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Mobile Video Learning for Improving Programming Competency

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G D P Maramis*, V R Palilingan, and M Modeong

Universitas Negeri Manado, Tondano, 95618, Sulawesi Utara, Indonesia

*gmaramis@unima.ac.id

Abstract. Programming competency is a must competency that every student who are studying computer science must have. Mostly of the student are struggling learning this skill especially for those who do not have any computer background. The objective of this research is to design and develop e-learning using videos and tutorial to provide content of programming skill that needed by the student to increase their coding skill. Student can watch this video many times to have a fully understanding about the topic. Research and Development method are used by this research to design the video learning that can be accessed using mobile phone. As the result, the programming skill of the student increased rapidly.

1. Introduction

Nowadays, learning concept using internet technology has been an alternative learning tools for lecturer for making education becomes more interesting, effective and efficiency. This sort of teaching style known as Electronic Learning (e-learning). E-learning it-self is a kind of schooling form that enables students to study anytime and anywhere using internet technology [1]. On the other word, e-learning is a learning method that uses internet [1]. In the scope of education, e-learning is said to be able to convert the conventional learning process into digital, because the learning process using e-learning is an innovation where students can get a material description of the lecturer in visual form with a more dynamic and interactive packaging.

E-learning offers the ability to share material in different types of formats such as video, slideshows, word documents [2], and easy access to lecture assignments. These facilities make e-learning interesting among teachers and students, because students can easily get teaching materials, tutorials, and even tasks with one access. Mobile video learning is one of the e-learning features that is expected to boost student programming skills. Therefore, the existence of video learning can give the students an opportunity to understand and analyze the complexity of the practice of an area of work which will increase student competence in that field [3].

The existence of video learning becomes increasingly popular in the field of education because of its ease in conveying learning and tends to be repetitive, thereby minimizing the possibility for students to be unprofessional to their field. As learning programming that occurred in the Faculty of Engineering UNIMA, lecturers have to repeat the lecture material when there are students who are not familiar with the topics that have passed. This condition can be said to slow down the material that is supposed to go forward. However, the existence of mobile video learning makes it easy for students to repeat past learning by accessing a site via their mobile phone. Brecht [4] supports the existence of learning videos because the existence of this medium can provide a model of evaluation and problem solving to students'

understanding, thereby increasing the ability of students to their field of expertise, especially on programming skills.

Another benefit that can be gained by implementing mobile-based learning videos is the space for learning to be broad. Some of the most frequent conditions are student interaction with limited learning. However, with this mobile video learning application enlarge the learning space and student communication to the material being taught. Significantly, the use of mobile video learning is revolutionary because it extends beyond the classroom structural boundaries and communication [5]. In his research, Admiraal & Gielis [3] also stated the existence of video learning can provide five benefits for its users, namely: (a) construction of knowledge, not reproduction; (b) conversations, not receipts; (c) articulation, not repetition; (d) collaboration, not competition; and, (e) reflection, not a prescription.

Mobile video learning is developed with the aim to facilitate students to be able to access course material easily and without being limited by lecture schedule. So that students can learn from anywhere and whenever they want. Furthermore, mobile video learning is intended to improve the skills of programming students majoring in Software Engineering (RPL).

2. Methods
Delivering high-quality and reliable software in modern software industry is a must, therefore, choosing the right method for developing software should be carefully planned. By selected wrong models will cost low-quality and high-cost software products [7]. Extreme programming (XP) is a developing software models. XP is a methodology that emerged as a counter-reaction to the ever increasing focus on processes [6]. XP model is an agile software development methodology founded by Kent Beck in 1996. This kind of methodology is a lightweight method that considered suitable for small and medium sized teams between 3 and 10 engineers [12], small project [8] and used for developing mobile application [9]. Five core values of this method namely simplicity, communication, feedback, courage and respect [10] [11]. Every software development methodology has its own life cycle. Thus, developing mobile video learning employ XP methodology has its life cycle which can be described into five phases, which are exploration phase, planning phase, Iteration to release phase, Production phase, maintenance phase, and finally death phase [8]. These phases are drawn in figure 1.

Figure 1. Life cycle of Extreme Programming

2.1. Exploration phase
This phase, is the first phase, in which deals with the requirement, architecture, tools and technologies This phase produced user story cards which is comprises of short name, priority of story and small paragraph without technical details. User story should be detailed enough to help developers have a fully perception of system requirement and time estimation [8].

2.2. Planning phase
Once the exploration phase passed, planning phase should take a place. In this step, priority is set for the user stories, estimation of effort and schedule for each story is decided [12]. Therefore, it is very important to have a full picture about the software that is being developed before move to the next phase.

2.3. Iteration to release phase
Iteration to release phase is the phase taken once the developer has a fully understand about the software requirement. In this stage, some basic development activities like designing, coding, testing and integration takes place. The result of planning phase will break down into number of stages, in which every single stage will take one to four weeks to implement [12]. Finally, the system is ready to be produced.

2.4. Productionizing phase
XP method produces software in small releases. A release is a small part of proposed software that need to implemented in order to fulfill the business process of the project. This phase is about developing software in small releases to check whether the application is ready for production, testing the acceptance rate of the software by the customer, and also testing the performance of the software is taken place. This phase takes an important role as this phase decides whether the system should be revised or not. [12]

2.5. Maintenance phase
Maintenance is a natural process for system software. In this phase, when the functionality is developed, the old system must keep running to ensure that the entirely system will perform well and the new features that has been released are suitable for the old system to satisfied the customer needs [12].

2.6. Death phase
Death phase is the final phase where the customer satisfied with the software and the software is ready to be released and used by the user. As the result, a document paper about five to ten pages is created. This paper describes the future use of the software [8].

3. Results and Discussion
While this e-learning can be accessed properly with the mobile phone, it also can be viewed best through web browser. It is designed and made to be accessed through those kind of technologies so the students can choose which one is suitable for them. When the user first to come to the system, they must sign in into the system before have page that will alow the user to choose subject that he wants to study. If the student has already had an account than he can use the account to access all of the materials offered by the e-learning system. Once the system authenticates the account, student will redirect to the page contains programming subject, in which every subject has a specific title for this lesson. User can choose which title he wants to learn by clicking on that title and the video explains the title will show up to the screen. For convenience, user can download the video so the user will not need the internet if he wants to replay again the video. If the user feels unsatisfied with the video, the user can choose to read from the written tutorial for better explanation. Figure 2 shows the flowchart diagram of this e-learning system.
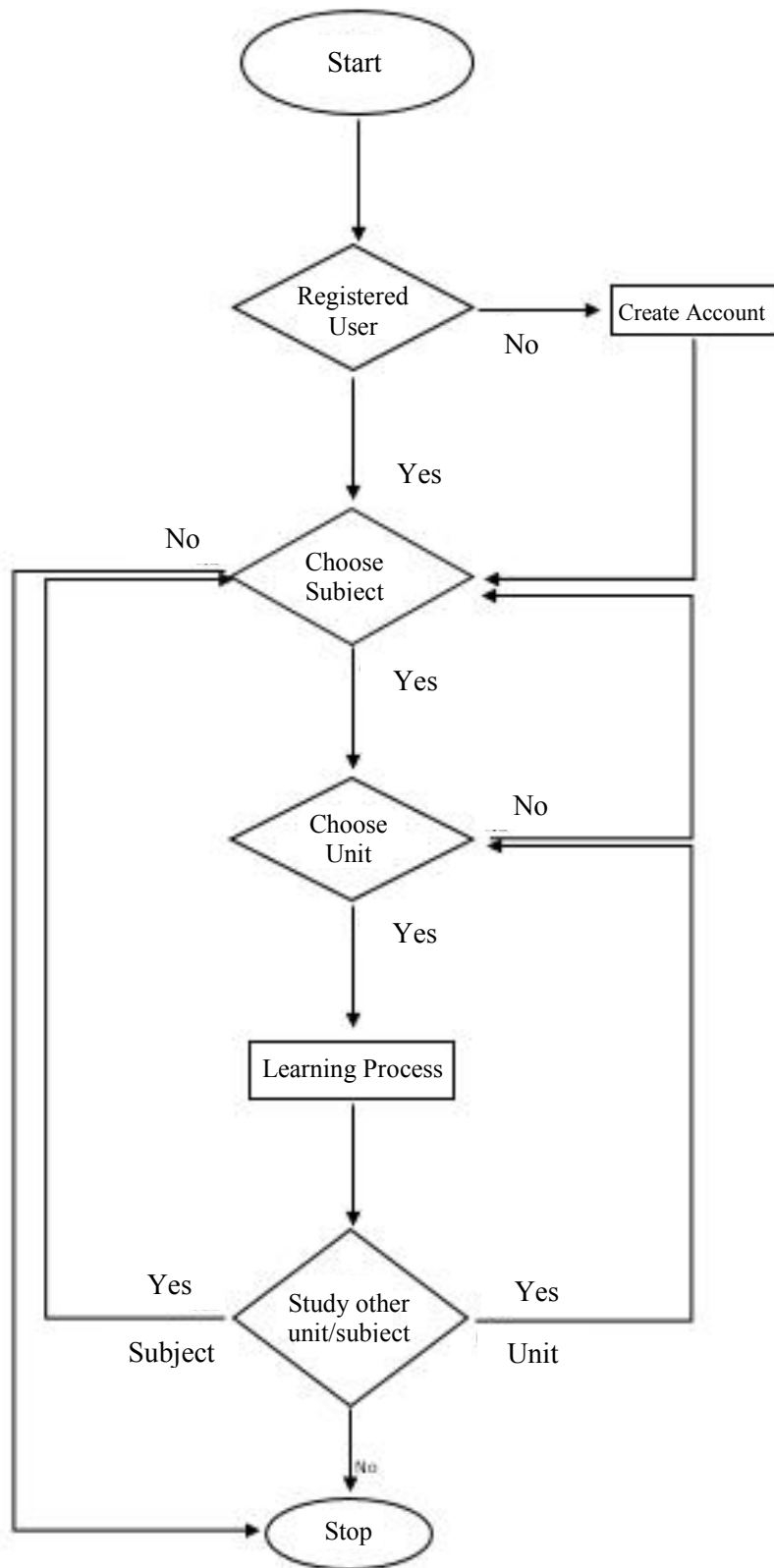
Figure 2. Flowchart diagram

Figure 3. User Interface and Login Screen

As can be seen figure 3 shows the user interface of the e-learning system that will show up for the first time. In this page, user must enter their valid account for accessing the material, otherwise, they must sign up for creating a valid account. The next page will come up is the welcome page. This page show number of programming subjects user may select. Figure 4 shows the welcome page where the student may choose the subject. Every subject contains number of meeting in which every meeting contains different subject that can be taught through video tutorial or written tutorial. This page is shown by the figure 5. As the result, the students can have a better understanding of programming as the material can be accessed many times anywhere and anytime as long as the user has an internet connection to download the materials. The reason why the skill of the student has been increased because the student can watch the video many times until they have a good understanding. When the user seems to struggle with one material, students can ask to the lecturer when they have an off-line class. Therefore, an off-line class also still needed by the students and the lecturer.
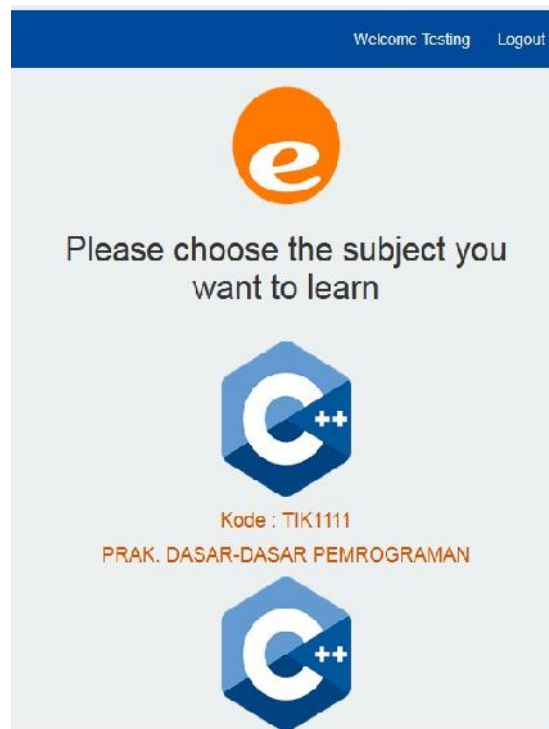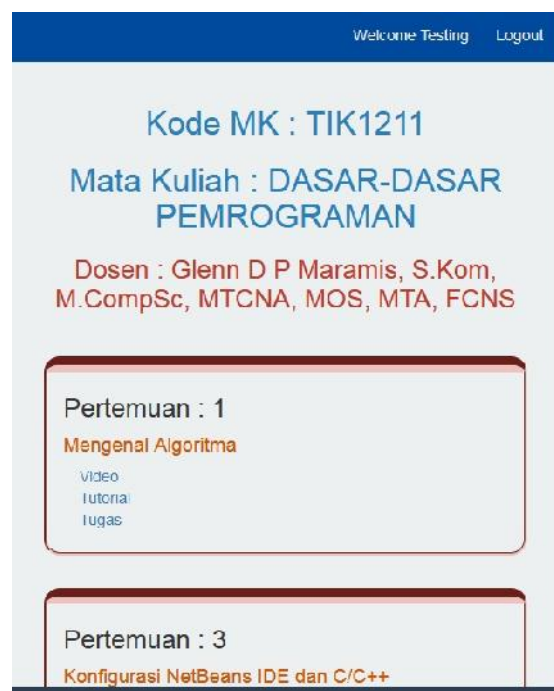
Figure 4. Welcome Page

Figure 5. Learning Material

When the user clicked on video link, the video related to the material will shows on the screen. This video is taken and embed in the system. This screenshot video is shown by the figure 5.

Figure 6. Screenshot Video

4. Conclusions

To sum up, mobile video learning has been improved the knowledge and programming skill of the students. When the material can be accessed through the e-learning system, students can learn any time they wants and when they forgot the passed material, the material is still available on the internet and can be accessed anytime and anywhere. For the further research, the e-learning system may be added with chat feature so the user can have a chat with the tutor instantly when the student has a problem.

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