

Application development of website content filling in the Information Technology Department of State Polytechnic of Malang

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Abstract. The website is a communication tool that is used as an intermediary to share the latest news. The website of the Information Technology Department - Malang State Polytechnic (JTI-Polinema) is also a means of communication to share the latest activities and information about JTI. From January 2018 to November 2018, the news uploaded is only six content. This is not proportional to the number of activities available at the JTI. This is because there is only one type of user, the admin who can fill the website content. And the admin does not always know the activities in the information technology department. This study aims to develop an application to fill the website content of the Information Technology Department in state polytechnic Malang's website by adding one more type of user, namely students and also make the interface look better and easy to use. This application allows students to upload articles about departmental activities, competitions, workshops and other information they know. This application development uses Kanban which is one of the lean software development methods (lean method). Based on validation testing this application is able to meet all the main functional requirements. while the usability test results based on usefulness, ease of use, ease to learn and satisfaction shows a high average value of 86.95%, it can be concluded that this application is acceptable and easy to use.

1. Introduction

Website is a communication tool that is used as an intermediary to share information [1]. The website of the Information Technology Department of the State Polytechnic of Malang (Jurusan Teknologi Informasi Politeknik Negeri Malang/JTI-Polinema) is also a means of communication to share activities and information about the Information Technology Department. Even this website is also used as a promotional tool regarding the Information Technology Department itself.

In January 2018 until November 2018, there were only six content uploaded. This is not comparable with the number of activities that exist in the JTI-Polinema. As one of the communication media, the Information Technology Department website should have news or information uploaded in accordance with existing activities in the department.

The small amount of content uploaded by the admin occurs not because the number of activities carried out by the department is very small, but the admin's own responsibility is not just organizing the website, and the responsibility of filling website content is only carried out by the admin. With the participation of students in filling content, it is expected that the amount of content on the website of



JTI-Polinema in Malang will increase according to the latest news at the Information Technology Department.

However, at this time, the interest of students to participate in filling this website content is still lacking. There are various ways to increase students to participate in this case, one of which is to create a website that let students to uploaded content about department's activities. This system will be apply using Kanban methodology that shows progression of system development. Student can upload content about activities in Information Technology Department and exchanged it as compensation. Compensation is a replacement of the time charged to students for his absence due to negligence (Alpa) [2].

At present, the compensation system at the JTI-Polinema is still in the form of the choice of carrying out work assistance such as helping administrators organize data or help as part of equipment for activities in the department. In this case, some compensation activities are carried out when vacation schedule. Based on this, the authors also provide additional options for compensation by filling in the content of the JTI-Polinema website. Normally, a Department website consist of various information that that can be useful for its user (community, students, and civitas academica) [3]. In this case, the information provided in the JTI Website consist of the activities of the JTI-Polinema conducted by students such as Lecturer and Student Dialogue, guest lectures, or competition activities which is still less publicized by the admin on the website. In addition, the contents of this website can be done by students anywhere without having to go to campus. With more and more content about the majors uploaded, it can provide more information to students, lecturers or the public about any development activities that occur at JTI-Polinema.

2. Theoretical basis

2.1. Website

Website or site can be defined as a collection of the pages which displays text data information, picture or motion, animation, sound, or an aggregation of all video, whether they are static and dynamic that forms a series of interrelated building which is connected by hyperlink [3].

2.1.1 Content management system. Content Management System (CMS) is a complex web application containing tools which enable you to add, update & delete pages and content on your website from within a web browser and without any understanding of HTML or other similar technologies. One of CMS principle is to separate the content from the layout, which makes it easier to pre-set the same content in different layouts for different media like web browser and printer. Separating content and layout also enables website designers to concentrate on the presentation, while others attend the content [4].

A content management system (CMS) is a computer application that allows publishing, editing, modifying, and organizing, deleting, and maintaining content from a central interface. Such systems of content management provide procedures to manage workflow in a collaborative environment. Typically, a CMS consists of two elements: the content management application (CMA) and the content delivery application (CDA).

The part of CMA is content manager may be able to manage the creation, modification, and removal of content from a website even does not know about the knowledge of HTML (Hypertext Markup Language) or may not be experts as a Webmaster. While CDA website is updated to use and CDA elements compiles the information to update the website [5].

2.2. Compensation

Compensation is a replacement for the time charged to students for their absence due to Alpa. Compensation does not eliminate total absence due to illness, permission and dispensation. The amount of compensation is determined based on the number of Alpa hours multiplied by two. Compensation is carried out after official school hours have ended or during holidays and the implementation and form

of compensation and sanctions for those who do not carry out compensation is determined by the department [2].

2.3. *Alpa*

Compensation is a replacement for the time charged to students for their absence due to negligence (Alpa). Alpa itself has the following understanding [2]:

- Not present without permission or
- Being late or
- Leave the lesson without the permission of the lecturer or the Head of the Study Program or the Secretary or the Head of the relevant Department or
- Not present because of illness for more than one day without a doctor's statement.

2.4. *Kanban*

Kanban is methodology with a pull system is a means of implementing JIT. Just in Time (JIT) is a manufacturing philosophy used in many production companies of producing what is needed in the right quality in the right place and at the very right time [6]. Principles of Kanban System [7]:

- Visualize workflow: used to visualize and coordinate teamwork, its columns show a sequence of activities.
- Limit work in progress: WIP is a way to manage and limit the amount of working in progress.
- Measure and manage flow: used to monitor the Kanban process such as cycle/lead time, queue size, and cumulative flow diagrams.
- Make process policies explicit: policies are an essential part of assuring that the flow is achieved.
- Use models to recognize improvement opportunities: three models are suggested (i) the Theory of Constraints, (ii) a subset of ideas from Lean Thinking that identifies wasteful activities as economic costs, and (iii) some variants that focus on understanding and reducing variability.

Kanban system is usually implemented as a board on a wall with columns representing the different development process stages [7]. The motivation behind visualisation and limiting WIP was to identify the constraints of the process and to focus on a single item at a time. Additionally, instead of pushing work on to software developers, Kanban promotes a pull approach: when a team member finishes an existing task, he or she automatically pulls the next item to begin work [8].

3. Development process

This system developed using Kanban methodology. Kanban term came into existence using the flavors of “visual card,” “signboard,” or “billboard”, “signaling system” to indicate a workflow that limits Work In Progress (WIP). Kanban has been used in Lean Production for over half-century [9]. Sample of Kanban board of this system shown in figure 1-4.

Cards are used to describe pieces of work or tasks, which are moved through the chart columns. A typical configuration used in a Kanban chart in the software context contains at least columns for the stages of specification, development. For each column, a limit for the work in progress is determined. As a result, flow and bottlenecks are usually the main issues addressed in daily meetings and play a crucial role in identifying improvement opportunities.

In this system based on figure 1-4, Kanban board will be updated every two weeks. Every two weeks (1 phase) we will see the progress that will be done (to do), still ongoing or completed.

The first thing we do by using Kanban is initialization phase (figure 1) that included at the system. This system divided into three part with three different note colors. The purple note shows the general task about system include case research, design system and database, creating database and testing (Blackbox and usability). The Yellow note shows the functions of systems that can be done by admin tasks, and the green notes shows the functions of systems that can be done by students.

The first phase is updated in two weeks after initialization. In this phase show the in progress. There are two task that is in progress in the first phase include case research and design system that shows in in figure 2.

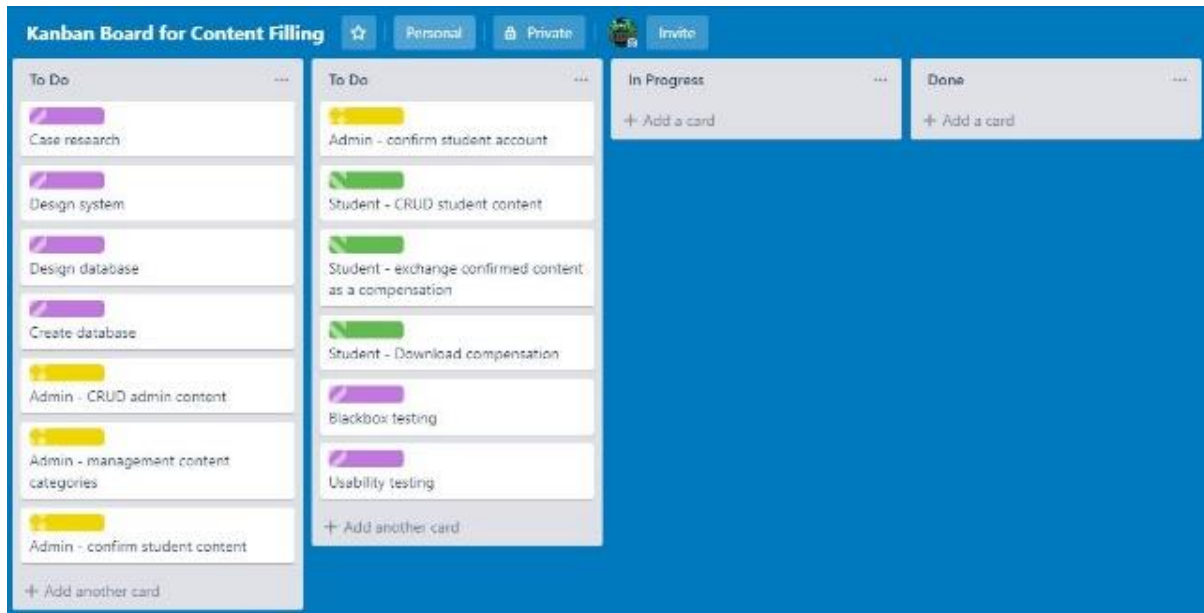


Figure 1. Initial.

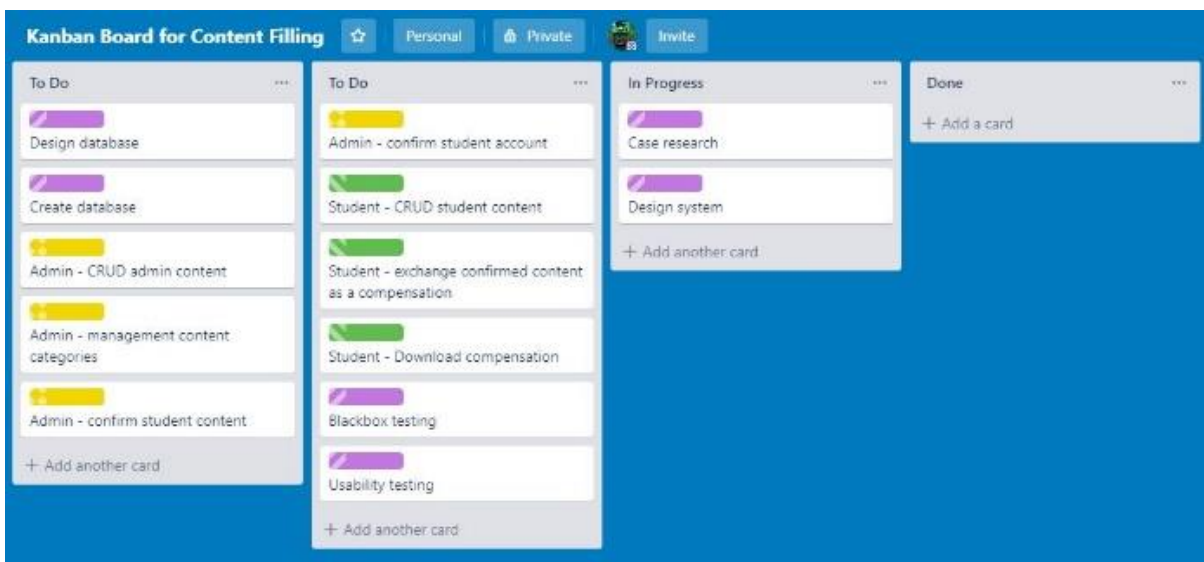


Figure 2. Phase 1.

From figure 3, we can see the progress of the method. There is one task that have been done, which is case research. And there is a task that have been done at “in progress” part included designing and creating database. There are ten phases for this system (figure 4). In the last phase shows that all task is done.

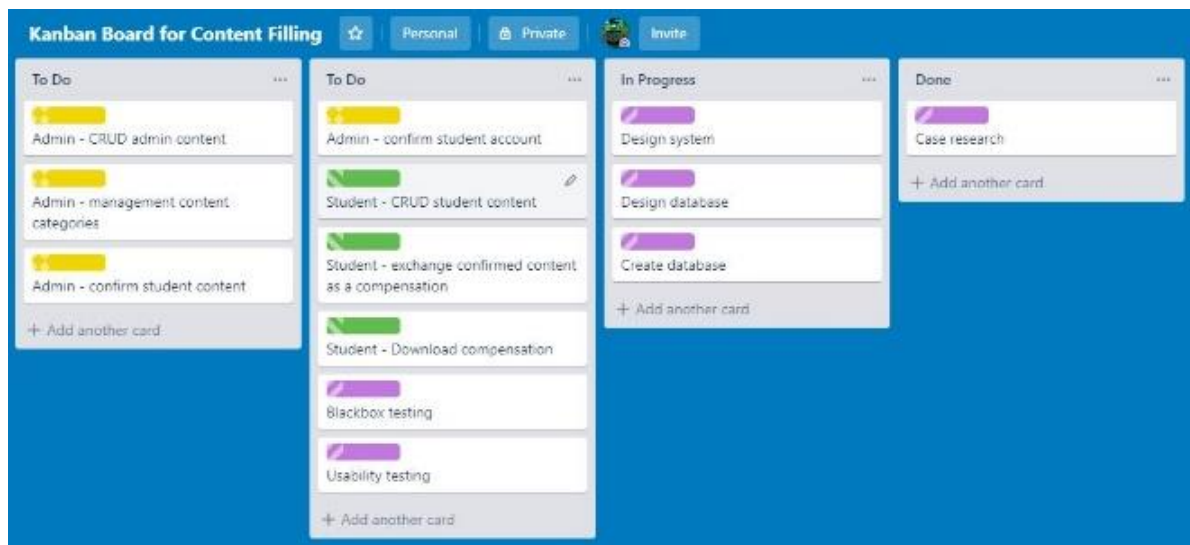


Figure 3. Phase 2.

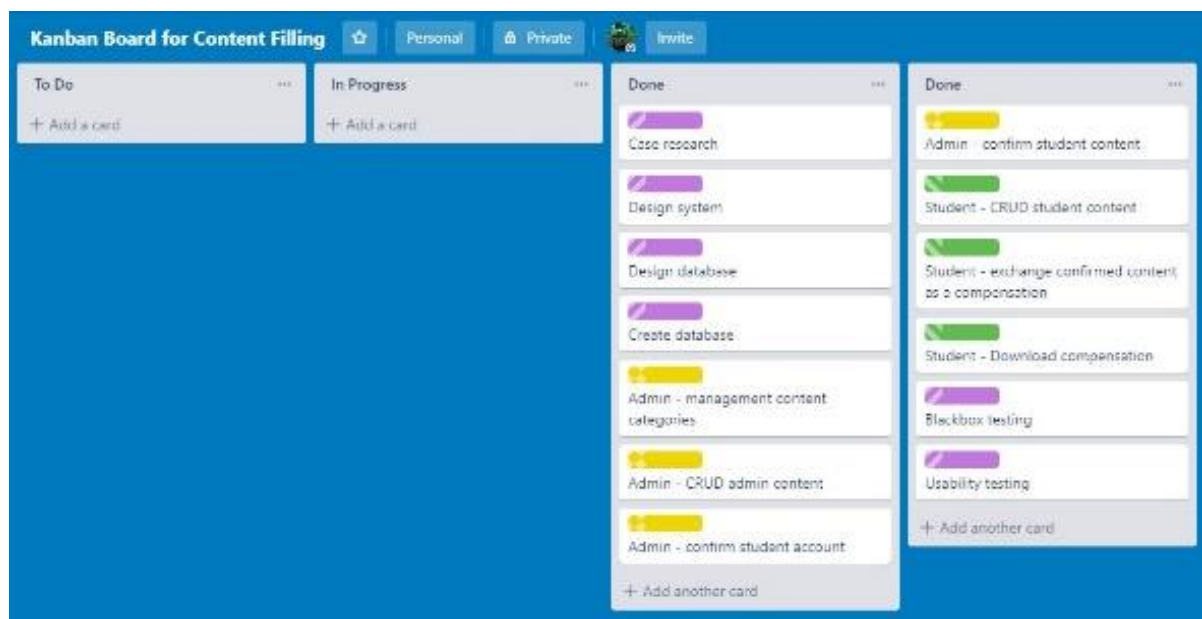


Figure 4. Phase 10.

4. Design implementation

Implementation of Kanban methodology is how much feature that done in time. Figure 5 shows activity diagram which is divided in three part namely students, system and admin. In this diagram, student can do compensation by upload content about JTI-Polinema with condition that their content status is “Accepted” or “Uploaded”. Each content that uploaded by student will be sorted by the admin to determine the content that will be “Accepted”, “Rejected” or “Uploaded” on the JTI-Polinema website. Content that get status “Accepted” or “Uploaded” can be exchanged to compensation. Student can submit compensation’s form if they have at least one content with status “Accepted” or “Uploaded”. Each one content with that status can exchanged as a one hour Alpa.

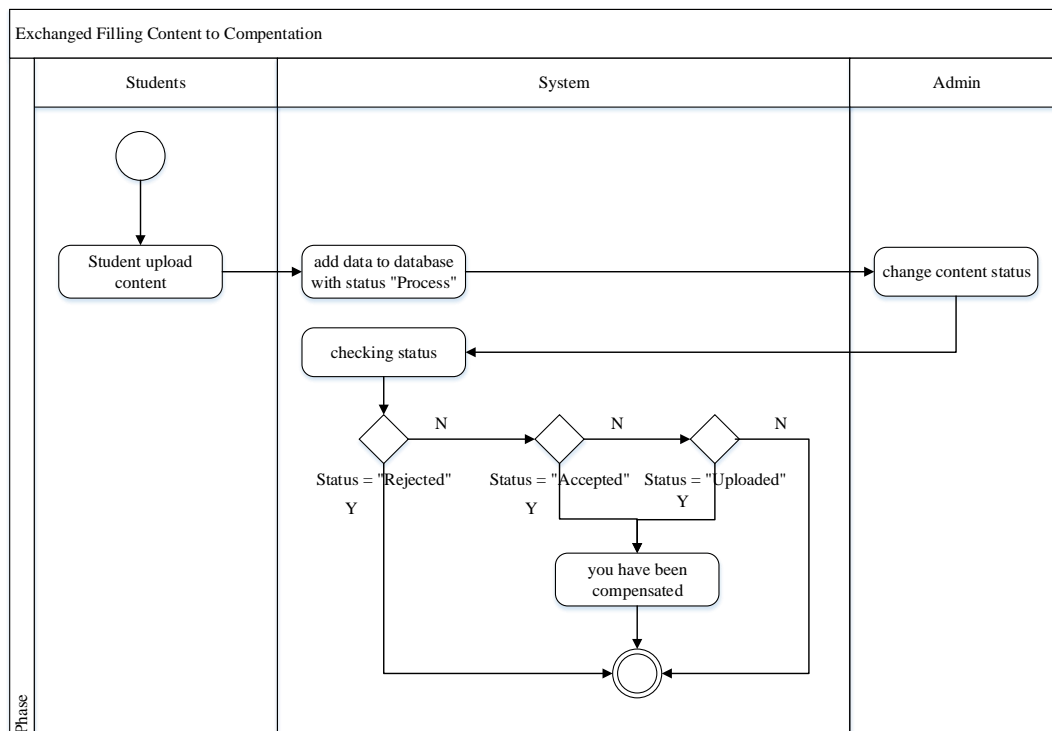


Figure 5. Exchange filling content to compensation.

Figure 6 shows admin's content. Admin can adding their own content. Each content that uploaded by admin will automatically show in the JTI-Polinema website. Admin also confirming each student's content status (figure 7). In figure 7 shows status of student content with different color. Yellow for "Process", red for "Rejected", green for "Accepted" and blue for "Uploaded". "Uploaded" means the content will be shown in JTI-Polinema website.

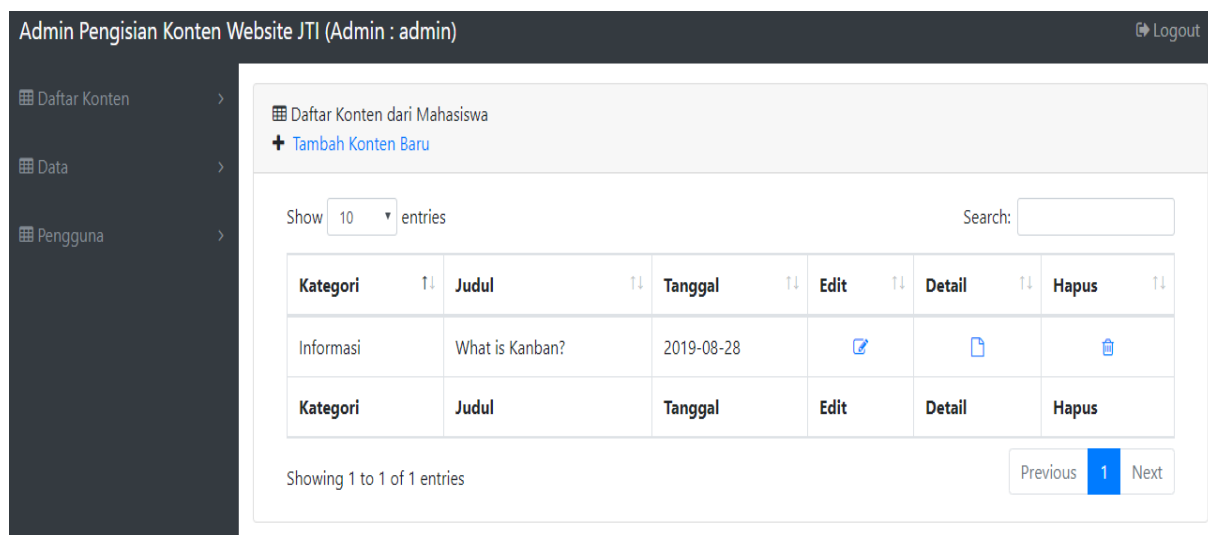


Figure 6. Admin's content.

Admin Pengisian Konten Website JTI (Admin : admin) Logout

Daftar Konten	>	Lomba	Lomba Pemrograman Jawa Timur	Lomba jawa timur	2019-06-10	Diterima			
Data	>	Lomba	Lomba Desain Multimedia	Lomba Desain Multimedia	2019-06-17	Diterima			
Pengguna	>	Lomba	Lomba Programming	untuk tingkat akhir	2019-05-29	Diunggah	Sudah Diunggah	Sudah Diunggah	
		Lomba	Lomba Desain Poster	Lomba Desain Poster	2019-07-16	Proses		---	
		Seminar	Workshop Pembuatan Dokumen Kurikulum	Pada hari Selasa , 29 Januari 2019 Jurusan Teknologi Informasi (JTI) menggelar kegiatan Workshop Pembuatan Dokumen Kurikulum yang diikuti oleh seluruh	2019-03-19	Diunggah	Sudah Diunggah	Sudah Diunggah	

Figure 7. Student's content status.

Each student content that get status “Accepted” or “Uploaded” can be exchanged to compensation. Students who have exchanged content for compensation will have a list of compensation (figure 8). Student can also see their content’s status in their own content list (figure 9).

Konten Website JTI Polinema Home Replika Web JTI Konten / Artikel Poin Leaderboard / Rank Profil

	Dwi Puspitasari (NIP : 197911152005012002) Jumlah Jam : 1
	Dwi Puspitasari (NIP : 197911152005012002) Jumlah Jam : 1
	Ridwan Rismanto (NIP : 197911152005012002) Jumlah Jam : 1

Figure 8. Student's compensation list.

Konten Website JTI Polinema Home Replika Web JTI Konten / Artikel Poin Leaderboard / Rank Profil

Daftar Konten/Artikel Saya 1234

No	Judul	Status	Detail	Edit	Delete
1	WHAT IS INFORMATICS? (2019-08-27)	Proses	Detail	Edit	Delete

Figure 9. Student's content list.

5. System testing

The testing of this system consists of three ways namely Blackbox and usability. The test scenario on this system is described as follows:

5.1. Blackbox

Testing using the Blackbox method is to observe whether each functional requirement that has been created can be run well [10]. Blackbox testing on this system is divided into two actors namely admin and students. Based on Blackbox testing with 20 feature features proposed, each features can run as planned. So it can be said the system can run well.

5.2. Usability

Usability testing is a qualitative analysis that assesses how easily the user uses the interface of the system made. Based on Nielsen's article, usability testing involved 5 user [11]. In this study, this test was carried out by distributing USE Questionnaire consisting of 4 namely [12]:

- Usefulness
- Satisfaction
- Ease of Use
- Ease of Learning

In this test, each criterion in the USE Questionnaire uses a 5-point Likert scale of response for the measurement scale of the user's response with the weight of each consisting of strongly disagree (1), disagree (2), doubt (3), agree (4) and strongly agree (5). Usability calculations are formulated as follows [13]:

$$usability (\%) = \frac{A + B + C + D}{4} \times 100 \quad (1)$$

Remarks:

A = presentation of usefulness values

B = presentation of the value of ease of use

C = presentation of the value of ease of learning

D = presentation of value of satisfaction

The USE questionnaire was distributed to nine people who have tried the system to fill the content to measure the usability level of the system.

From the results of the questionnaire the writer multiplies each answer point from the questionnaire by the weight of the available value. The formula used to calculate the index of each usability section is as follows [13]:

$$index\ value (\%) = \frac{total\ score}{Y} \times 100 \quad (2)$$

$$Y = Highest\ likert\ score \times Number\ of\ Respondents \quad (3)$$

Based on equations (2) and (3), the usability data will be generated, and from the data calculation it can be concluded that the results of the usability of each part are as follows:

Table 1. Usability testing result.

Assessment Aspect	Average Percentage	Status
<i>Usefulness</i>	87.2	Strongly Agree
<i>Ease to Use</i>	84.4	Strongly Agree
<i>Ease to Learn</i>	87.36	Strongly Agree
<i>Satisfaction</i>	88.85	Strongly Agree
Average	86.95	Strongly Agree

6. Conclusion

By using Kanban, the Application Development of Website Content Filling in the Information Technology Department of State Polytechnic of Malang that we do can be divided into 13 smaller tasks according to our needs. The development process can be done well and finished within 10 phases, with each phase runs for two weeks. The result of the development is considered feasible based on Blackbox testing and usability questionnaire about usefulness, ease to use, ease to learn and satisfaction.

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