The development of ppdb (admission of new students) application to develop the quality of new students’ recapitulation administration in vocational high school bumi cikajang

D D Bhakti*, S M Putri, I Nasrulloh, Tetep and S Nurkamilah
Institut Pendidikan Indonesia, Garut, Indonesia

*Corresponding author’s E-mail: demmy@institutpendidikan.ac.id

Abstract. Every year the Vocational of High School BMI Cikajang as the education executant accepted new students. Students who registered there were registered manually by filling out the forms and attaching some requirements. Related to the results of interview with the committee regarding the process of registration found the problems, those were the disappearance of data or the registrant forms due to mixed with other files and the lack of management administrative of new students recap by the committee. The purpose of study was to find out PPDB application can assist the committee in conducting the data recapitulation of new students and making efficient of the performance of committee. Waterfall implementation was employed as a design of study. To test the functional aspect, this study used black box testing, meanwhile to test usability aspect it used CSUQ. The test was conducted to whole prospective new students and the committee. The result of questionnaire was 88.2% with very decent criteria, it can be concluded that PPDB application can help the committee in recapitulation the data of new students; in addition, it can make efficient the performance of committee in conducting registration collectively.

1. Introduction
The use of information technology, especially on websites, has made it easier to promote and disseminate information globally. Therefore, the media that is currently the main choice of the community and students is the internet, where advertising or promotion can be disseminated through social networking media and websites. The use of technology is growing very rapidly among the community not only in the field of education but also in the field of business or e-commerce where the use of technology is very helpful for all those who need it, including educational institutions that also make various kinds of needs and complement the needs of users of technology utilization in the field education includes the creation of learning media, searching for material about online learning using smartphones, seeking information related to the world of education, and one of them is also how to register with school online.

Every year Cikajang BMI Vocational School as an education provider accepts new students in accordance with the laws and regulations Permendikbud 17 2017 [1]. New students apply to BMI Vocational School by registering to school independently or registering collectively to their teachers then filling out forms and attaching some requirements determined by the committee such as Credentials Graduated (SKL), Diploma / SHUN and Photo to the committee PPDB. In the current system, the writer
conducts an interview with the PPDB committee and the Deputy Principal of Student Affairs regarding the registration process which must occur every year as an education organization. The problems found in the system that are running in this school are 1) often the occurrence of data loss or registrant forms due to stacked with other files, 2) lack of administrative management of new student recapitulation by TU staff or committee due to stacked paper when receiving new students or teachers who register new prospective students, 3) there are often some requirements left by applicants, 4) there are those who do not know the registration procedure so that it requires ineffective time for registrants, 5) inefficient time for registrants located far from the BMI Vocational School. Therefore, the authors conclude that the problems at the BMI Cikajang Vocational School are the lack of administrative management of recapitulation of new students who apply to school because it is still conventional so it is not effective and efficient in collecting registrant files, often found some missing requirements even registration forms that not stored in place. Apart from that there is a problem if the registration system is carried out collectively by the teacher, many files and equipment must be brought by the teacher to the school where the registration is not close to the school then there are still additional problems such as file lag or incomplete.

Of the problems found above and considering the advantages of developing technology today, it is necessary to develop an application system that can help all parties in the registration process of new students, even for the registration of new prospective students whose students register not directly to school but collective by the teacher. One of them is in BMI Cikajang Vocational Institution that requires a system that can recapitulate the identity of prospective new students who register, can easily access new student admission applications are expected to facilitate the reach of prospective applicants independently or collectively, and can facilitate the administration in recapitulation of new students at SMK BMI Cikajang. However, Application development can be a deceivingly complex undertaking [2]. The successful IT-system is a combination of different factors, among them the high participation of the end-users in the whole development process, clear specification requirements, good planning and support from the stakeholder [3].

2. Methods
The product to be produced is a website-based application. This application can be used as a medium for registering prospective new students. In this study the author will use the Waterfall model. Waterfall is a sequential research method starting from Analysis, Design, Code (Encoding), and Testing [4]. This method has several advantages, one of which is this method is sequentially regular and the stages are easy to understand [5]. Figure 1 describe about waterfall model [6].

![Figure 1. waterfall model](image-url)

2.1. Analysis Phase
The analysis phase is the initial stage of research. Before conducting technical research, analysis needs to be carried out. This study refers to making a website-based PPDB application using the Waterfall method. So, the analysis is done by finding problems based on data obtained from information gathering interviews, questionnaires and research results directly. The first step in analysis stage is requirement gathering the needs of a software from the user or institution involved. Requirement gathering is an activity carried out to explore natural concepts or phenomena that exist in the realm of the problem, this
is the stage to capture and analyze the functional requirements of the application to enter the design stage. It is quite justified to state that requirements engineering is a critical success factor in systems development [7]. Analysis consisted of functional and non-functional. A functional requirement specifies what a system must do. A non-functional requirement represents constrains on the services offered by a system [8].

2.2. Design Phase
Development of the PPDB application at the Cikajang BMI SMK using the waterfall model, this application development tool uses Unified Modeling Language (UML) such as use case diagrams, activity diagrams, and sequence diagrams. Table design in the development of this application uses table normalization, entity relationship diagram (ERD), and data dictionary.

2.3. Code phase
The coding phase of the PPDB application at the Cikajang BMI SMK using PHP (Hypertext Preprocessor), MySQL (My Structured Query Language).

2.4. Testing Phase
Testing the functional aspects of the PPDB application black box testing with 27 scenarios test case for each and every function in PPDB application.

3. Result and Discussion
The software construction process begins with an analysis that determines the requirements of the system. At this stage the focus is on determining what the system must perform without regard to the methodology to be employed. To handle the results of the analysis, we will try to solve the problem with alternative solutions. There are several needs analysis conducted in this research process:

3.1. Analysis of functional needs
Functional needs consist of user needs and needs for the system itself. The main function of this application is as an alternative registration of prospective new students and administration of new student recapitulation with the concept to facilitate the registration process and recapitulation of new students through the website application. It is expected that this application can help the problems in registration and administration of recapitulation of prospective new students for applicants in general and for administrative staff or PPDB committee. This need is related to system users, namely PPDB administrative staff / committee and prospective applicants for new students who directly use the system.

3.1.1. User's functional requirements as a Committee or Staff.
- The system must be able to input data collection of prospective registrants
- Admin able to manage application content such as website identity, registration method, and PPDB information.
- Admin able to view and print PPDB data, check document completeness consisting of Family Card (KK) documents, Student Candidate Photos, SKL / SKKB (Pass Certificate)/(Certificate of Good Conduct).
- Admin able to manage the initial settings so that the system can run according to their needs, namely starting from information settings, user settings, and data management of prospective students and reports.
- Admin able to backup data to prevent unwanted things, such as damage to the server, the website is attacked by irresponsible parties so that it is damaged.

3.1.2. Functional needs of users as Prospective New Student Registrants
- Registrants able to view PPDB information.
- Registrants able to see information about the website.
• Registrants able to see information on how to register.
• Registrants able to see school contact information.
• Registrants able to register students online.
• Registrants able to upload / upload documents that consist of photo documents and pass certificate or certificate of good behavior (SKL / SKKB).
• Registrants can print the completed form when completing the online registration process.

3.1.3. System Functional Requirements
• Provides a login page for admin and PPDB committee as security in accessing and using the system.
• Provide online input pages (online forms).
• Displays messages both error messages and success messages for actions taken by system users.
• Displays information needed by system users
• Print a document that is accessed by system users, and
• Backup data for website application security.

All functional needs in this research will described with use case analysis. Use case analysis is a case-based way of describing the uses of the system with the goal of defining and documenting the system requirements. It is essentially a narrative describing the sequence of events (actions) of an external agent (actor) using the system to complete a process. It is a powerful technique that describes the kind of functionality that a user expects from the system [9]. Use case diagrams are responsible primarily for documenting the macro requirements of the system. Think of use case diagrams as the list of capabilities the system must provide [10, 11]. Figure 2 describe use case diagram of PPDB application at the Cikajang BMI SMK.

![Use Case Diagram](image)

**Figure 2.** PPDB application at the Cikajang BMI SMK use case diagram.

3.2. Analysis of nonfunctional needs
The application that will be created is a Website application. In the needs analysis this software defines what software is needed to make this application. The main software needed are Notepad ++, XAMPP, PHP (Hypertext Preprocessor), MySQL (My Structured Query Language). Analysis of hardware
requirements is done to determine the hardware needed to make the application. The hardware used includes using the Windows 8.1 Pro 64-bit operating system, specifications. Figure 3 describe an user interface of PPDB application at Cikajang BMI SMK which is built using PHP and MySQL as database.

Figure 3. PPDB application at the Cikajang BMI SMK.

Data collection strategies were carried out on 20 prospective new students, 5 committee members at the BMI Cikajang Vocational School. After giving questionnaires to prospective new students and PPDB committee using the questionnaire of the Computer System Usability Questionnaire (CSUQ) developed by IBM for standard usability measurement software [12]. The results obtained are the number of questions and the total number of scores, as shown in the table 1.

| Question Item                                                                 | Total Score / Question Item |
|-------------------------------------------------------------------------------|----------------------------|
| Overall, I am satisfied with the ease of this system.                         | 91                        |
| How to use this system is very simple.                                        | 96                        |
| I can complete the task effectively when using this system.                  | 80                        |
| I can quickly complete the task using this system.                           | 84                        |
| I can complete the task efficiently when using this system.                  | 81                        |
| I feel comfortable using this system.                                         | 87                        |
| This system is very easy to learn.                                           | 93                        |
| I am sure to be more productive when using this system.                      | 84                        |
| If an error occurs, this system provides a notification message about steps to be taken to resolve the problem. | 97                        |
| Whenever I make a mistake, I can go back and recover quickly.                | 93                        |
| The information provided by this system is very clear.                       | 93                        |
| Easy to find information needed.                                             | 95                        |

The results obtained from the number of questions and the total number of scores, total score = (total score of items 1 + ... + total score of item 19).
Steps to calculate the student candidate questionnaire and the committee:

Total score (x) = (total score of item 1 + ..... + total score of item 19)

Total score (prospective students)
= 91 + 96 + 80 + 84 + 81 + 87 + 93 + 84 + 97 + 93 + 95 + 85 + 93 + 98 + 96 + 81 + 90
= 1709

Total Score (committee)
= 23 + 21 + 20 + 21 + 22 + 23 + 19 + 23 + 22 + 22 + 22 + 23 + 24 + 24 + 24 + 22 + 22
= 419

Table 2. the result of the calculation of the prospective student questionnaire and the committee.

| Respondents       | Number of Respondents | Percentage of Response | Criteria       |
|-------------------|-----------------------|------------------------|----------------|
| Prospective Students | 20                    | 89.9 %                 | Very Worthy    |
| Committee          | 5                     | 88.2 %                 | Very Worthy    |

The results of the calculation of the table 2 is the result of the calculation of the prospective student questionnaire and the committee, obtained from the total score of 1709 student candidates and 419 committee, while for the maximum score if all answered strongly agree given a score of 5, the maximum score formula = (highest score per item x number respondent x number of items), so that it can be obtained by calculating the maximum score of prospective students = 5 x 20 x 19 = 1900 and the committee 5 x 5 x 19 = 475.

Steps to calculate the prospective student questionnaire and committee: Percentage (x) = (total score)/(maximum score) x 100%

Prospective Students = 1709/1900 x 100 = 89.9%
The committee = 419/475 x 100 = 88.2%

This research was conducted at Cikajang BMI Vocational School for prospective students and committee members. Researchers took samples of 20 prospective students and 5 committee members. Based on the results of the calculation of the questionnaire on 20 prospective students and 5 committee members, the presentation of prospective students 89.9% and 88.2% of the committee with very decent criteria was obtained.

4. Conclusion
Based on the description of the results of the analysis carried out during the development of the PPDB application, the following conclusions can be drawn:

- Development of the PPDB application at the Cikajang BMI SMK using the waterfall model, this application development tool uses Unified Modeling Language (UML) such as use case diagrams, activity diagrams, and sequence diagrams. Table design in the development of this application uses table normalization, entity relationship diagram (ERD), and data dictionary. Testing the PPDB application using black box.
- The functional aspects of the PPDB application fulfill the results as expected, as evidenced by 27 black box tests with 27 scenarios with the conclusion of each scenario "running".
- The web-based PPDB application helps and streamlines the performance of the committee in the data recapitulation process for prospective new students, who no longer depend on recapitulation in the form of sheets of paper and photocopies of the required file but now uses the PPDB application which makes the committee easier and faster and more accurate. It was proven based on the results of testing
by usability testing on PPDB applications and from the results of the questionnaire given to a sample of 20 prospective applicants / prospective new students and 5 PPDB committees, with the percentage of prospective students 89.9% and PPDB 88.2% stated according to Guritno percentage of 81% - 100% entered the criteria of "very decent".

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