Design and Development of Management Information System in Ma'had Huffadz Bilingual Darul Hikmah Malang Using Scrum Method

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Abstract

The scrum method is the most important thing in building software. The following research builds a management information system on Ma'had Huffadz Bilingual Darul Hikmah under Darus-Sa'adah Al Mardliyah Foundation. The institution, which is one of the Boarding Schools Tahfidzul Qur'an located in the city of Malang, East Java. The following research uses the Scrum framework. The implementation of the scrum method in the following research uses three sprints. The process of working on each sprint takes no more than a month. The software development in this research is web-based. Work on application programs using the Laravel framework using the PHP programming language. The results showed that the scrum method is very effective in building a boarding school management information system. Scrum is more dynamic, and the results of this scrum implementation can be seen from the system that has been developed. So that by implementing Scrum can produce a system that suits the requirements of the user.

Keywords: Effective, Scrum, Sprints, Requirements, Management information system

1. Introduction

Boarding Schools in Malang, East Java, according to the statistics of the Ministry of Religion 2019, amounted to 60 who have NSPP (Static Number Pondok Pesantren) both salaf huts and Koran huts with the number of students 6,889. In addition to the 60 boarding schools, there are many boarding schools and Ma'had that have not been officially registered either boarding schools for the public, students, or students. Based on the number of boarding schools shows that the interest in learning in boarding schools is quite high. Ma'had Huffadz Bilingual Darul Hikmah under Darus Sa'adah Al Mardliyah Foundation is one of the Pondok tahfidzul Qur'an located in Malang, East Java. This boarding school activity program focuses on memorizing AlQuran, but there are still other activities as supporting as well as reciting the book. The management in this cottage is still using the conventional way. As well as registration, payment, attendance activities, memorization monitoring, and reports are still done manually. The process of collecting, managing, and reporting data in all aspects in a boarding school that still uses manual means is considered less efficient and effective. Information System Development should look at some aspects of the need [1]. Confusion of processed data due to not being integrated can cause system failures [2][3].

Therefore in this study, researchers designed a management information system to overcome data confusion in Ma'had Huffadz Bilingual Darul Hikmah Malang by using scrum framework, which Scrum is part of agile software development. Scrum is a framework used to develop a complex product. In Scrum, the developers can solve complex problems and are also required to be able to produce high-value products. The characteristics of the Scrum framework are lightweight because Scrum can be easily implemented on a variety of issues, simple in framework implementation, Scrum stable and non-modifiable [4]. The Scrum method is very suitable for fast and effective software development [5]. In recent years, developments in the software development
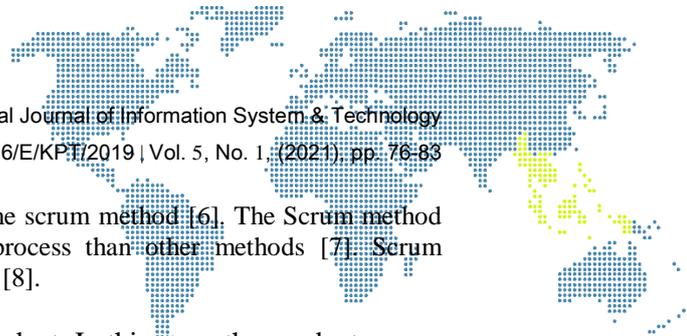
process have become more dynamic and iterative using the scrum method [6]. The Scrum method is a faster and more effective software development process than other methods [7]. Scrum methods include design, development, testing, and review [8].

The stages of the scrum are as follows:

a. Product Backlog is a list or list of needs of a product. In this case, the product owner plays a full role in determining the product backlog, including its content, availability, and order.

b. Scrum Planning is the stage of identifying the tasks of each team member. At this stage, it is very important because it determines the next process in running Sprint.

c. Sprint Backlog is the result of Scrum planning. The sprint backlog is a forecast from the development team regarding the functionality that will go into the next increment and the work that needs to be completed.

d. Sprint is a time limit that has a duration (one month or less). Sprint has a consistent period during the process of creating the system. Every Sprint done has been completed then continued on the next Sprint. Sprint consists of two (2) scrum daily and scrum sprint 30 days. Scrum daily is a daily meeting for approximately 15 minutes to evaluate the work, discuss obstacles during work, and make targets for the next job. While Scrum Sprint 30 days is a meeting conducted every month to discuss the product backlog that has been completed and evaluate to improve the work on the next Sprint.

e. Incremental software result is the result of the backlog product that has been completed on Sprint-Sprint, and the system can already be used. After the product is finished, then the next is Sprint review or submission of increments or results to the client. Which result of the product should be in a condition that can be used [9].

One of the modeling systems is to create Activity diagrams. The type of flowchart used to visually model the dynamic behavior of a particular part of a system that is most commonly used is activity diagrams [10]. The activity diagram shows the steps on the system work process created. The activity diagram serves to describe the order of activities in a system [11] .

2. Research Methodology

Scrum is part of agile software development, and Scrum is a framework used to develop a complex product. In Scrum, the developers can solve complex problems and are also required to be able to produce high-value products. The characteristics of the Scrum framework are lightweight because Scrum can be easily implemented on a variety of issues, simple in framework implementation, Scrum stable, and non-modifiable.
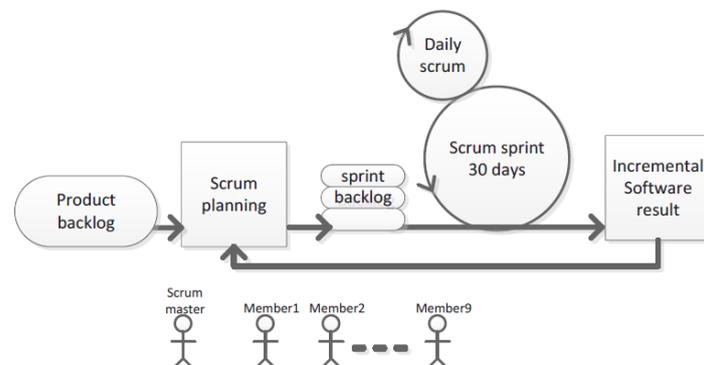
Figure 1. Scrum stage

Information System management of this integrated boarding school is a website-based system, the technology we use is as follows:
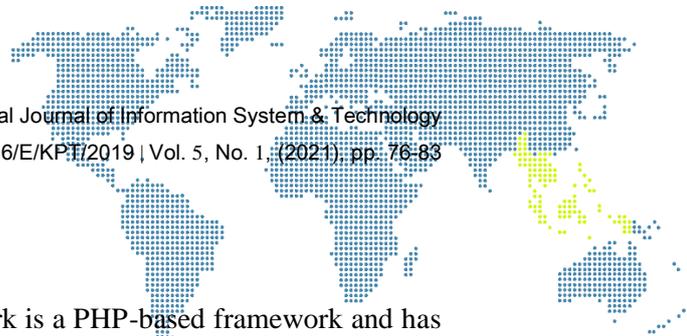
➢ Database : MySql
➢ Framework : Laravel
➢ Programming Language : PHP

The process of creating it using the laravel framework is a PHP-based framework and has open-source properties [12]. This research uses the Scrum framework, which consists of 3 Sprint-based product backlogs that have been created before [13]. Here's an explanation of each of his Sprints:

a. Sprint 1
Each Sprint consists of Scrum events, the following are the Scrum events in Sprint 1 :
Sprint planning
The results of the 1st Sprint design are:
Time : 3 weeks
Objective : initial design of the system
From Sprint planning generated the following Sprint backlog:

Table 1. Sprint backlog 1

Sprint Stage	Assignment	Task Description	Estimation (Day)
1st Sprint	Initial system identification	Student activity process	5
		The process of memorizing students	
		Student payment process	
		Report process	
	System Concept Design	Use case diagram	10
		Acitivity diagram	
		Design User *Interface*	
	Database design	Create Database	7

Daily Scrum
Daily Scrum or scrum daily meeting at the time sprint is run to discuss what has been done and what will be done.

Sprint Scrum 30 days
Monthly meetings to discuss completed backlog products and can be an evaluation to improve work on the next Sprint.

b. Sprint 2
In each Sprint consists of Scrum event, here is scrum event on Sprint 2:
Sprint planning
The results of the 2nd Sprint design are:
Time : 4 weeks
Purpose : Create a master admin
From Sprint planning generated the following Sprint backlog:

Table 2. Sprint backlog 2

Sprint Stage	Assignment	Task Description	Estimation (Day)
2nd Sprint	Create a landing page	Create a landing page before logging in to the system	7
	Writing code	Create Login Feature for	18
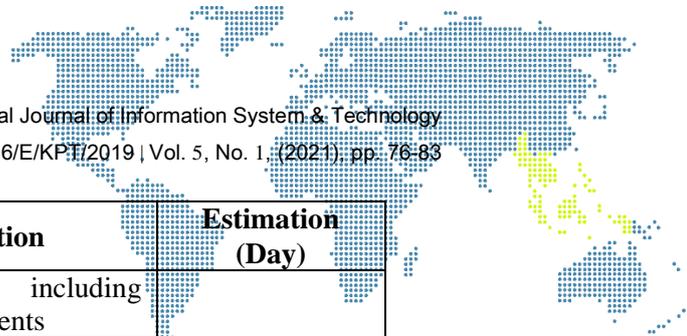
Sprint Stage	Assignment	Task Description	Estimation (Day)
	for master administrators	some users, including admins and students	
		Admin dashboard	
		Create user data features, including crud administrators, students, and verification of old students.	
		Create an activity attendance feature	
		Create a payment feature	
		Create a report feature	

Daily Scrum

Daily Scrum or scrum daily meeting at the time sprint is run to discuss what has been done and what will be done.

Sprint Srum 30 days

Monthly meetings to discuss completed backlog products and can be an evaluation to improve work on the next Sprint.

c. Sprint 3

In each Sprint consists of Scrum event, here is scrum event on Sprint 3:

Sprint planning

The results of the design of the 3rd Sprint are:

Time   : 4 weeks

Purpose   : Create a system for the user

From Sprint planning generated the following Sprint backlog:

Table 3. Sprint backlog 3

| Sprint Stage	Assignment	Task Description	Estimation (Day)
3rd Sprint	Writing code on the system used by the user	Create registration forms and Dashboards for system students	15
		Display licensing, recitation, attendance, penalties, and payment data	
	Code writing for internal user interfaces	Create reports for internal parties	10

Daily Scrum

Daily Scrum or scrum daily meeting at the time sprint is run to discuss what has been done and what will be done.

Sprint Scrum 30 days

The monthly meeting aims to discuss the completed product backlog and conduct evaluations for repair work on the next Sprint.
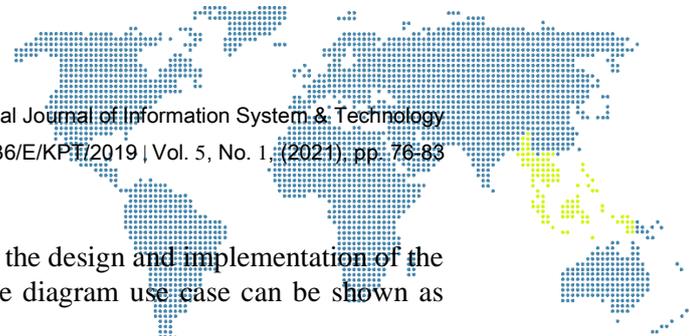
3. Results and Discussion

The discussion in the following research includes the design and implementation of the system developed. The results of the creation of the diagram use case can be shown as shown in the following figure 2.
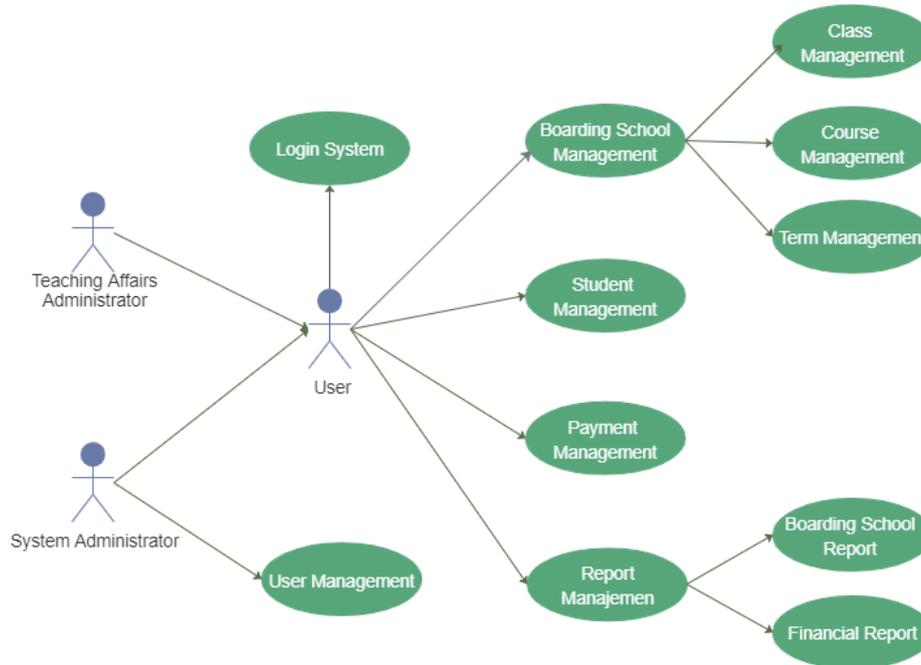

Figure 2. Use Case Diagram

The use case diagram consists of 3 actors, namely Teaching Affairs Administrator, User, System Administrator. The process described in the diagram use case includes Login System, Boarding School Management, User Management, Student Management, Payment Management, Report Manajemen, Class Management, Course Management, Term Management, Boarding School Report, Financial Report. The result of the implementation of the application program is shown in figure 3, 4 and 5.

Figure 3. Menu View
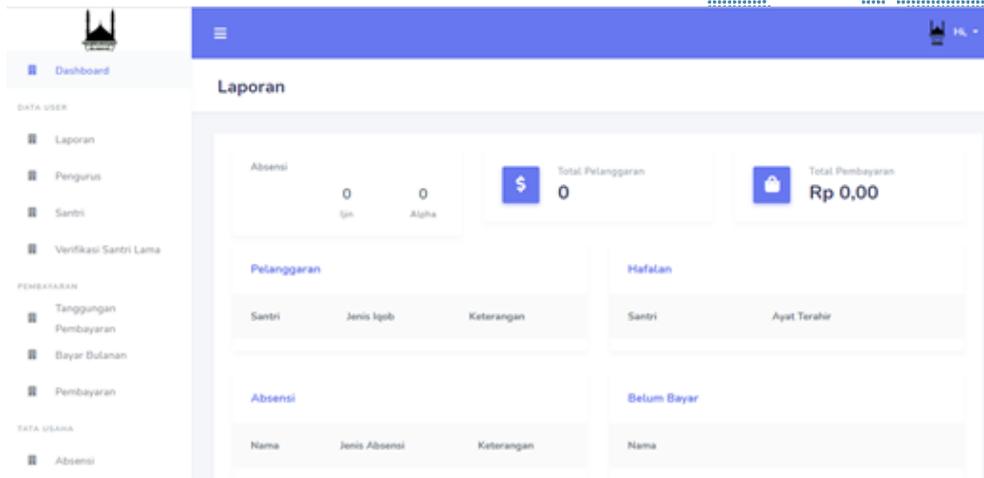
Figure 4. Report View

3.1. Application Implementation Results.

The assessment division uses the scale shown in table 4 and table 5. The test involves relevant stakeholders so that software testing is obtained by covering several factors of software quality, including Correctness, Completeness, Consistency, Traceability, Reliability, Error Tolerance, Simplicity, Integrity, Usability, Operability, Access Control, and Communicativeness.

Tabel 4. Assessment Scale

Description Assessment	Value
Very Important	0,8
Important	0,7
Quite Important	0,6
Not Important	0,5
Very Inactive	0,4

Tabel 5. Software Testing

Quality Factors	Weight	Value
Correctness	0,8	4,1
Completeness	0,7	4,0
Consistency	0,8	4,5
Traceability	0,6	4,2
Reliability	0,8	4,0
Error Tolerance	0,6	4,4
Simplicity	0,7	4,3
Integrity	0,8	4,6
Usability	0,7	4,2
Operability	0,7	4,3
Access Control	0,6	4,4
Communicativeness	0,7	4,4
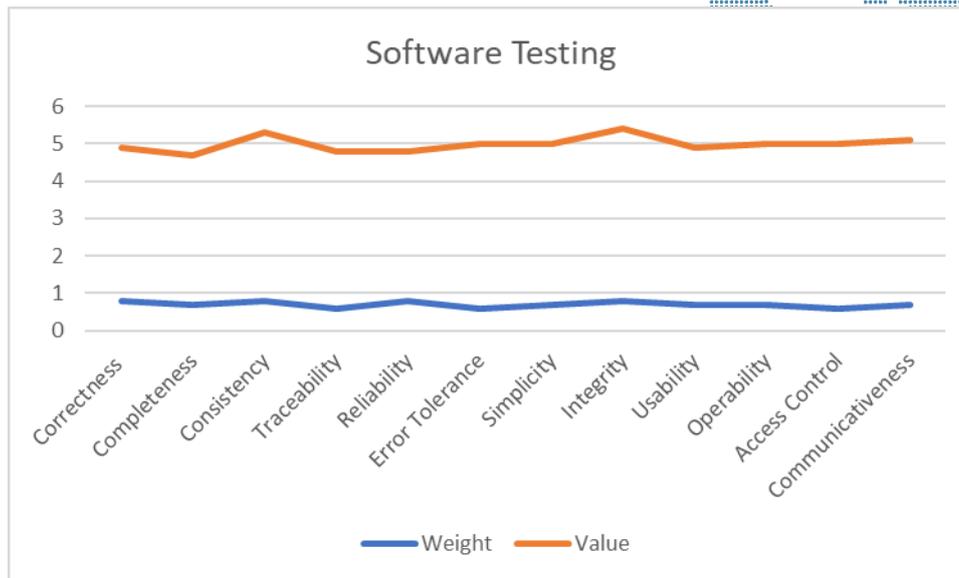
Figure 5. Software testing

4. Conclusion

The creation of an integrated boarding school management information system with the research object Ma'had Huffadz Bilingual Darul Hikmah uses a Scrum framework with 3 Sprints. At the same time, each Sprint has a different working period and task. The use of Scrum is more dynamic, and the results of this scrum implementation can be seen from the system that has been created. So by implementing Scrum can produce a system that suits your needs.

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