

Original Research Article

The Development and Perception of Trainee Teachers towards smartphone based Free Fall Measurement Kit using Arduino

Abstract:

The Free fall motion is one of the topics that are is always considered difficult for Physics Students. The lack of teaching aids in on this topic is also why students are less exposed to the free fall concept. Thus, this study aims to develop a Free Fall Kit as a teaching aid for the Physics Form Four under the subtopic Free Fall Movement. This kit is developed using an Arduino microcontroller where the result of gravitational acceleration will be displayed on the smartphone using the Bluetooth module. This study also aims to test trainee teacher's perceptions of majoring in physics at Universiti Pendidikan Sultan Idris towards the Free Fall Kit. The validity study was conducted on three experts among the physics lecturers at the Sultan Idris University of Education. These validity data were analyzed using Percentage of Consent. The validity value obtained showed a high value where the total percentage of validity agreement from the three experts was 98.3% for face validity and 93.3% for content validity. This study uses a descriptive method to assess the instrument reliability and respondents perceptions of the developed kits. The data obtained showed that Cronbach's Alpha value is 0.97, an average mean score is 3.82 and an average standard deviation value is 0.28 indicate that the level of reliability and perception is at a high level of agreement among the respondents. In conclusion, the Free Fall Kit has a good perception among trainee teachers of at Universiti Pendidikan Sultan Idris and has achieved the objectives of this research. The implication is that the Free Fall Kit can be an alternative teaching aid for teachers to teach the subtopic of free fall motion to determine the value of gravitational acceleration.

Introduction:

The Education in Malaysia plays an important role in producing a balanced and harmonious current generation in terms of physical, emotional, spiritual, intellectual, and social. Science Education in Malaysia is a field that encompasses knowledge, skills, scientific attitudes and values. Physics is one of the elective subjects for the science curriculum offered at the upper secondary level. The Physics curriculum plays a vital role in producing students who have knowledge and skills in technology and physics and are able to solve problems and make decisions in daily life based on scientific attitudes and values. The topic of force and motion is one of the topics covered in the form four physics subjects in Malaysia. This topic is among the topics that are often considered difficult and require a high level of understanding to understand topic [1]. Among the subtopics covered in the topic of force and motion is free fall motion.

Comment [UW1]: Delete : the

Comment [UW2]: Replace are by is

Comment [UW3]: Add the before subtopic

Comment [UW4]: Add: the before Bluetooth

Comment [UW5]: Correct: teacher's

Comment [UW6]: Add of after perception's

Comment [UW7]: Replace of by at

Comment [UW8]: Delete : the

Comment [UW9]: Add the

Comment [UW10]: Remove topic

Conclusion:

This study has developed a Free Fall Kit that has a good perception among trainee teachers of Universiti Pendidikan Sultan Idris as a teaching aid in the subtopic of Form Four Free Fall Movement. The validity values obtained from the three experts showed a high value level of agreement where the total percentage of validity agreement was 98.3% for face validity and 93.3% for content validity. The Cronbach's Alpha value obtained for the pilot study was 0.97, having indicating a high level of reliability. Furthermore, for the actual study, it was found that the average mean score value is 3.82 and the average standard deviation value is 0.282 indicating the level of perception is at a high level of agreement among the respondents involved. The implication is that the Free Fall Kit can be used as an alternative teaching aid for teachers to teach the subtopic of free fall motion to measure the value of gravitational acceleration.

Comment [UW11]: Replace value by : level of agreement

Comment [UW12]: Replace having by indicating

Comment [UW13]: Add : it was after study