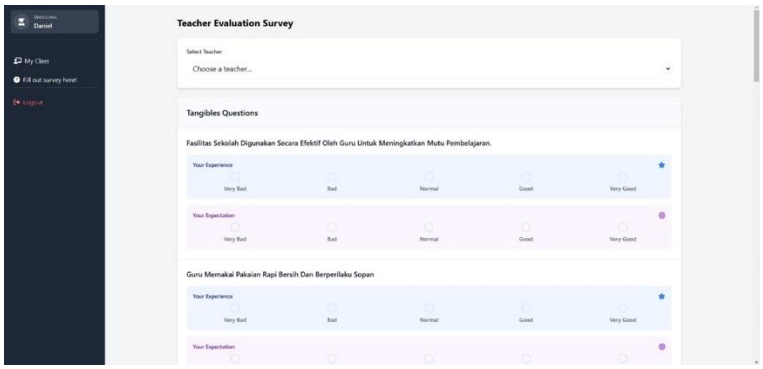

Figure 13. Student Page

5.0 CONCLUSION

Based on the research and discussion that has been done previously, the following conclusions were obtained:

1. The researcher succeeded in building a teacher assessment system at SMK Dharma Loka Pekanbaru.
2. This study uses the SERVQUAL (Service Quality) method to assess the quality of teaching provided by teachers, which includes dimensions such as tangibles, reliability, responsiveness, assurance, and empathy. The application of this method allows for a more objective assessment of teacher performance

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