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M-learning App: Learning and Understanding through Visuals (Heredity and Variation)

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Abstract

Mobile penetration among teenagers aged 15 years and above has spiraled to 70% on 2017. This has paved the way for educational system to technologically step up. M-learning is defined by how mobile devices are used as a learning tool in education. The aim of this research is to develop an M-learning application for Science Subject Form 4 Chapter 3 as another medium for students to master a chapter in short period of time. This research also focuses on improvising user interface (UI) and enhancing user experience (UX). This research will also evaluate the effectiveness of mobile learning apps as a learning medium among Form 4 students.

Keywords: M-learning, Heredity, Variation, User Interface (UI), User Experience (UX)

INTRODUCTION

Education has always been conducted in classroom where interaction between students and teacher is present. However, educational system seems to progress to be on par with technology. There are no limits to innovation. Thus, a new pedagogical methodology has been introduced in the form of Mobile-learning application. The term mobile itself means availability and portability. According to Mohamed Sarrab (2012) the possibility of taking places in multiple locations, across multiple times, and addressing multiple content areas using either static or portable equipments such as wireless laptops, Personal Digital Assistants (PDAs) and smart phones is what define mobile. This research focuses on Science subject for Form 4 students. According to Atkinson (2009) being "science literate" will no longer be just an advantage but an absolute necessity in life. Therefore, a different effort needs to be raised in order to help students learn Heredity and Variation in an effective way.

Hence, an M-learning app will be developed and it will be comprised of various appealing graphics and important content to deliver best learning experience and help in memorizing key points of the particular chapter. The goal of this project is to design, develop and evaluate an M-learning application which can be used as a learning tool in teaching Form 4 students specifically in Science Subject Chapter 3: Heredity and Variation.

M-learning as the next generation of E-learning

Mohamed Sarab (2012) claims that Internet does not just deliver and gives information and contents, but it also helps in creating learning environments that suits modern, global learners where engagement between learners and pedagogical activities exist. He also added that this has turned Internet into the state of art for distance learning around the globe and thus making M-learning as the next generation of distance learning. Curriculum content needed in M-learning has the same potential with other pedagogical approaches but the means of how M-learning work is the factor that makes M-learning appears to be as the next generation of E-learning.

Importance of M-learning

Doug Vogel (2007) states that it is statically proven that mobile devices are increasingly pervasive amongst students. He also analyses that the ubiquitious nature of reachability and connectivity of mobile technology to users give them a unique status in the realm of technology. According to Lapouch (2013) educational applications are linked to compelling increases in student achievement. Even slight increment in students' achievement means a lot to school and teachers as it gives positive improvement on the grades. Small change is still a change. This can be supported by pointing out several benefits of M-learning stated by Mohamed Sarab and Laila Elgamel (2012):

(1) Content can be accessed anytime
(2) Content can be accessed anywhere
(3) Distance learning support.
(4) Ability to enhance student-centered learning
(5) Ability to increase interaction between and among students, learners, and instructors
(6) Best for just-in-time review of content

Case Studies: *Little Alchemy*

Figure 1: Little Alchemy icon

Emergence of Little Alchemy started back in 2010 and has been running until now on various platforms such as web and now available on mobile devices. The purpose of Little Alchemy was to test the Chrome Web Store which was newly launched at that time as stated by (recloak). According to Little Alchemy, the app is a free chemistry education platform which helps users in gaining knowledge on the addition of substances in terms of chemistry. Little Alchemy supporting platforms are littlealchemy.com, Android, iOS, and Windows Phone. Features that are offered by Little Alchemy are personalized education, a fun way of learning, and universally accessible. Students may able to analyse the difference between substances and the processes behind it as commented by (Lix, 2016).

Strengths:

(1) Allows extensive experiments.
(2) Ability to fit into a variety of classes.
(3) Interactive.

Weaknesses;

(1) Not designed for classroom.
(2) Requires hints.

Case Studies: *Quizlet*

Figure 2: Quizlet icon

According to Nicole (2018), Quizlet is tailored for marathon study sessions. The app allows users to create their own personal flashcards and some tools to that can help make the flashcards attractive. Quizlet, in reference to Quizlet (n.a.), started 10 years ago. As stated by Mogulpedia, the creator is Andrew Sutherland, and the first idea of creating Quizlet started when he needed a tool to study for his French test. Quizlet grew from there until now with over 10 million downloads as recorded on Google Play Store. Supporting platform of Quizlet are iOS and Google Play Store.

Strengths:

(1) Functions as a memorization tool to assist students' learning.
(2) Offers a variety of learning modes, including four study modes and two study games.
(3) Allows students to share their works with other friends.
(4) Free and operates on mobile.

Weaknesses;

(1) Some flashcards made might give misleading or wrong info.
(2) Might have problems with ownership of works.

METHODOLOGY

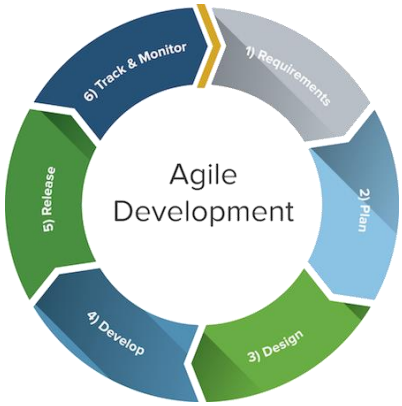

Figure 3: Agile methodology[1]

According to Cleveroad (2017), Agile is iterative and a step-by-step development methodology. During a software cycle, agile application development helps organize designing and planning methods, development and testing methods. Agile work cycles are as listed below:

(1) Requirements
(2) Planning
(3) Design
(4) Development
(5) Release
(6) Track and Monitor

Each iteration plays a crucial part in building a full-pledged product as what stressed by Cleveroad (2017). There are also some benefits of using agile method for mobile app development. Mentioned below are some benefits picked from the article:

(1) Real-time planning
(2) Sprint by sprint
(3) Immediate changes
(4) Instant feedback from customers

As referred to Eduonix (2017) agile methodology has proven its efficiency and help to mobile app development environment. Agile methodology has been adapting and this has helped create apps

that are seamless, quick, small in size, and easy to work with.

DATA ANALYSIS & FINDINGS

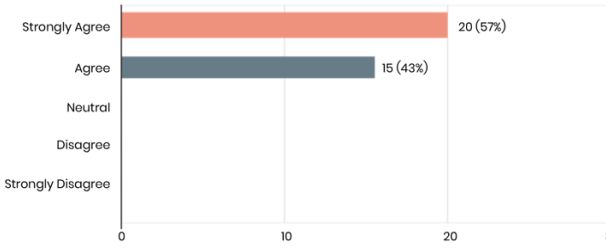

Figure 4: Students understanding towards chapter Heredity and Variation increases

The above graph shows that from 35 students, 20 students (57%) strongly agree that their understanding towards chapter Heredity and Variation have increased after using the M-learning app while the remaining 15 students (43%) chose agree. This data shows that the M-learning actually helped the students gain more knowledge thus making the second objective of this research is achieved.

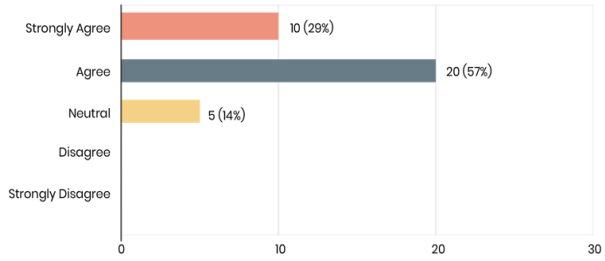

Figure 5: Students are able to understand chapter in a short time

Second graph indicates the ability for students to understand the chapter in a short time. As shown, out of 35 students, majority of the students agree (57%) that they are able to understand the chapter in a short period of time. Apart from that, 5 students (14%) picked neutral. This indicates that most of the students are capable of understanding the chapter even in a short amount of time based on the apps. This shows that the M-learning app is effective towards the students' learning and comprehension.

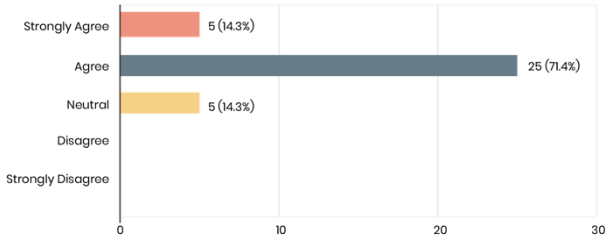

Figure 6: Students are able to reduce study time with apps

Above graph shows the statistic for students that agree apps help to reduce their study time. 25 students (71.4%) agree that their study time can be reduced by using apps while fairly 5% chose strongly agree and neutral. This data supports the main objective of this M-learning app which is to develop a Heredity and Variation mobile learning application which can minimize the time required for students to master a chapter.

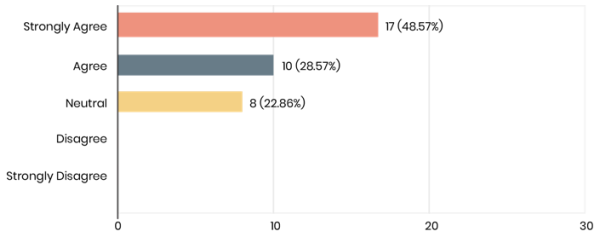

Figure 7: Students can understand better than using textbook

The above graph shows the result for students' understanding using app. Majority of the students (48.57%) strongly agree that they can understand better using app rather than textbook. However, this does not mean that textbook is not useful for students, this just shows that knowledge can be taught in other form and in this context, M-learning app.

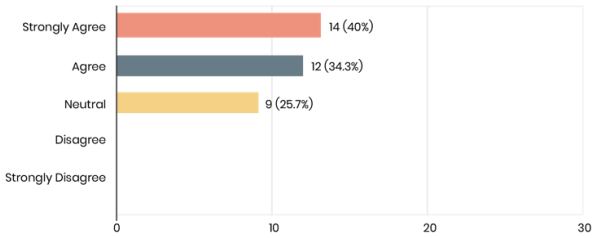

Figure 8: Students find the notes helping in memorizing keywords

Figure 8 shows the statistic for students that find the notes in the app help in memorizing keywords. This can be supported by the 40% and 34.3% of the students who chose agree based on the questionnaire. This can help in contributing to the effectiveness of the app towards the students' learning.

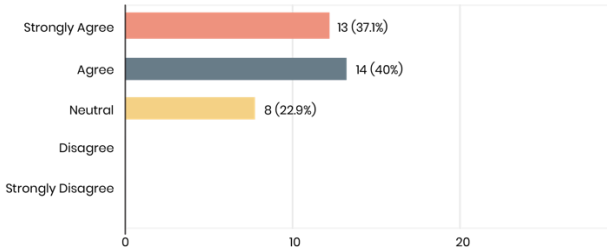

Figure 9: Students find that assessment help them to master the chapter

This last graph shows the data for students who find assessment in the app helpful for them to master the chapter. From the graph, a total of 40% agree and 37.1% strongly agree while the rest 22.9% feel neutral towards the idea. This shows that M-learning truly can help the students in mastering the chapter thus prepping them for examination.

DISCUSSION

First limitation would be the number of chapter covered in this research. This research only covers a chapter from Form 4 Science subject: Heredity and Variation. Other chapters are not covered in this research provided the limited time given to finish the project.

Second limitation is the assessments included in the application. The application only has 5 sets of assessments and each assessment are limited with number of questions.

CONCLUSION

Although the nature of this study is a minute-scale, the findings can be considered as a successful study. This study was carried out with the aim to develop an M-learning app concerning chapter Heredity and Variation. It also attempted to evaluate the effectiveness of the app towards students' learning.

As stated by (Abu-Al-Aish, 2014) M-learning allows students to engage in learning activities and also facilitates the collaboration between students. Further added, M-learning helps in improving the students' learning accessibility to learning materials by providing a flexible environment to learn at any places, anytime. This can also help students use their time wisely and improve their grades even a little.

It can also be concluded from the findings that students mostly agree that the M-learning app help them in learning chapter Heredity and Variation and their positive attitude towards the app is greatly appreciated.

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