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AN ANDROID-BASED E-OBSERVATION APPLICATION ON LESSON STUDY LEARNING IN VOCATIONAL HIGH SCHOOLS

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Abstract

This study aimed to design an Android-based e-observation application on lesson study learning in vocational high schools. The application made was a digital tool to record the learning process on lesson study comprising plan, do, and see steps. These three steps are the signature of lesson study learning. The procedure of the application development used a waterfall software model-V. The process started with designing the application using Balsamiq Mockup software. In terms of design, the results of the application consisted of the splash screen, login page, menu page, lesson planning in PDF, camera to record the learning process, and video saving with notes. The e-observation application was based on Android operating system to observe, record, distribute information, and evaluate the learning process in a more practical way. The whole processes of the plan, do, and see of the lesson study were recorded well so that it was an integrated part of the quality improvement of the lesson study learning.

Keywords: Android-based e-observation application, Digital tool, Lesson study, Plan-do-see steps.

1. Introduction

Lesson study is a learning approach supporting the development of professional learning [1]. The main goal of professional learning in lesson study is student-centred learning. Consequently, this stimulates teachers to plan, observe, and evaluate how teachers and students should ideally interact with each other in learning processes. Schipper et al. [2] and Riza et al. [3] mentioned that the planning process in lesson study namely "plan" is carried out in a collaborative and inquiry-based way focusing on students' learning activities. In the "do" process, there is support from the colleagues as their observers for mutual interaction [4]. One of the evaluation models, namely lesson study evaluation model, reflects the relationship among the context, process and outcome of learning [5]. The model shows that lesson study embraces the principles of adaptive learning, where teachers need to harmonize such aspects as learning the purpose, learning material, method, and individual needs in learning [6].

One of the special features in lesson study is observation [7], in which, the learning processes are observed by fellow teachers to evaluate both teachers and students' learning behaviours. This process is an attempt of collaborative working to enhance teachers' professionalism in giving the best services to the students [8] as in the context of lesson study, observation is a part of its strengths especially in terms of continuous evaluation [9]. The observation process is considered "noticing", in which, observers analyse what is happening during the learning process, particularly on the students' learning behaviours, either as groups or as individuals [1]. According to Bjuland and Mosvold [10], data collected from the observation process are the empirical data performing as "the main materials" in the reflection step namely "see".

To date, most of the learning processes in lesson study have been analysed through manual observation. In this process, observers use a paper and pencil - based assessment tool to take notes on what is happening during the learning, aiming mainly to come up with effective evaluation [11]. It is believed that this type of observation has not worked comprehensively. In addition to incomprehensive results, the observation cannot be documented in the long term as well [12]. Therefore, an assessment tool enabling observers to have a more comprehensive and effective observation is necessary. There has been an implementation of the use of a digital tool in the "do" step by utilizing e-rubric [13]. However, the use of digital tools is also needed for the other two steps, "plan" and "see", to have complete information for comprehensive evaluation.

With regards to the aforementioned facts and reasons, this study aims to design a digital tool for the observation process in the lesson study steps namely "plan, do, and see". The digital tool is an android-based application namely e-observation. The Android operating system is selected to have an easier and more accessible observation with supporting features. Therefore, the use of e-observation in lesson study is expected to come up with more effective evaluation since it can be displayed repeatedly to actually dig out what is happening during the learning process.

2. Method

E-observation is an Android-based application used in lesson study. The application consists of two parts, backend and frontend. Backend works to control

data displayed in the frontend part, such as to manage username and password for observers. Backend part can also insert files to use in the lesson. On the other hand, frontend part is used on the observation process of lesson study learning.

The procedure of the application development administered waterfall software development model-V (Fig. 1.), which comprised the following steps communicating, planning, modelling, construction, and deployment [14]. The application development process is shown in Fig. 2.

Figure 2 is the procedural steps of the development of the android-based e-observation application. It is explained that, for instance, when one presses the login menu and inputs their username and password, run login.js is running. In addition, when one chooses one among the three options "plan, do, and see", DB, content, and camera are running. Finally, when they push the logout menu, logout.js is running.

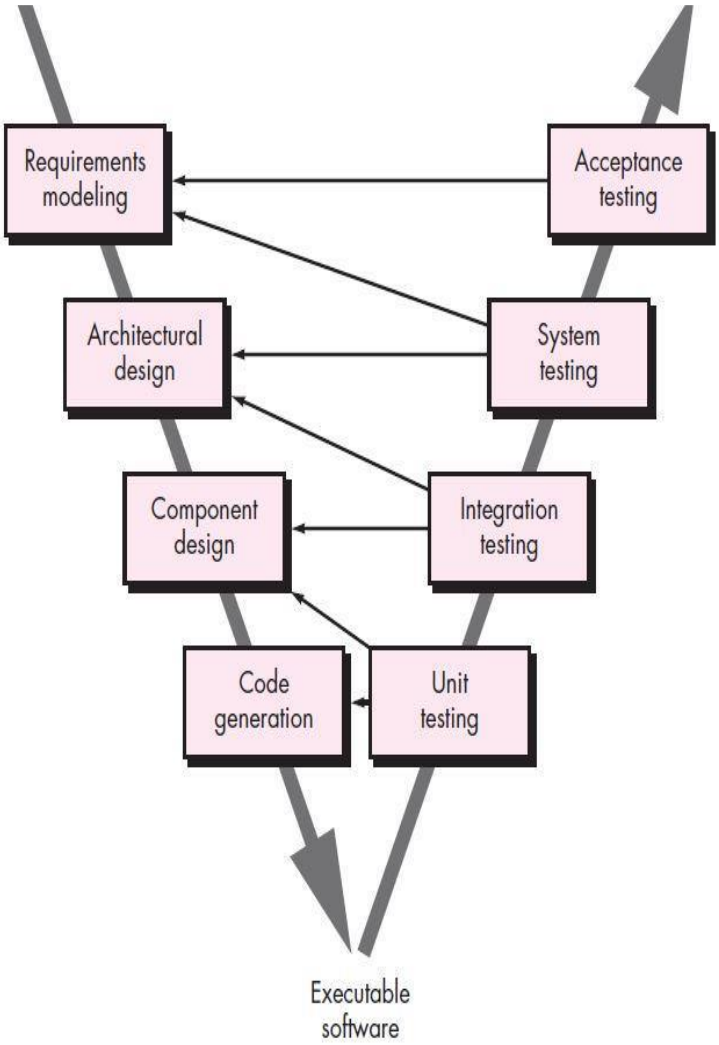

Fig. 1. Development of waterfall software model-V.

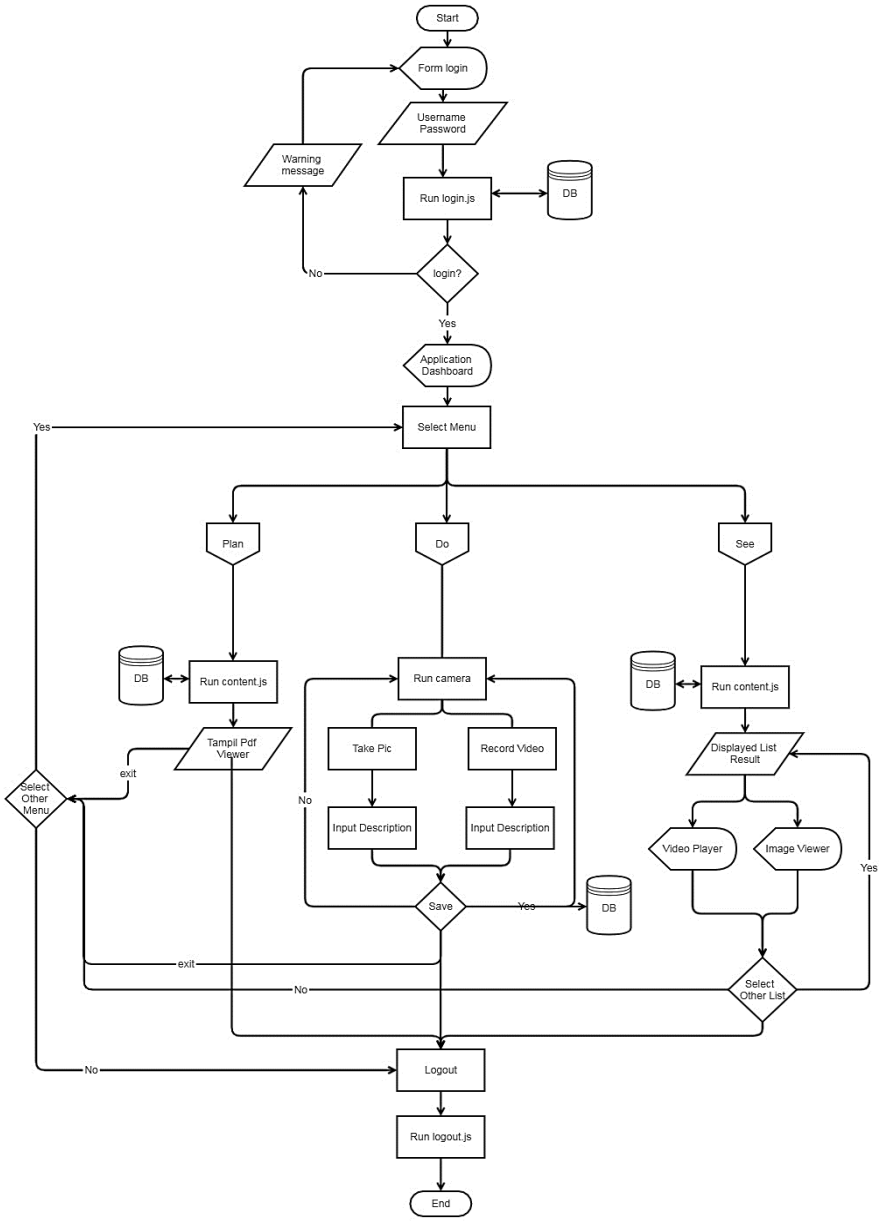

Fig. 2. Development of android-based e-observation application.

3. Results and Discussion

3.1. Design of e-observation application

The design of e-observation application mainly aims to provide a better observation tool for lesson study observers. The design starts with the application development using Balsamiq Mockup software. Figures 3(a) and (b) show the development of

the e-observation application, which is planned to implement in all the three processes of lesson study learning namely "plan, do, and see".

Figures 3(a) and (b) show the splash screen of the e-observation application and the login menu using username and password so that observers can join in the lesson study observation.

Figure 4(a) displays the menu page consisting of three options of lesson study, which are plan, do, and see. Figure 4(b) shows the lesson planning designed by the teachers in the plan step. Through this application, observers can do check and recheck the plans made by the teachers. The scenario made by the teachers are also the outline to start the lesson and keep it on track.

Fig. 3. (a) Splash screen, (b) Login page.

Fig. 4. (a) Menu page, (b) Lesson plans (plan).

Figure 5(a) shows the feature of the application, which can record the learning in the form of videos. The video can be recorded in a certain duration as needed. Figure 5(b) shows the feature of the application that can save the videos as the observational results of the learning. There is also a facility of note-taking, which functions to select the information needed for the discussion on the reflection session, or in the "see" step.

After all the designs have been made, an interface application making process takes place next. The process of shifting the design into the application interface uses Android Studio (Fig. 6). This model is becoming popular particularly in tool automation model [15].

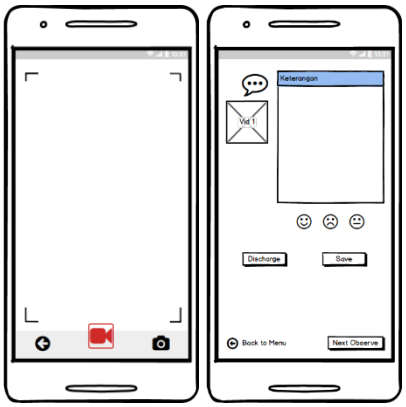

Fig. 5. (a) Use of camera to record the learning process, (b) Videos saved along with the notes.

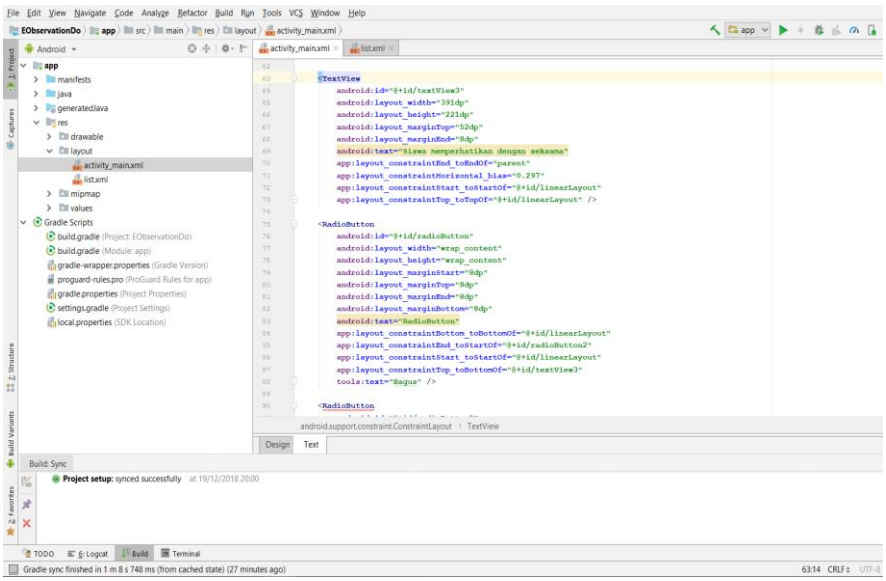

Fig. 6. Process of application making using Android Studio.

3.2. Implementation of e-observation application design

The implementation of the e-observation application made by Android Studio is then tested. The results of the test can also be used in all the three learning processes of lesson study, namely "plan, do, and see".

In the planning process, observers are presented by the learning design in the form of PDF (Fig. 7). The learning design has been uploaded by an admin.

Based on studies by Bjuland and Helgevold [16], one of the benefits of lesson plan lies in its sessions showing the existence of collaboration between interthinking and interaction where lesson plans can be clarified and confirmed within the process of learning through dialogic processes.

In the next step, which is called "do", observers can use the application for an observational tool by recording students' learning activities in the form of videos and taking notes about them. Observers can also record the activities in the form of pictures and still take notes on the captures (Fig. 8).

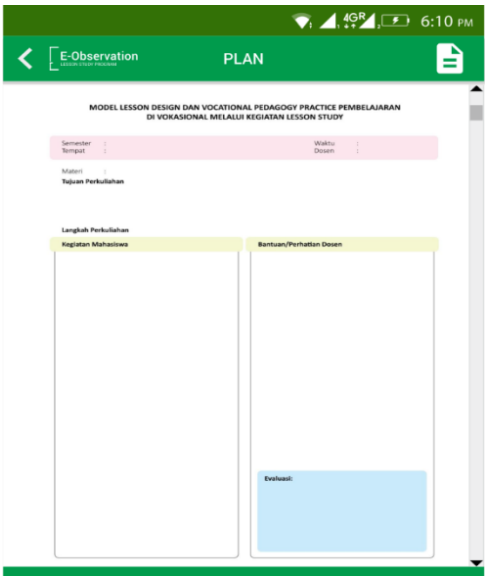

Fig. 7. Display of e-observation application on plan step.

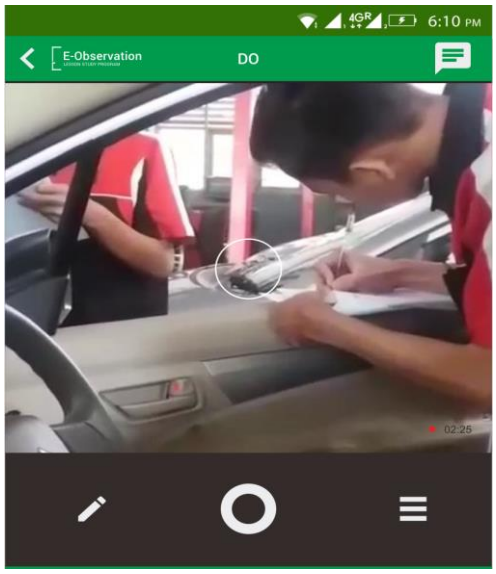

Fig. 8. Display of e-observation application on "do" step.

On the "do" step, the process elaborates the relationship in the learning procedure, especially between the process and the objective of lesson study [17]. E-observation can also lead the learning process to be in line with the learning objectives set.

In the next step, namely "see", e-observation application can help observers evaluate the learning by replaying the videos, photos, and also their notes. Thus, observers can discuss the results of every video and picture recorded (Fig. 9).

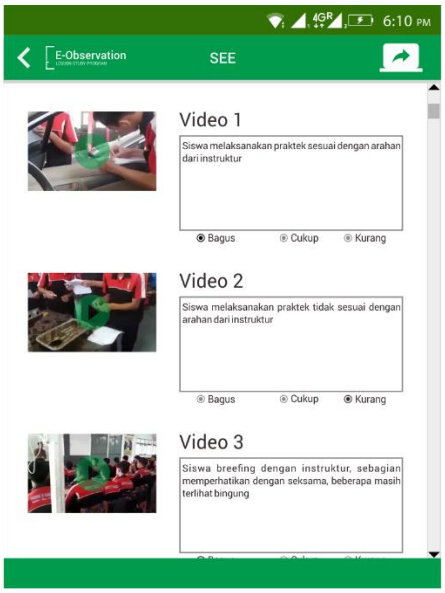

Fig. 9. Display of e-observation application on "see" step.

Digital tools implemented in lesson study is beneficial, especially in the contexts of collaborative information and learning [18]. In this session, both teachers and observers can exchange information based on their observation in a variety of forms such as notes, pictures and videos.

The unique characteristic of lesson study with the existence of observation proves that lesson study is trying to have accurate teacher-student activities during learning processes. The structure of lesson study, which starts with "plan" shows that there is an important correlation among planning, teaching, and assessment. This initial step is a planning step, which is an important aspect of the pedagogical decision and pedagogical black box, which interpret the entire processes of learning anticipated from the beginning when there are obstacles [1]. The use of digital tools in learning has been proven to be effective in improving the quality of learning in comparison with the use of traditional learning, particularly in learning perception [19]. The use of technology in the pedagogical content context also makes it easier for the students to understand the contents of learning [20].

4. Conclusions

Designing e-observation application in lesson study is an important digital tool to record, distribute, and present the learning process. The important finding of

this study is that the learning processes in lesson study are a prototype with unique characteristics in three steps namely "plan, do, and see". The three processes are integrated meaning that they are closely related to each other. Replacing the manual observation, this application gives more significant contribution since the observational results are saved in a well-documented way and are available in long terms.

Acknowledgement

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