SIM FOR SCIENCE: SCAFFOLD IN INQUIRY-BASED LEARNING

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Research Highlights

Inquiry-based learning is a form of active learning that starts by posing questions, problems or scenarios. Inquiry-based learning is an indispensible element for the generating of higher order thinking skills that assist students to inquire meaningful questions that led to relevant answers. It is essential to provoke students’ interest and bewilderment. Recent advancement in technology have captivated the enthusiasm of both educators and researchers to develop an inquiry-based classroom activities that emphasize on the application of educational technology in the domain of school science education. Thus, we have designed a learning application “AIBASE”, which assists primary school students in generating hypotheses during Science experiments. The Triple E evaluation framework was used to determine the effectiveness of using “AIBASE” in aiding the learning process. The results implied improvements on students performance level. In addition, this paper also highlights the main criteria of inquiry-based learning.

Research Objectives

Education in Malaysia has been growing rapidly due to the increasing of students, education programs and learning institutions. In these globalisation era, critical challenges faced by learning institutions is to enhance the quality of the institution. Quality human resources is one of the challenges that need to be focused on. The challenges in producing qualified human resource can be handled through a few objectives. First, by making sure that information communication technology or ICT is utilized in the most favourable way. Second, any technological applications or simulations are enhanced as an effort to improve the quality of teaching and learning. As an effort to improve science education, educators have searched for engaging ways to teach science inquiry in the classroom. While abductive inquiry is inherently interesting, it is underused. It is because, the traditional science teaching method usually followed deductive and inductive forms of inquiry. Therefore, the objective of this study is to develop and evaluated the content and training suitability of inquiry-based learning application in science education in hypothesis generating and critical thinking enhancement.

Methodology

This study uses the Rapid Application Development (RAD) approach in which the learning application development process involves the application draft development, the validity evaluation of the learning application content and the application training sessions suitability. The development of the application is based on need analysis, theories, models and literature reviews. Finding from need analysis is crucial in producing an application that meets the needs and solves the problems in the context of this study. The constructivist learning theory on scaffolding of learning, inquiry-based model, active learning theory and reflective awareness theory are used in the design and development of the learning application. The prototype is later been developed. The validity of the contents and suitability is determined by three field experts compromising the information technology field. Evaluation of the application contents validity was conducted to ensure the accuracy of concepts and contents so that the application is more effective and and achieve the overall objectives. The validity of the application content was evaluated using the Triple E evaluation framework (Kolb, 2017).

Results

The Triple E evaluation framework supports the technology development process from the very early stages of the design until the final assessment of the technology in a learning context.
this study, three levels (engage, enhance, extent) of Triple E were applied to explore the use of the mobile learning application. Qualitative data were gathered in semi structured group discussion and also learning observation. Three of the questions in the discussion were asked of the students for evaluating the application in term of their mobile learning experience, hypothesis generation process and comprehension about given topic. These questions were used to define the usability and the mobile quality aspects of the software quality measures. In this group discussion, eight students participated. As far as the question 1 were concerned, most of the students considered that application was easy to use and they did not find any difficulty while using the application. In answering the second question in the group discussions, almost all the students were positive about their learning experiences and they enjoyed using the application. The responses for question 3 were promising and most of the students felt that the given suggestions were relevant and made them think.

Findings
This study produced a learning application in which consisting the learning content generation and experiment generation. The application has been developed based on the constructivist learning theory on scaffolding of learning, inquiry-based model, active learning theory and reflective awareness theory are used in the design and development of the learning application. The application then evaluated by three experts for the application validity encompass the content and training compatibility. Findings on the application provides some insights for science teachers to use the application as an effective way of assisting students in developing hypotheses but also exploiting their critical thinking skills.

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References