

# Web-Based Student Grade Progress Monitoring Information System

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**Abstract.** In this study, the researchers found a way to help teachers input student grades and achievements. Currently, records are still kept in books, which can cause problems such as burning, deterioration over time, or damage caused by pests. The purpose of this study is to create a system that can be a solution to the above problems, which will also make it easier for teachers to monitor their students so that they can report to the students' guardians. The researcher hopes that this system can help in monitoring student development. Blackbox testing was conducted to show that all features functioned as expected. In addition, a user survey was conducted, which showed a satisfactory rating of 60%, particularly for the interface design. However, the system performance still needs improvement because errors occurred in several aspects and received a low satisfaction rating of less than 50%. There are still many shortcomings in this research that need to be addressed. Hopefully, future research can improve on these shortcomings, resulting in a useful project.

**Keywords:** Web-based, Teacher, Monitoring, Student, Information System

## 1 Introduction

Elementary school is a very basic level of education that lays the scientific foundations and helps children develop optimally. Compared to other levels, elementary school takes a long time to complete, which is 6 years. Elementary school is a formal educational unit that needs to be supported by an information system that can accelerate the work program process at school[1]. Basic education is defined as follows in Article 17 of the National Education System Law (Law Number 20 of 2001)[2]: Basic education is the level that precedes secondary education (junior high school/MTs). Elementary school (SD) serves as a stepping stone for students who wish to continue their education to a higher level. This must be taken into consideration as much as possible in the development of children during elementary school (SD). Educators and psychologists view this early age as an important period that must be handled as early as possible. Maria Montessori argues that the age of 3-6 years is a sensitive period for children[3].

There are several factors that influence the improvement of education quality, one of which is accreditation, which raises teaching standards by producing student achievements that schools can use as performance benchmarks. Therefore, it is important for schools to monitor student development[4]. Student academic activities are an important consideration that must be reviewed by various parties, especially parents or guardians. The relationships between students, with instructors or teaching staff, and with other educational tools are important indicators of the effectiveness of the learning experience[5]. Due to the growing use of information and communication technology, these interactions can now be paired to gain a better understanding of the learning process. Advances in information technology provide great opportunities to improve the efficiency of data management in various sectors, including the education sector[6]. The education sector has a considerable influence on school growth due to technological advances. Currently, almost all educational institutions, from elementary schools to universities, have websites that display their profiles. These websites utilize the now widely available internet to provide quick and effective access to information about schools of interest. In addition, websites also function as web-based data managers[7].

Monitoring is a step in the process of reviewing activities to ensure that they are carried out according to plan, identifying problems that arise so they can be resolved, evaluating work patterns and management to ensure that objectives are achieved, and understanding the relationship between activities and objectives to measure progress[8]. Monitoring serves as a reminder when mistakes occur and helps keep the work on track. Monitoring aims to improve the effectiveness and efficiency of an activity and is based on the objectives and plans that have been set for the activity. Monitoring allows us to determine whether our resources are adequate and well utilized,

and it serves as a useful basis for further evaluation[9] . Parents' busy schedules sometimes become an obstacle, resulting in them leaving everything entirely to the school. Therefore, given the various issues at hand, a monitoring system is needed that can facilitate both the school and parents in monitoring students at school, which will undoubtedly make it easier for parents to track their children's progress[10] . The monitoring process involves measurement and

The development of technology and information systems in today's digital age is very important in institutions and even companies, which cannot escape the use of digital media such as computers. Rapidly developing technology and the ability to spread information quickly make it possible to simplify all human tasks[11] . Realizing progress in education requires a tool to manage data such as curriculum, student, and grade data. This tool can be used to monitor student activities at school so that information can be conveyed immediately and the monitoring process can run effectively, thanks to communication between the school and parents[12] . In the world of education, the role of teachers and parents is influential in the process of student achievement. However, at present, parents rarely monitor their children's learning progress[13] .

Kartika II Junior High School in Bandar Lampung still uses Excel to input academic and non-academic data. The data is collected by an operator who acts as a data collector for curriculum meetings, but errors often occur, such as incorrect data entry when copying and pasting into the operator's score application[14] . Seeing this problem, the author hopes that implementing this monitoring system can help solve existing problems. For example, problems in entering grades can be solved by providing a grade input menu. The researcher hopes to assist the school in managing and presenting student grade and achievement reports in a better, more accurate, and structured manner[15] .

## 2 Method

This research is observational research conducted by collecting data deliberately and systematically on social phenomena and then recording the data. In relation to this research, the author conducted direct observations to determine and obtain data related to the research. Then, data processing will be carried out to obtain accurate data.

This research uses in-depth interview techniques. In this case, the interviewer must be able to establish a good relationship so that the informant is willing to cooperate, feels free to speak, and can provide accurate information. The interview technique used by the researcher is structured (written). This is intended to make the interview more focused on the intended purpose and avoid digressions.

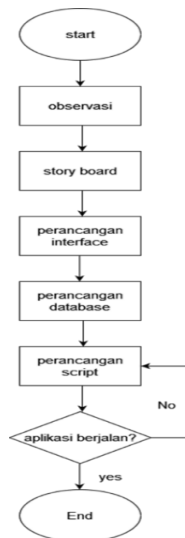


Figure 1. Research Flowchart

## 3 Results and Discussion

### 3.1 Analysis

The Web-Based Student Grade Monitoring Application was successfully designed, and the test results showed that the application could run well. The supporting tools to assist in the web development process included:

- a. Hardware
  1. PC with specifications: i3 12100f Tray, 16GB RAM, RX 580
- b. Software

1. Operating System  
Windows 10
2. Visual Studio Code  
VS Code (Visual Studio Code) is a lightweight and reliable text editor for editing any programming language. Developed by Microsoft for multiplatform operating systems, including Linux, Mac OS, and Windows. VS Code (Visual Studio Code) offers various features, including Git Integration, Debugging, Intellisense, and extensions that enhance the capabilities of the text editor.
3. MySQL  
MySQL is a relational database management system (RDBMS) similar to Oracle, PostgreSQL, and Microsoft SQL. It is quite easy to use for new learners. Because it is open-source, the application has many forums where users can seek help if they encounter problems. MySQL should not be confused with SQL (Structure Query Language), which is defined as a syntax of specific commands in a programming language used to process a database. Therefore, MySQL and SQL are different. MySQL is the software, and SQL is the command language.
4. PHP  
PHP (Hypertext Preprocessor) is a server-side language designed specifically for web applications. PHP is embedded within HTML code. Since it is server-side, PHP is executed on the server, so when it runs in the browser, the result is displayed as HTML. The PHP code itself is not visible. PHP can be integrated into a web server or function as a separate CGI program. The most notable feature of PHP is its database integration capability. Here are some advantages of PHP: PHP is supported on all operating systems (OS) and browsers, as well as various web servers such as Apache, Xitami, and others. It is easy to learn, as there are many references from various sources and forums discussing PHP. It is free and open source (open for modification and distribution).
5. CodeIgniter  
CodeIgniter was first developed by Rick Ellis with a burning flame logo in 2006. CodeIgniter is an open-source web application used to build dynamic web-based PHP applications. CodeIgniter follows the MVC code pattern, which includes a model for data retrieval (insert, delete, update data), a view in the form of HTML, and a controller that acts as a bridge between the model and the view.
6. XAMPP  
XAMPP is open-source software that works with various operating systems and programs. XAMPP is a program that combines several software packages into one environment. Users no longer need to install and configure the server manually. The Apache web server, programming language, and MySQL configuration are connected after installing XAMPP. XAMPP will install and configure them automatically.

### 3.2 Design

At this stage, researchers design the system using the waterfall model system development method. This stage of the application development process is very important because it establishes the framework for the final product. At this stage, parts related to the processes that will take place in the proposed system will be created, including Use Case Diagrams, Activity Diagrams, and Sequence Diagrams.

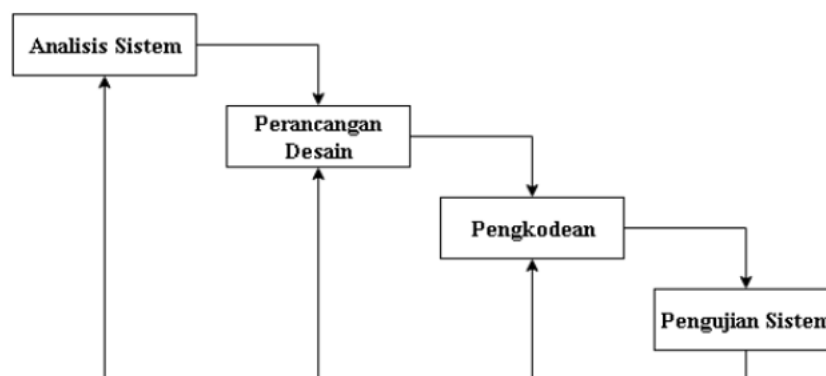


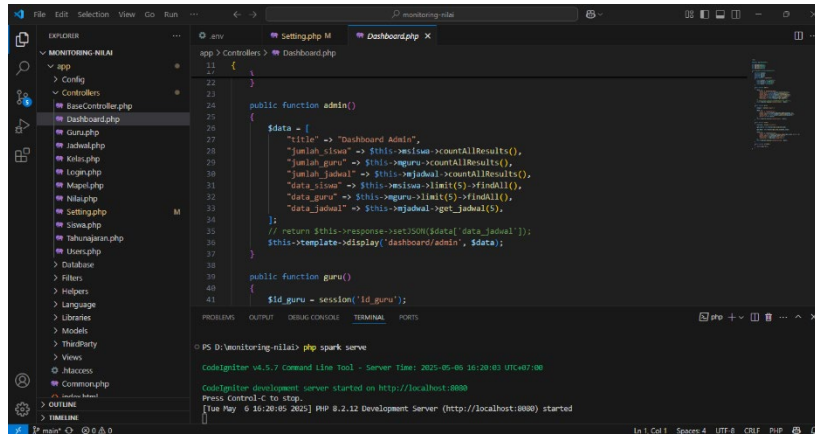
Figure 2. Waterfall Method

In this design stage, an overview of the processes and data flows that will be involved in the system to be developed will be provided. The designed processes aim to improve the performance of the system being developed, so that errors in the system can be minimized effectively.

### 3.3 Development

The development phase is a complex and time-consuming application development process, which includes coding, refinement if there are system failures, and development of several sectors. Researchers also test the system being built to identify system errors and algorithm writing. These errors will be corrected in this phase. The testing was conducted on the admin, two teachers, and one parent.

The following is part of the source code:

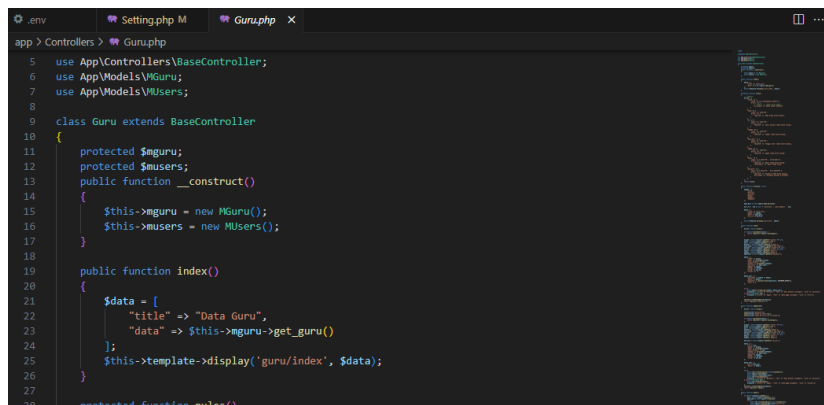


```
public function admin()
{
    $data = [
        "title" => "Dashboard Admin",
        "jumlah_siswa" => $this->siswa->countAllResults(),
        "jumlah_guru" => $this->guru->countAllResults(),
        "jumlah_jadwal" => $this->jadwal->countAllResults(),
        "data_siswa" => $this->siswa->limit(5)->findAll(),
        "data_guru" => $this->guru->limit(5)->findAll(),
        "data_jadwal" => $this->jadwal->get_jadwal(5),
    ];
    // return $this->response->setJSON($data["data_jadwal"]);
    $this->template->display('dashboard/admin', $data);
}

public function guru()
{
    $id_guru = session('id_guru');
}
```

Figure 3. Source Code for the dashboard menu

Figure 3 shows the application development process on the dashboard menu. The source code is used to organize and retrieve data to be displayed on the admin page.

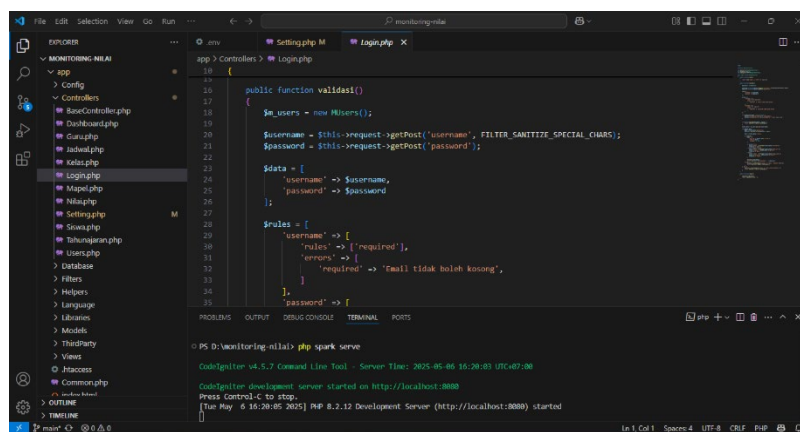


```
class Guru extends BaseController
{
    protected $guru;
    protected $users;
    public function __construct()
    {
        $this->guru = new MGuru();
        $this->users = new MUsers();
    }

    public function index()
    {
        $data = [
            "title" => "Data Guru",
            "data" => $this->guru->get_guru()
        ];
        $this->template->display('guru/index', $data);
    }
}
```

Figure 4. Teacher Source Code

Figure 4 shows the source code used to input teacher data, with the input results displayed on the teacher data menu.



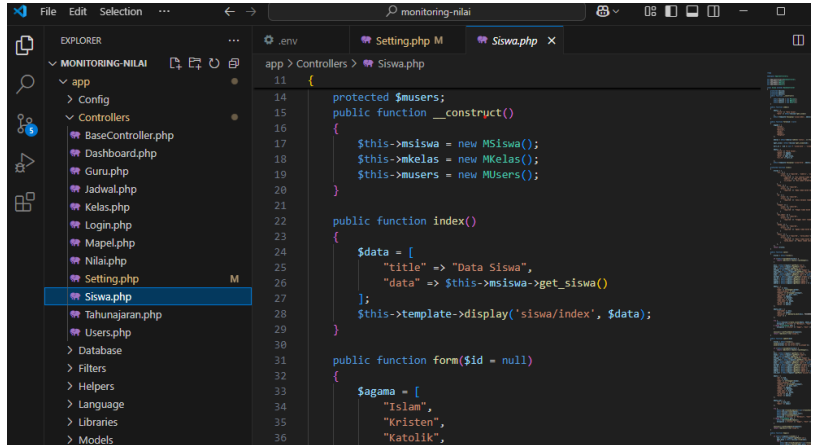
```
public function validasi()
{
    $u_users = new MUsers();
    $username = $this->request->getPost('username', FILTER_SANITIZE_SPECIAL_CHARS);
    $password = $this->request->getPost('password');

    $data = [
        'username' => $username,
        'password' => $password
    ];

    $rules = [
        'username' => [
            'rules' => ['required'],
            'errors' => [
                'required' => 'Email tidak boleh kosong',
            ]
        ],
        'password' => [
            'rules' => ['required'],
            'errors' => [
                'required' => 'Password tidak boleh kosong',
            ]
        ]
    ];
}
```

Figure 5. Login Source Code

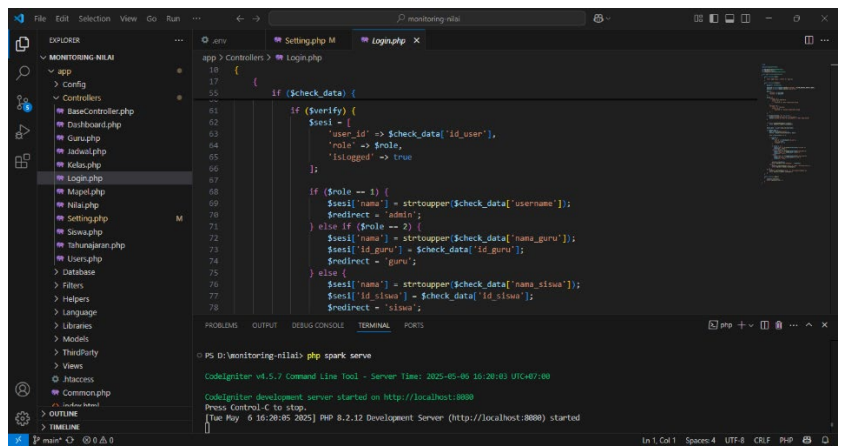
Figure 5 shows the login source code that allows users to log in to use the application, with the results of this source code shown in Figure 8.



```
protected $musers;  
public function __construct()  
{  
    $this->msiswa = new MSiswa();  
    $this->mkelas = new MKelas();  
    $this->musers = new MUsers();  
}  
  
public function index()  
{  
    $data = [  
        "title" => "Data Siswa",  
        "data" => $this->msiswa->get_siswa()  
    ];  
    $this->template->display('siswa/index', $data);  
}  
  
public function form($id = null)  
{  
    $agama = [  
        "Islam",  
        "Kristen",  
        "Katolik",  
    ]
```

Figure 6. Student Source Code

Figure 6 shows part of the program code in the siswa.php file, which is one of the controllers that handles the logic related to student data shown in Figure 10.



```
if ($check_data) {  
    if ($verify) {  
        $sesi = [  
            'user_id' => $check_data['id_user'],  
            'role' => $role,  
            'logged' => true  
        ];  
        if ($role == 1) {  
            $sesi['name'] = strtolower($check_data['username']);  
            $redirect = 'admin';  
        } else if ($role == 2) {  
            $sesi['name'] = strtolower($check_data['nama_guru']);  
            $sesi['id_guru'] = $check_data['id_guru'];  
            $redirect = 'guru';  
        } else {  
            $sesi['name'] = strtolower($check_data['nama_siswa']);  
            $sesi['id_siswa'] = $check_data['id_siswa'];  
            $redirect = 'siswa';  
        }  
    }  
}
```

Figure 7. Application Source Code

The source code in Figure 7 is responsible for handling application logic related to class data. This source code manages the process of retrieving data from the database through the Mkelas model, then forwarding it to the appropriate view.

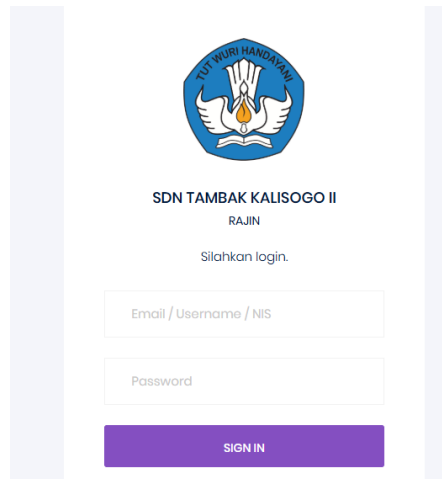


Figure 8. Admin Login Display

Figure 8 shows the login interface of the web-based student grade monitoring information system, which allows users such as teachers, students, or administrators to log in using their respective identities.

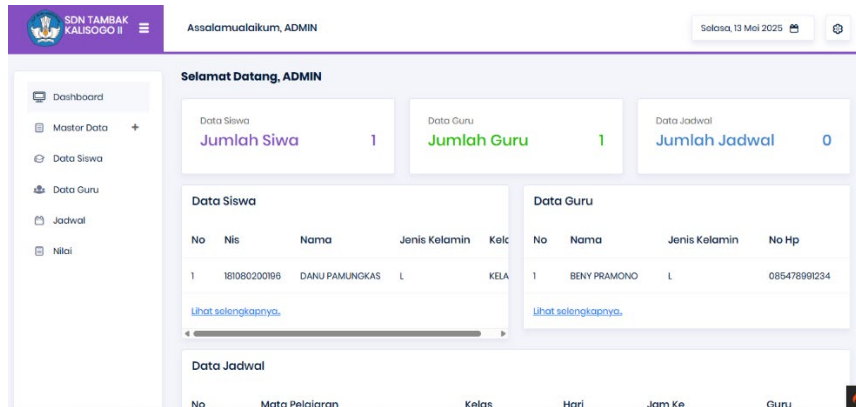


Figure 9. Main Menu Display

Figure 9 shows the dashboard for the admin account, where the admin can view summaries and manage student, teacher, and schedule data.

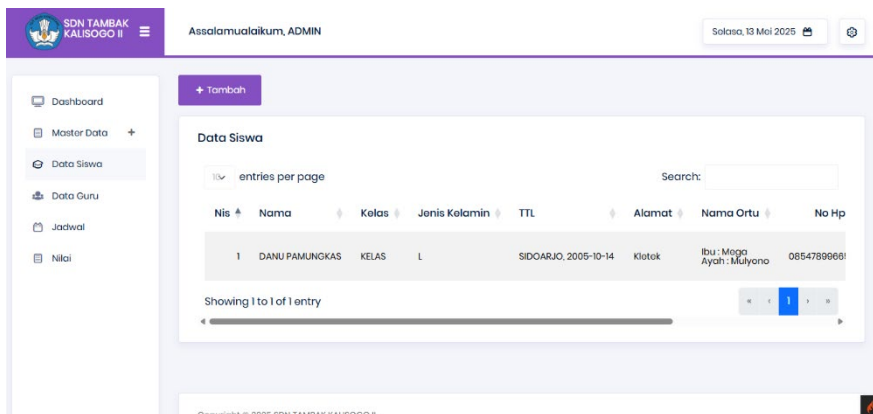


Figure 10. Student Data Display

Figure 10 displays student profiles, including name, class, gender, place and date of birth, address, and parents' names. On this page, administrators can modify and add student profiles.

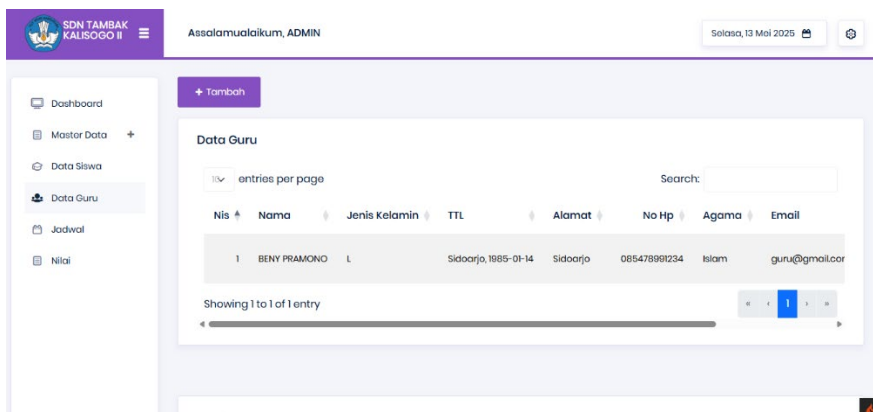
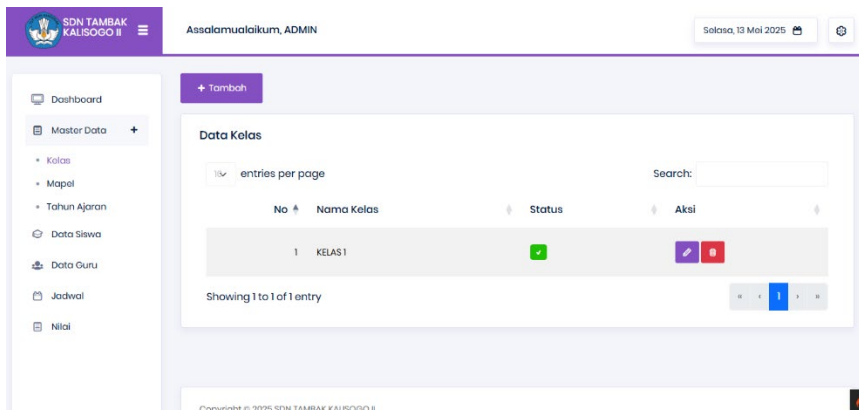


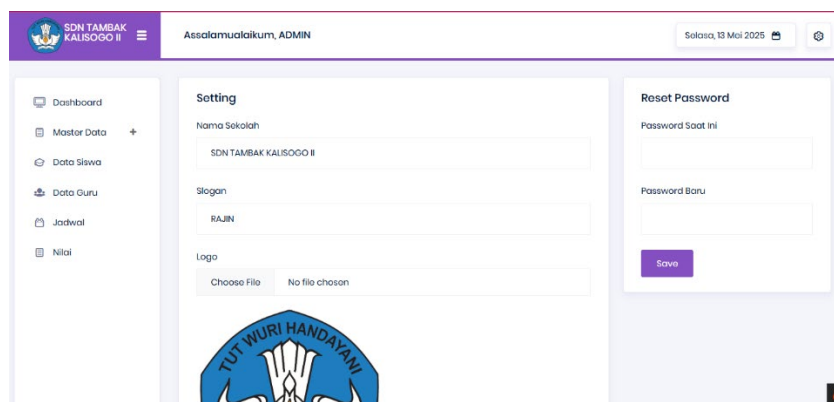
Figure 11. Teacher Data Display

Figure 11 is the teacher data page accessed by the administrator. On this page, the administrator can view, add, and manage teacher data stored in the system.



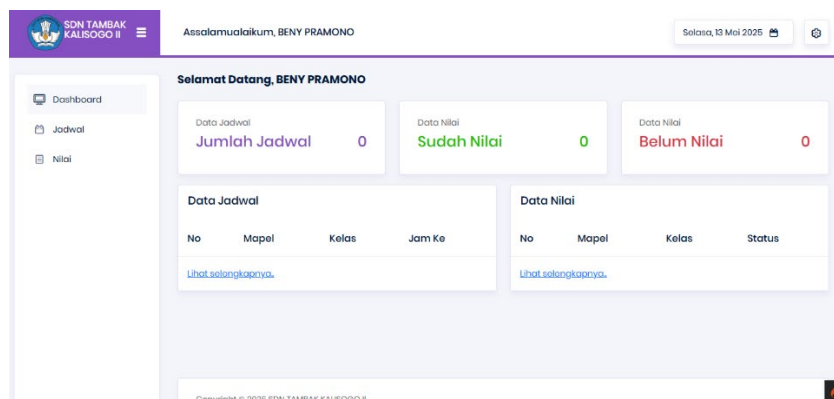
**Figure 12. Master Data Display**

In Figure 12, we can add the number of classes, as well as edit them if there is a need to update them. Here, we can also add subjects to be included.



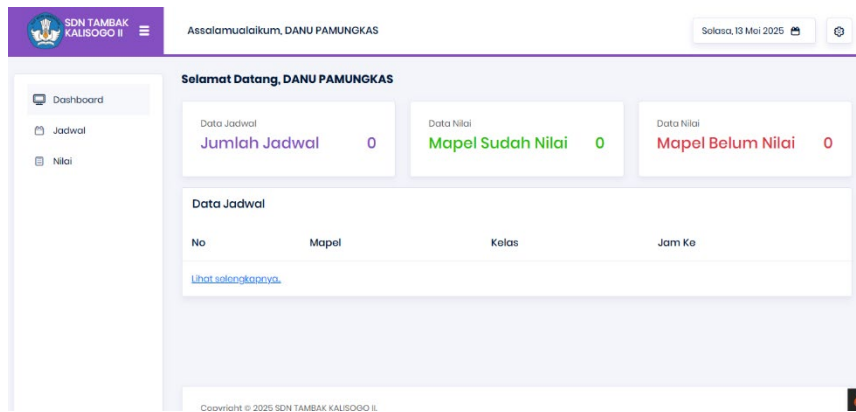
**Figure 13. Settings Display**

In Figure 13, this is part of the information system that functions as the central hub for school identity settings and admin account management features.



**Figure 14. Teacher login display**

Figure 14 serves as a summary of teacher activities in the system, consisting of several components such as schedule data, graded data, and ungraded data.



**Figure 15.** Student login screen

Figure 15 presents a summary of student activities. On this screen, users can input schedule data, subjects that have been graded, and those that have not. This information can later be used to generate reports.

Blackbox testing is a software testing method that focuses on system functions from the user's perspective, without knowing the internal structure, source code, or program logic used. The main purpose of this test is to verify whether the system is working according to the specified requirements and functional specifications.

**Table 1.** Blackbox Table

Testing the system interface			
Test	Expected	Observed Results	Description
Login	The system can distinguish user levels during login	When entering the system, users can log in according to their user level	Successful
Dashboard	The system is able to display menus according to user level	When users log in, the system is able to display menus according to user levels	Success
Master Data	The system can enter class and subject data	The system is capable of storing class data in the database	Success
Student Data	The system can display student data	The system can store student data and add student data	Success
Teacher Data	The system can display teacher data	The system can store teacher data and add teacher data to be stored in the database	Successful
Schedule	The system can enter schedules according to the form provided	The system is capable of inputting student schedules and storing them in the database	Success
Grades	The system can enter grades according to the form provided	The system is able to input student grades to be stored in the database	Successful

Table 1 shows the results of testing several key features in the system interface. Testing included login, where the results showed that when users logged into the system, they could log in according to their level (admin, teacher, or student). Meanwhile, the system dashboard was able to display menus according to the user's level after logging in. Testing proved that the system adjusted the menu display according to the user's access rights. Master data testing was conducted to ensure that the system could enter class and subject data. The results showed that the system could store this data in the database without any problems. The student data menu was tested for its ability to display and add student data. The system was able to store and display the data properly. The teacher data feature was tested to ensure that the system could store and display teacher data. The test showed that the system could successfully add and store teacher data in the database. Each feature was tested based on its expected

functionality, such as distinguishing user levels, displaying menus according to level, and the ability to store and display data. The results of the observation showed that all features worked as expected and were declared successful, indicating that the system functioned properly and was ready for use.

**Table 2.** User Testing

Statement	Score	Answer	Respondent
Logging into the system is easy	5	Very Satisfied	-
	4	Satisfied	2
	3	Fairly satisfied	5
	2	Not Satisfied	1
	1	Very dissatisfied	-
The data displayed by the system is as required	5	Very Satisfied	1
	4	Satisfied	2
	3	Fairly satisfied	4
	2	Not Satisfied	1
	1	Very dissatisfied	-
The system interface is easy to understand	5	Very Satisfied	1
	4	Satisfied	5
	3	Fairly satisfied	2
	2	Not Satisfied	-
	1	Very Dissatisfied	-
Important information such as the number of students, teachers, grades, and schedules is easy to find	5	Very Satisfied	1
	4	Satisfied	1
	3	Fairly satisfied	4
	2	Not Satisfied	2
	1	Very dissatisfied	-
The system runs smoothly without many errors	5	Very Satisfied	-
	4	Satisfied	-
	3	Fairly satisfied	3
	2	Not Satisfied	5
	1	Very Dissatisfied	-
The features in the system (add, edit data) work well	5	Very Satisfied	-
	4	Satisfied	1
	3	Fairly satisfied	3
	2	Not Satisfied	3
	1	Very dissatisfied	1
The system can be used without the need for special training	5	Very Satisfied	2
	4	Satisfied	3
	3	Fairly satisfied	3
	2	Not Satisfied	-
	1	Very dissatisfied	-
<b>Satisfaction</b>			
I am satisfied with this information system	5	Very Satisfied	-
	4	Satisfied	1
	3	Fairly satisfied	3
	2	Not Satisfied	3

	1	Very dissatisfied	1
This system makes it easier to manage student grades at school	5	Very Satisfied	-
	4	Satisfied	3
	3	Fairly satisfied	3
	2	Not Satisfied	2
I would recommend this system to other schools	1	Very dissatisfied	-
	5	Very Satisfied	-
	4	Satisfied	2
	3	Fairly satisfied	5
	2	Not Satisfied	1
	1	Very dissatisfied	-

**Table 3.** User Response Scores

No	Statement	Score					Maximum Score	Percentage
		5	4	3	2	1		
1	Logging into the system is easy	0	2	5	1	0	40	62.5
2	The data displayed by the system is as required	1	2	4	1	0	40	67.5
3	The system interface is easy to understand	1	5	2	0	0	40	77.5
4	Important information such as the number of students, teachers, grades, and schedules is easy to find	1	1	4	2	0	40	62.5
5	The system runs smoothly with few errors	0	0	3	5	0	40	47.5
6	Features in the system (add, edit data) work well	0	1	3	3	1	40	50
7	The system can be used without the need for special training	2	3	3	0	0	40	77.5
8	I am satisfied with this information system	0	1	3	3	1	40	50
9	This system simplifies the management of student grades in schools	0	3	3	2	0	40	62.5
10	I would recommend this system to other schools	0	2	5	1	0	40	60

The average satisfaction percentage for the system aspect received a fairly positive response (above 60%), particularly in terms of the interface and ease of use without training. However, the system performance aspect (such as errors or features) still needs improvement as it received a low satisfaction score (below 50%). The information system that was tested has provided convenience in the use and management of student data, but improvements are needed in system stability and feature functionality in order to increase user confidence and the potential for wider recommendation.

#### 4 Conclusion

From the results of the author's research on web-based student grade monitoring information systems, there are several conclusions, namely that the monitoring system created makes it easier for teachers to input grades and inform parents. The system that has been developed can help schools improve cooperation between teachers and parents to improve student achievement. Web-based monitoring applications can make it easier for parents to access information about their children's progress.

The author has several suggestions for this research. In the future, it is hoped that several features can be added for monitoring by parents. The types of achievements that students have earned can be added so that they can be seen by parents. Input for special students who excel in other fields can be added. This research also has several shortcomings, including occasional web errors and the need to add features to each section.

## 5 Acknowledgment

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## References

- [1] F. Abdussalaam and I. Oktaviani, "Designing a Web-Based Information System Using the Prototyping Method," *J. E-Komtek*, vol. 4, no. 1, pp. 16–29, 2020, doi: 10.37339/e-komtek.v4i1.213.
- [2] D. Ayu Megawaty, M. Bakri, and E. Damayanti, "STUDENT ACADEMIC ACTIVITY MONITORING SYSTEM USING A WEBSITE," *J. TEKNOKOMPAK*, vol. 14, no. 2, pp. 98–101, 2020.
- [3] D. A. Raihan, A. Saleh, and B. Triandi, "Designing an Android-Based Student Monitoring Application at SD IT Al-Munadi Medan," *J. Dunia Pendidik.*, vol. 5, no. 3, pp. 988–1004, 2024.
- [4] S. Nabila and T. Wati, "Implementation of the Codeigniter Framework in a Web-Based Information System for Recording Academic and Non-academic Achievements of Students at SMA Negeri 4 Cibinong," *Inform. J. Computer Science*, vol. 18, no. 1, p. 80, 2022, doi: 10.52958/iftk.v17i4.4634.
- [5] A. A. Nabila and A. Jananto, "Web-Based Information System for Monitoring Academic Achievement and Non-Achievement of Students at MA Nurus Sunnah Tembalang, Semarang City," *J. Multidisciplinary Science*, vol. 4, no. 2, pp. 688–697, 2025, doi: 10.38035/jim.v4i2.923.
- [6] E. D. Shanty, Wasino, and Z. Rusdi, "Web-Based Student Monitoring Information System at SMAK BPK Penabur Cianjur," *Comput. J. Comput. Sci. Inf. Syst.*, vol. 7, no. 1, pp. 18–27, 2023, doi: 10.24912/computatio.v7i1.17220.
- [7] M. R. A. Afif and J. Sutresna, "Designing a Web-Based Academic Information System for Al-Karmaniyah Elementary School in Tangerang City," *J. Inform. Utama*, vol. 1, no. 2, pp. 11–18, 2023, doi: 10.55903/jitu.v1i2.128.
- [8] W. D. Mukmin I, "Remik: Research and E-Journal of Computer Informatics Management Designing a Student Grade Monitoring System," vol. 8, no. April, pp. 517–529, 2024, [Online]. Available: <http://doi.org/10.33395/remik.v8i2.13546>
- [9] Widodo and I. N. Arsyad, "Web-Based Student Monitoring Information System at SMP Negeri 1 Sentani," *J. Teknol. Inf.*, vol. 9, no. 1, pp. 1–15, 2021.
- [10] N. Kholila, M. S. Lamada, J. Teknik, F. Teknik, and U. N. Makassar, "Designing a Website-Based Student Monitoring System at Bulukumba State Senior High School 7," vol. 1, no. 3, pp. 55–59, 2024.
- [11] A. Syaputra, "Academic Achievement Monitoring System for Students at State Senior High School 5 Pagar Alam," *J. Ilm. Inform.*, vol. 5, no. 2, pp. 76–84, 2020, doi: 10.35316/jimi.v5i2.949.
- [12] M. S. Haq, W. Wagino, K. Rofiah, and N. Aini, "Development of an Academic Service Information System Application Based on Codeigniter," *J. Adm. and Manaj. Education.*, vol. 4, no. 2, p. 139, 2021, doi: 10.17977/um027v4i12021p139.
- [13] Yuyun Tri Wiranti, Sri Rahayu Natasia, Vika Fitratunnany Insanittaqwa, and Rendy Setyawan, "Wiranti et al. - 2022 - STUDENT ACADEMIC MONITORING INFORMATION SYSTEM IN SM," vol. 7, no. April, pp. 1–13, 2022.
- [14] R. U. G. Yuli Anggreini Pratiwi, "Designing a Web-Based Academic Information System," *J. Health Technology and Social Sciences*, vol. 2, no. 1, pp. 1–6, 2020.
- [15] Lukman Santoso and Juni Amanullah, "Development of a Website-Based Academic Information System Using the Rapid Application Development (RAD) Method," *Elkom J. Electron. and Computing*, vol. 15, no. 2, pp. 250–259, 2022, doi: 10.51903/elkom.v15i2.943.