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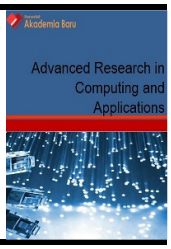

Mobile Learning Application for Enhancement of Teaching Tool in Java Programming

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ABSTRACT

Programming is a basic subject to several areas of technology. However, many students frequently faced a difficulty to understand the programming characteristic and visualize problem solution using programming. It is can help students improve their performance and attitude towards Java Programming Language. This method given hands-on experience and also learned through their experience. This paper study of mobile learning application used to help students improve their skill in Java Programming Language

1. Introduction

It was globally known that programming courses are generally regarded as complex and difficult, particularly to novice students [4,6,12,14,20]. In fact, it is considered as one of seven grand challenges in computing education [15]. Based on this studies, among the problems frequently faced by them is a difficulty in understanding abstract programming characteristics as well as to relate the program development environment with real problems [1]. In many Malaysian Polytechnics there are, on average, 40 students to one teacher, resulting in some students not getting the individual attention they may require. This also contribute to lack of motivation or students may have difficulty understanding the level of Java programming as they lack the critical pre-requisites. Students may not always be able to complete the required curriculum on time; students have multiple intelligence and it may be very difficult for one teacher to cater for the multiple intelligence of an entire class especially with limited time [11].

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2. Related Literature

2.1 3D Visualization Animation

Animation typically relates to movies, cartoons or special effects. Though, there were many positive result showing that animation has significant contribution within the education field too [3][16][8]. Studies show that implementation of animation in learning has led to promising outcome since decades ago. Animation plays a potential role in improving the human learning process, particularly in promoting profound understanding of the subject matter experimental section can be divided into subsections, the contents of which vary according to the subject matter of the article. It must contain all the information about the experimental procedure and materials used to carry out experiments.

2.2 From Electronic to Mobile Learning

Owing to the swift advancement and popularity of wireless communication and mobile technologies, Mobile Learning has become more and more important [13]. Mobile learning initiated from the evolution of portable, lightweight devices, which sometime seven fit in a pocket or in the palm's of one hand. Examples of these devices include mobile phones, smart phones, palmtops, handheld computers or PDA and also laptops and tablet PC. This device support mobility and can be used for communication and collaboration. Meanwhile Electronic learning or e-learning describes education and communication exchangeable using electrical device, which most suitable device is a desktop. The main difference between this two is the mobility aspect. The mobile devices mostly have much in common attributes with other type of e-learning on desktop computers but the advantage is that it is smaller and easy to carry. A group of researcher [9], agreed that mobile learning is a new stage of the progress of distance learning (d-Learning) and electronic learning (e-Learning).

2.3 Active Learning Strategies

Active learning is generally defined as any method of teaching that involves students in the learning process [19]. Programming skills cannot be obtained directly if they have not actively engaged in learning activities [10]. Abstract concepts in programming can't be concrete unless students are given hands-on experience that will make the concept of being clear and also learned through their own experience [18]. Therefore, as 3D visualization is beneficial for students to comprehend the abstract concept of programming, it is essential to administer an active learning strategy in order to guide student to actively engage with the tool. This can be implemented by utilizing Engagement Taxonomy (ET) proposed by [17], the modes by which students could become active participants in exploring with a 3D Visualization. Without a strong pre-existing knowledge, active involvement may be limited. In this regard, to study the impact of the engagement level and programming learning performance would be of a great value and interest.

3. Methodology

3.1 Research Setting

The software development approach designed for the 3D Programming: Mobile Java Programming Language based learning project can best describe with the following elements:

i. The chosen software development lifestyle is window or Android as an operating system.

ii. Develop 3D Programming: Mobile learning application that can use as learning tools to the student in Java Programming Language class. The application should be test by using the pilot test.

The phases of software of development life cycle relevant to the project using ADDIE Model. Selecting an appropriate software development life cycle model is important to a software project in that it ensures a structured approach to delivering an information system that works for the users.

Table 1
Engagement Taxonomy Level [17]

No.	Engagement Level	
1	No Viewing	There is no use of visualization tools
2	Viewing	Considered the core of student engagement with the visualization tool. Students only view the behavior of program activities from screen display.
3	Responding	Learner interacts with visualization by responding to visualization's related questions.
4	Changing	Visualization or state of visualization can be altered.
5	Constructing	Learner can create own visualizations.
6	Presenting	Learner presents visualizations for discussion and feedback.

3.2 Research Design

The most widely used for developing new training programs is called Instructional Systems Design (ISD). The ADDIE model or some derivative of it provides designers with the necessary structure for designing any curriculum, regardless of the instructional methods employed [2].

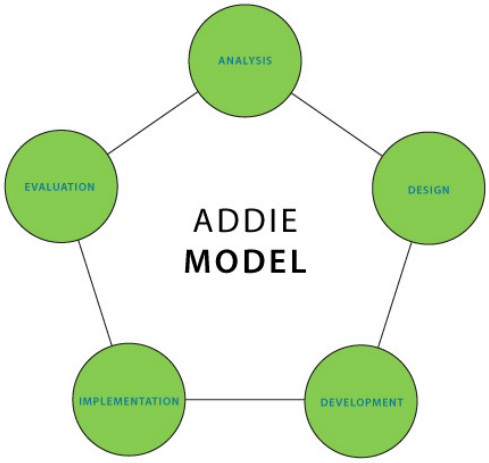

Fig. 1. Work Flow based on ADDIE Model

During the Analysis phase, the designer identifies the learning problem, the goals and objectives, the audience's needs, existing knowledge and any other relevant characteristics [5]. Several software packages were used in the courseware authoring process such as hardware, word processor, elements of multimedia, and voice recording software. During Design phase, developer give more attention the kinds of skills required to achieve the goal specific learning objectives, presentation methods and media, learner exercises and assessment criteria to be used. The appropriate interactions were determined. They should be creative, innovative and encourage learners to explore further [7]. During the development phase, all audio, video and text are collected, prepared or

created. This phase sees the designing according to storyboard specifications and also focuses on programming according to storyboard specifications [7]. Implementation phase are delivers the 3D programming where the application is actually presenting and delivering the developed plan to the target learning group or audience. Audience need to download online 3D programming mobile application. After delivery, the Evaluation phase assesses the effectiveness of the topic content, objective and training materials utilized in the 3D programming application.

4. Conclusion

Programming courses are closely related to skills comprises the set of sequence or order through the programming language which then is translated and executed by a computer. However, the subject is said to be difficult and complex. This is because novice students require a proper understanding to capture an abstract concept of the learning and difficult to imagine. Previous finding shows that amongst factor students' difficulty to master programming is because they could not visualize the programming process. Therefore, the designed and developed 3D visualization is function as the potential learning support tools to strengthen students' understanding of the programming learning process. 3D visualization using the approaches and techniques of dynamic performances in illustrating the changes to the program code and thus helping students grasp the changes that occurred to the program states. Nevertheless, using 3D visualization merely without the active engagement of students will not be able to give an effective impact on students' programming performance. Therefore, an active learning strategy is functions as an approach that must be embedded in the learning process of programming.

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