

Research Article

Design and Development of Maahad Tahfiz Memorization System

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Abstract: Due to technological advancements, educators must now use various tools to aid in their management and operation. Maahad Tahfiz is an institution where students learn Islamic religious subjects and basic academics while focusing on memorizing the Quran. However, the Maahahfiz encountered a few problems while recording the students' memorization, such as a massive amount of paper waste, limitations in checking students' progress, and late supervision. This project aims to change the manual process of managing the students' memorization progress into a web-based system to improve the process significantly. The methodology used was the waterfall, which has been modified into three phases: requirements gathering and analysis, design and development, and testing. The outcome of this project is that the system allows teachers to create students' memorization progress, and the system displays the student's progress visually in the graph. Furthermore, the system can be accessed by the parents and the Vice Principal of Academic Affairs. In the future, it is recommended that the system be accessed through mobile devices, and a search or filtering feature can be added to enhance the project.

Keywords: web-based; technology in education; waterfall methodology.



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1. INTRODUCTION

Information Technology (IT) has proven immensely beneficial for organizations, especially regarding data collection, storage, processing, and organization. However, for people and organizations to effectively utilize organized and processed data, it is crucial to disseminate it widely (Rajaraman, 2018). This principle also applies to the management system of Maahad Tahfiz. Maahad Tahfiz should innovate its traditional manual methods and upgrade them by incorporating IT solutions to enhance its recording process.

Presently, some of the Maahad Tahfiz manage the memorization record manually. Teachers record the students' memorization progress on paper forms daily and store them in their daily teaching plan files. To meet the syllabus targets, students must memorize one page or more of the Quran daily, amounting to approximately seven or eight chapters (juz) in one year, to complete the entire Quran memorization in four years. Every Friday, the Vice Principal of Academic Affairs reviews the files to assess whether students have achieved their targeted progress. If a student's memorization is not progressing adequately, the Vice Principal intervenes and supervises the student and their teacher to

ensure they do not fall behind. Parents receive information about their children's progress when the semester examination slip is distributed at the end of each semester.

To improve the recording process and enhance overall efficiency, it is recommended that Maahad Tahfiz adopts IT solutions. Implementing a digital system for recording and tracking students' memorization progress would eliminate the need for manual paperwork. A dedicated software or application could be developed specifically for this purpose. Teachers could record students' daily progress digitally, and the data would be securely stored in a centralized database accessible to the Vice Principal and other authorized personnel. This digital system could also provide real-time monitoring of students' progress, enabling prompt intervention if necessary. Additionally, parents could be granted access to an online portal or app to track their children's progress regularly rather than relying solely on the semester examination slip.

2. METHODOLOGY

This project uses the modified Waterfall approach, starting from the requirements gathering and analysis phase, then the design and development phase, and lastly, the functional testing. This method was selected because, according to Salve et al. (2018), this model is appropriate for smaller projects with defined requirements. Figure 1 below shows the summary of the applied research methodology approach.

Figure 1. Project Methodology

3.1 Phase 1: Requirements Gathering and Analysis

This phase is essential to understand the stakeholders' needs and realize all requirements. It started with the elicitation of the requirements from the stakeholder through the interview session. Subsequently, the requirements were analyzed and depicted in a use case diagram to aid the developer in visualizing the functionalities to be developed.

3.2 Phase 2: Design and Development

In the design phase, the primary artefacts are the entity relationship diagram and the system. These artefacts were designed using the Unified Modeling Language (UML) tool, StarUML, MySQL as a database platform, and PHP language with the Laravel framework.

3.3 Phase 3: Testing

In this last stage, the system is tested to ensure it meets the requirements and functions correctly from all users' perspectives. This system is tested by inserting different input values to verify that it produces the expected output.

3. FINDINGS AND DISCUSSIONS

This section presents the research findings based on the applied research methodology described in the previous section.

3.1 Phase 1: Requirements Gathering and Analysis

For the first phase, an interview with stakeholders was conducted. The interview results indicated that the stakeholders preferred the web-based platform since it is easier for all users to access and manage the information. After the interview results were analyzed, it was modelled using the use case diagram shown in Figure 2 below. Fourteen use cases and three actors are involved: parents, teachers, and vice principal. Parents must create their accounts first and add their children's information to the system. Parents can manage their accounts and update their children's information. They can also view their children's memorization progress. Teachers can manage the students' progress, such as updating and deleting the progress. While for vice principals, they have more access, including verifying the student's information and generating progress reports of the students.

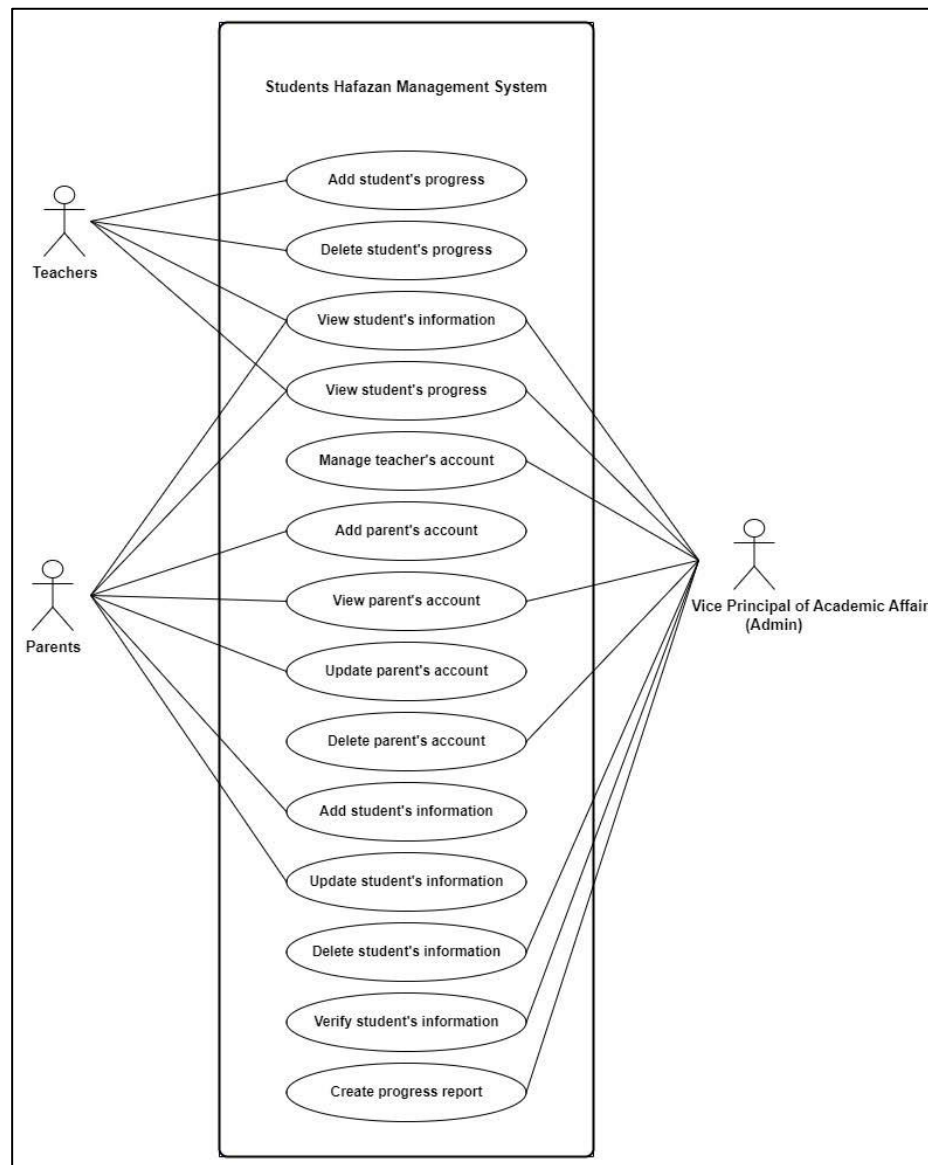


Figure 2. Use Case Diagram

3.2 Phase 2: Design and Development

After developing the use case diagram, a database design is constructed and represented by using an entity relationship diagram. As shown in Figure 3, five tables are involved: Users, Students, Progress, Juz or Chapters, and Report. Users consist of teachers, parents, and vice principals. The teacher can update the student's memorization progress and store the data in the Progress table. A report is generated based on the data in this table.

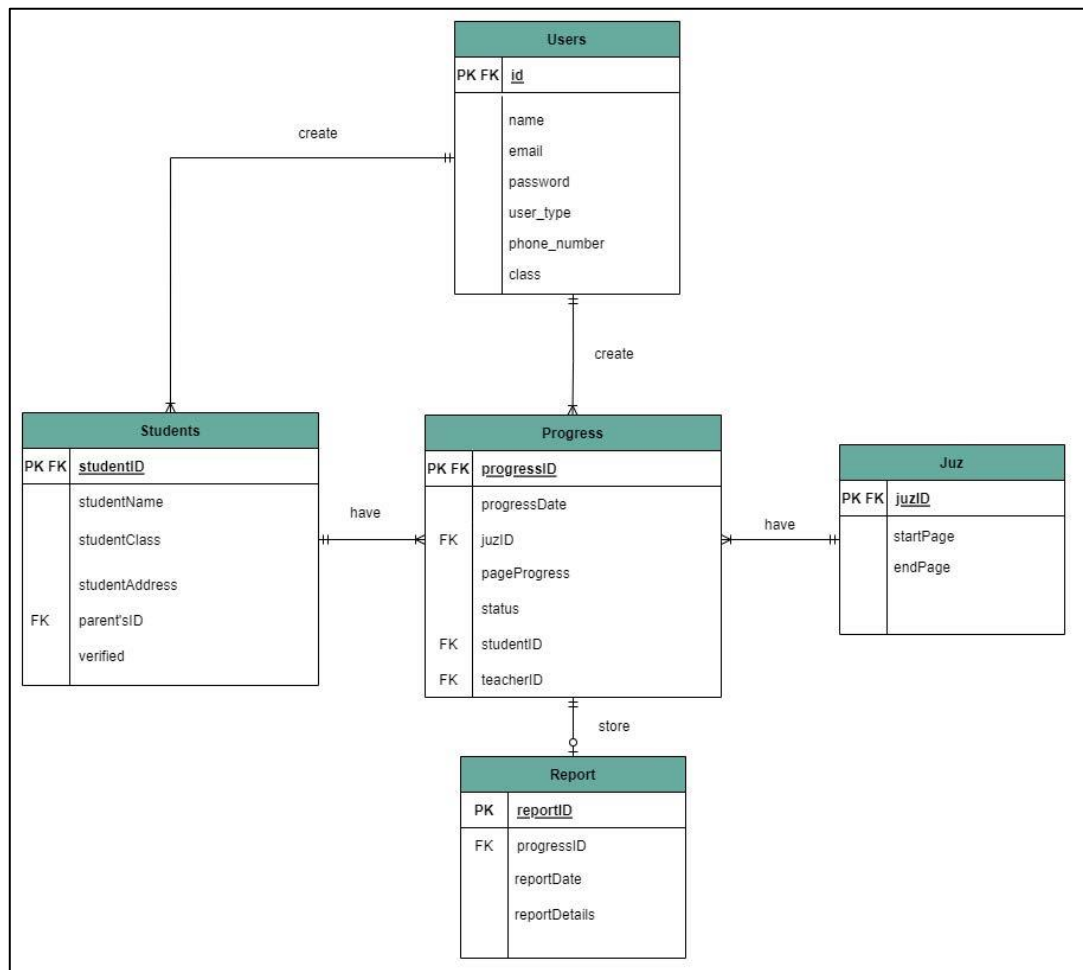


Figure 3. Entity Relationship Diagram

Next, the system is developed based on the use case diagram and entity relationship diagram by using the Laravel framework. According to the finding from Yadav et al. (2019), Laravel became the most popular and successful PHP framework in 2019. The statistics were based on the annual framework popularity survey by SitePoint. Gunawan (2020) indicated that Laravel is MVP-based website progress executed in PHP. It is an advanced software quality that can reduce early development and maintenance budgets. Laravel goal is to refine the way of working by applications when the code is expressive, rich and saves time.

All functions are developed based on the stakeholders' requirements. Figure 4 below shows one of the system's main functionalities: recording students' memorization progress. Teachers must log in to the system and click on the Student Progress menu. The list of students assigned to the teacher is displayed, and the teacher can view and update the students' progress.

Figure 4 shows the students' progress for Chapter 1 (Juz 1). Each chapter has approximately 20 pages; thus, the teacher needs to tick on the page where the students have memorized it. For instance, the first student memorized sixteen out of twenty pages of Chapter 1, the second student is on page three, and the third student is on page 2.

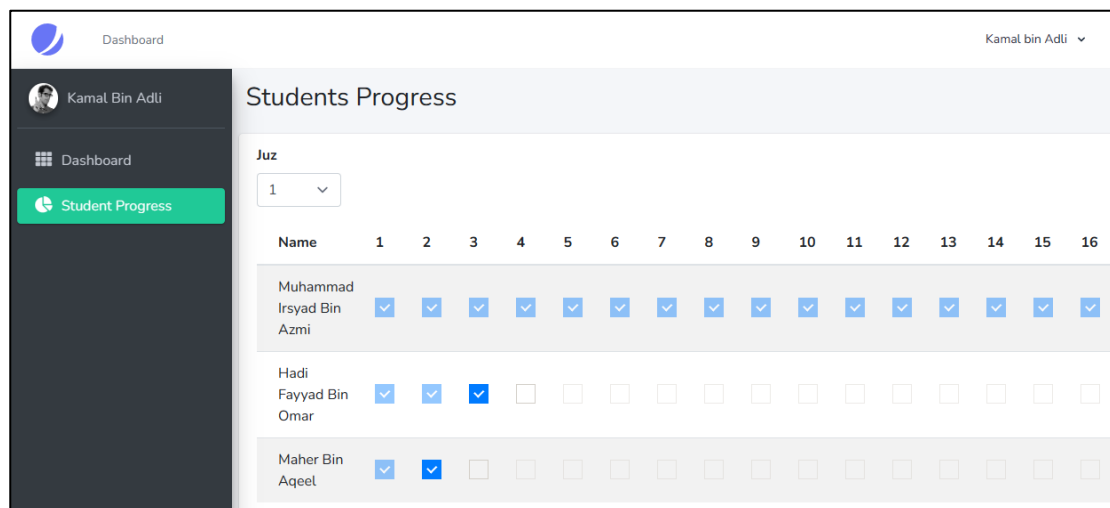


Figure 4. Manage Student Progress

The student's progress is represented in another form for the vice principal view, as shown in Figure 5. The first student has completed almost four per cent of the total Al-Quran pages, comprising thirty chapters.

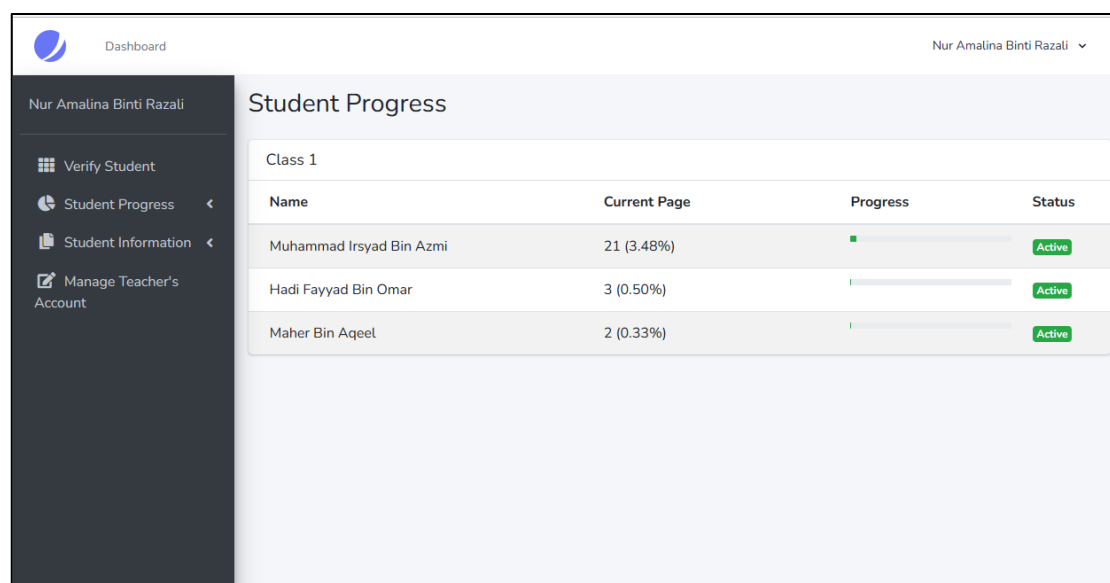


Figure 5. Entity Relationship Diagram

Parents must log in to the system to view their children's progress. The data is in graphical format, as shown in Figure 6 below.

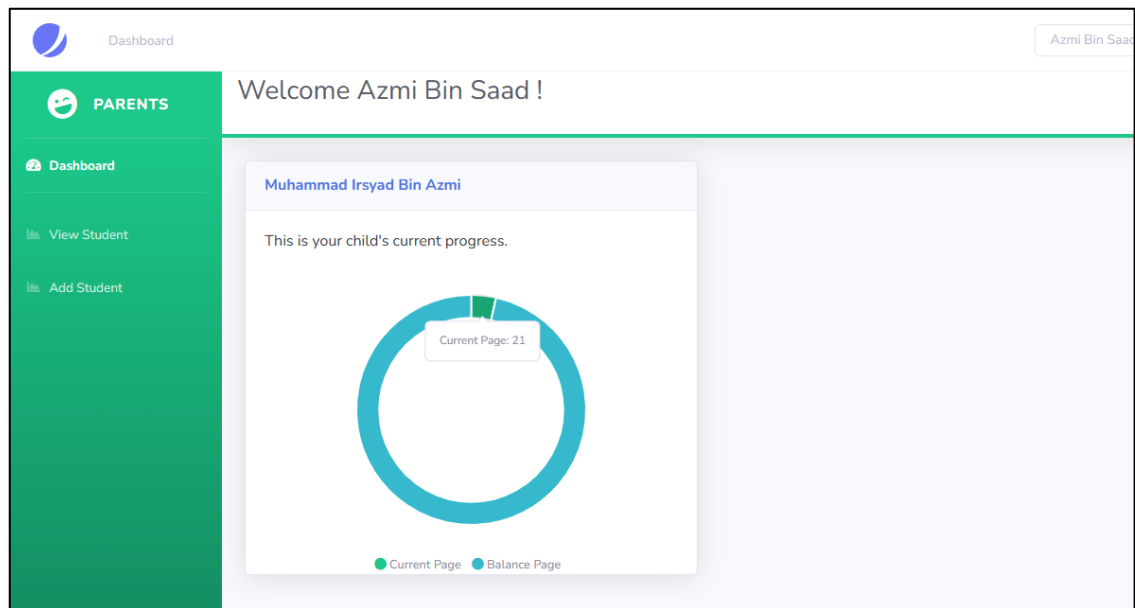


Figure 6. Student's Progress Graph

3.3 Phase 3: Testing

The functional testing ensures all functions are working as specified in the requirements. This activity helps identify missing requirements and ensures the system's accuracy (Rana et al., 2019). All use cases passed the testing, as shown in Table 1 below.

Table 1. Functionality testing results.

Use Case	Functionality testing results
Add student's progress	Pass
Delete the student's progress	Pass
View student's information	Pass
View student's progress	Pass
Manage teacher's account	Pass
Add parent's account	Pass
View parent's account	Pass
Update parent's account	Pass
Delete the parent's account	Pass
Add student information	Pass
Update student's information	Pass
Delete student's information	Pass
Verify student information	Pass
Create progress report	Pass

4. CONCLUSION

This paper discussed a study on the system design and development to record Maahad Tahfiz students' memorization progress. This system is significant for Maahad Tahfiz for better record management and has successfully addressed the challenges faced by the institution. The project utilized a waterfall methodology, encompassing three phases; requirements gathering and analysis, design and

development, and testing. The resulting system allows teachers to create and track students' memorization progress, presenting it visually as graphs. Additionally, the system provides access to parents and the Vice Principal of Academic Affairs, enabling efficient supervision and monitoring. Looking ahead, there are opportunities for further enhancement of the system. Integrating mobile device accessibility would allow for greater convenience and flexibility in accessing and updating student information. Additionally, a search or filtering feature would enable more straightforward navigation and retrieval of specific data, facilitating a more efficient workflow. Overall, this project demonstrates the transformative potential of technology in educational settings, offering a more streamlined and practical approach to managing students' memorization progress.

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