Chapter 4

PLAY - The Way Children Learn Agriculture

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ABSTRACT
While students are already influenced by the technology boom and could easily obtain materials from the Internet, current Malaysia current education scenario still see teachers using traditional teaching method of using textbooks to teach in classrooms. Although there are over 80,000 mobile applications marketed as “educational”, most of these apps are actually not educational. The objectives of this project is to develop a mobile application for teaching and learning about farming and agriculture for children, to integrate the suitable academic resources and activities to enhance students’ engagement and understanding using interesting and creative modules, and to provide teachers with instruments for measuring students’ abilities and learning outcomes by using quizzes and tests with suitable difficulties. This project is targeted to 5 years old children studying at Tadika Sinaran Ria, a Community Learning Centre in PACOS Trust. The syllabus and modules will be designed accordingly with suitable difficulties to make sure it is easy enough for the students to progress through the program, but hard enough to keep them learning and engaged. Hence, the mobile application is expected to fulfil the users’ requirements which includes three modules: i) various modules of Kivatu Nature Farm programs, ii) plant identification and, iii) plant monitoring feature. Students will also be making choices from the quizzes provided where they have the chance to discover the correct answer and learn to solve problems about farming and agriculture. Therefore, the system proposed is
expected to create awareness about the importance of farming and agriculture the community, and to foster quality education to the unfortunate population in rural areas by integrating technology.

**Key Words:** teaching method, learning, mobile application, educational

1. INTRODUCTION

The swift advance of mobile computing technologies alongside plentiful mobile software applications make universal mobile learning possible (Johnson et al., 2012). User mobility resulting from device portability, comparatively strong computing power in small devices, and always-on connectivity are the significant affordances of mobile computing technologies for learning (Hsu & Ching, 2012). These affordances lead to a huge potential for creative uses of mobile technologies in education. Furthermore, mobile devices such as smartphones or tablets are immeasurably picking up ubiquity (Johnson et al., 2010) because of the accessibility of countless easy-to-use mobile software applications.

The development of mobile applications has raised attentiveness among teachers since it encourages teaching and learning (Johnson et al., 2012). However, teachers can only judge the ‘quality’ of an app by looking at the users review instead of actually testing them. Even though there are over 80,000 mobile apps advertised as “educational” in the Google Play Store and iOS App Store, the majority of these apps are actually are not educational (Zosh et. al, 2015). And, although there are mobile apps developed related to farming and agriculture, but most of them are not related to teaching and learning.

In the book “From Play to Practice Connecting Teachers’ Play to Children’s Learning” by Nell and Drew (2013), they clarified Vygotsky's distinctive dimensions of learning, which states that learning will take place when a child is challenged, but not discouraged. If a child already knows and understands the materials, the child is not adapting, but if the material is too hard then the child could become frustrated and no learning will occur. Children who are 5 years old need the correct parity of easy and hard; easy enough to advance through the program and sufficiently hard to keep them learning and engaged. Too easy or too hard and will cause them to turn the mobile application off (Nell & Drew, 2013).

2. TECHNOLOGY INTEGRATION PROMOTES LEARNING

If technologies are to be utilized to promote important and meaningful learning, they ought to be utilized as facilitators of thinking according to Jonassen et al. (2008).

For technologies in supporting important and meaningful learning, the accompanying roles have been proposed. Firstly, technology is an instrument that reinforces information development for demonstrating students' conclusions, understanding, convictions and delivering composed information bases by students.
Second, technology is an information vehicle to obtain knowledge by getting to the required data and looking at world perspectives. Technology is a genuine tool to help learning by appearing and stirring important troubles, circumstances, and settings, uncovering perspectives, contentions, and characterizing a controllable issue space for students’ thinking (Jonassen et al., 2008). Third, technology is also a social way to enhance learning by coordinating with others, examining, thinking, and achieving an assentation among individuals from the general public, and supporting discussion among information-based networks. Lastly, innovation is an intellectual partner to support learning by helping students express and demonstrate the information they know, information they have learned and how they know about the information, supporting students’ internal discussions and significance building, making individual portrayals of importance, and supporting imaginative thinking (DePasquale et al., 2003).

Innovation constructively affects students’ learning. It makes students more engaged in learning hence retain more knowledge. Innovation conveys important learning encounters. It gives students more chances to cooperate with their peers and this will lead the students to learn from each other (Costley, 2014). According to Costley (2014), innovation is an amazing supporter of learning if it is utilized to extend students’ commitment in significant and bona fide educational modules. Technology is a great learning tool and it should be selected when educators are looking for the best tool to supplement their teaching. Students should begin utilizing innovative instruments as a critical supporting piece of their learning. Teachers should demonstrate the utilization of technology to supplement their educational programs with the goal that students can see the right utilization of innovation and advantage from presentation to further developed applications that they will utilize autonomously later on (DePasquale et al., 2003).

3. BENEFITS OF TECHNOLOGY INTEGRATION

The advantages of technology integration have been reported in numerous studies. First is the expansion of students’ inspiration (Riasati et al., 2012). This is a critical factor that can achieve a great deal of advantages for students in their classes (Riasati et al., 2012). The other preferred standpoint is that utilizing innovation encourage the expansion of collaboration in learning activities. Gillespie (2006) said that innovation enables students to assemble information and interact with resources like images and videos while Murphy (2006) expressed that innovation empowers the students to get associated with the world and deliver astounding work.

Innovation helps the students and the teachers in compiling the course materials effortlessly because of the quick access that technology provides. The utilization of innovation in the prospectus of schools, universities, and colleges has helped them in understanding the subjects well and getting their nuts and bolts cleared. Enhancements in innovation gain the critical task of ensuring students utilize the knowledge that they gained during learning, onto the real world working environment (Rodinadze & Zarbazoia, 2012).
Hennessy (2005) found that ICTs can propel teachers and students to work in peer discussion, investigation, analysis and thinking, examining, and assistance. The analyst comprehended that as students turn out to be more independent, teachers ought to encourage and support their students in acting and thinking autonomously. According to Parvin and Salam (2015), through utilizing innovation into the classes, students can inspire the chance to make their very own individual learning in an important setting. Students ought to be given open doors for genuine social associations to rehearse genuine aptitudes. This can be obtained through students’ collaboration on genuine exercises and tasks.

4. IMPLEMENTATION OF PLAY

The user requirements had been determined for the project PLAY, and there will be three (3) main modules or features included. The first module to be developed in the mobile application is to design the nine programs of Kivatu Nature Farm that are taught to the student into various chapters to be taught to the students. The programs will include Bokashi, Fish Amino Acid (FAA) Fertilizer, Green Waste Compost, Kitchen Waste Compost, Mud Balls, Potting Soil, System of Rice Intensification (SRI), Stingless Bee Rearing and Vermicompost. Each chapter will introduce procedures of the activity and explain the importance and benefits by using a combination of photos and texts to enhance students’ understanding and learning engagement. At the end of each chapter, quizzes will be designed to be answered by the students. Not only students can learn to solve problems by applying knowledge about agriculture activities through quizzes, it can also provide teachers with a measuring instruments of students’ abilities and learning outcomes.

The second module that will be developed is the plant identification feature. This feature will be done by students answering questions provided from the mobile application such as the type of stem the plant has, the foliage on the plant, the tips of the plant’s leaves, the edges of the plant’s leaves, how the plant’s leaves attach to the stem(s), the arrangement of leaves on the plant and the veins of the plant. For each question asked, users will have to choose an option which is made up from of an image and its description that best represents the answer. Then, after all questions have been answered, the identified plants are shown with images as well as common and scientific names.

The third module that will be included in the mobile applications is the plant monitoring feature. This module aims to let the students in Tadika Sinaran Ria grow plants more efficiently by measuring temperature, humidity and soil moisture using an Arduino board, soil moisture sensor, temperature and humidity sensor. Students will learn the optimum temperature, humidity and soil moisture for the plants to grow healthily. As different plants require different conditions to grow, students will get to learn various types of plants and of course gardening techniques. Figure 1 shows the user manual for the mobile application, PLAY. When the users first open up PLAY, they will first encounter the Main Activity Interface. In this interface, there will be three main modules
that PLAY includes which are Chapters, Plant Identification and Plant Monitoring modules.

![Figure 1: Manual and Functionality](image)

5. CONCLUSION

Students nowadays are influenced by the technology boom and the variety of learning materials such as video and animation that are easily obtained from the Internet. Teaching strategy is critical in encouraging students’ enthusiasm to learn the subject, and the lack of resources and innovation in technology about farming and agriculture are causing students to be disengaged. Disengaged students are reluctant to participate in class discussions, tune out, constantly bored, distracted and easily abandon tasks.
Through the mobile application proposed, PLAY will add an alternate method other than textbooks for teachers in Tadika Sinaran Ria to conduct teaching and learning in classrooms. Since the inflexibility of textbooks in terms of the content and syllabus can prompt the issue of insufficiency as different needs of students cannot be fulfilled by using a single textbook and teaching strategy is critical in vesting the enthusiasm of students to learn the subject, using PLAY as a new strategy in teaching and learning helps to solve the mentioned issue above and also accommodates the lack of resources and innovation in technology about farming and agriculture. Also, based on the observation done in the user acceptance testing phase, a more systematic teaching method had also significantly increased teachers’ performance in teaching the students in Tadika Sinaran Ria. Teachers are able to explain the lessons using images provided by the application and this had impressively reduced the time teachers took to explain the relevant topic comparing the time taken for the teachers to do so previously.

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