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Androidified: The Impact of Android Phone-Assisted Instruction in Teaching Science Concepts

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Abstract: *Android phones have become more accessible and affordable today. Students, particularly in the secondary level, are now more engage in using android phones. This dramatic upsurge has resulted to several research on integrating the mobile phone in teaching. The accessibility and portability of the mobile phones, compared to laptops and projector, made it more convenient to use in the field of education. In connection, the lack of ICT facilities is one of the major challenges of education in the Philippines. Thus, the use of android phones is one of most feasible solution in the mentioned dilemma. This study aimed to determine the impact of using android phone in teaching science concepts among Grade 9 students of Taltal National High school, Zambales, Philippines. This study is quasi-experimental research. Android phone assisted learning was used in 40 students from Grade 9 Mercury of Taltal National High School. The research was conducted from December 2015 – February 2016. The study evidently shows an increase in the pre assessment MPS of 33.6 % to a post assessment MPS of 76.8 %. It also reveals that there is no significant difference between the post assessment scores and the expected scores after using the android phone in teaching science concepts. Further, results of the survey says that 62.5 % agreed to the usability of android phones in playing videos related to the topics. These suggest the potential use of android phones in teaching science concepts. The study recommends conducting further application of android phone assisted class in lower section and other academic areas.*

Keywords— android, science, quasi-experimental

1. INTRODUCTION

Android phones are becoming pervasive in the world today. According to the International Telecommunication Union [3], the share of total mobile subscriptions in the developing world increased by one fifth between 2005 and 2010, to stand at 73%. In Africa, penetration rates were projected to reach an estimated 41% at the end of 2010 (compared to 76% globally) leaving a significant potential for growth.

With this dramatic upsurge on the accessibility to android phones, several studies had been undertaken to integrate the use of mobile phones in education. Mobile Learning is the use of mobile or wireless devices for the purpose of learning while on the move or learning that takes advantage of mobile technologies. Android phones have a lot of advantages in education compared to laptop and desktop. They are lighter, instant, handy, and inexpensive making it more feasible rather than using projector and other ICT devices. A study was conducted to determine the extent to which the use of mobile phones helped to improve educational outcomes in two specific ways: 1) in improving access to education, and 2) in promoting new learning. The study reviewed the evidence of the role of mobile phone-facilitated m-Learning in contributing to improved educational outcomes in the developing countries of Asia by exploring the results of six m-Learning pilot projects that took place in the Philippines, Mongolia, Thailand, India, and Bangladesh. The study revealed that efficiency of the m-learning in education sector. Mobile learning (M-learning) has turned out to be one of the methods of learning used for educational purposes using mobile devices [6]. In every class, it is evident that almost 40% of the class has android phones. Consequently, they are being scolded for misused of this device. Hence, this study came up to maximize the use of mobile phone in class.

This action research aimed to evaluate the impact of m-learning, specifically the use of video presentation in mobile phones, in teaching science concepts in Grade 9 Mercury students of Taltal National High School.

2. METHODOLOGY

2.1 Type of Study

This study utilized a Quasi-experimental study design.

2.2 Participants

Android Phone Assisted Instruction was used in 40 students from Grade 9 Mercury Class of Taltal National High School.

2.3 Data Collection

A pre-assessment was administered before the introduction of the lesson. Three videos were used to introduce the lesson. An interactive class discussion was also utilized. After watching the video, there was a video analysis through sharing the learned concepts. A post assessment was administered after the class discussion. To test the retention rate of the students, two weeks after presenting the lesson, a retention test was administered to the students. A survey questionnaire was also given to the students after the session. The Chi Square

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Test was used to test the hypothesis that there is no difference between the post assessment scores and the expected scores after using the mobile technology in teaching the characteristics of stars. Retention test scores was then compared to the expected scores using the Chi Square test as well. Furthermore, MPS of the pre, post and retention assessment were also calculated to show the trends in the scores. MPS was calculated by adding all the scores divided by the total cases.

2.4 Instruments

Structured Survey Questionnaire was utilized to all the participants to determine the impact of using android phone instruction.

3. Related Literature

Several studies on mobile learning have been continuously undertaken around the world. A Review of the Literature reviewed 200 recent studies of mobile phone use in the developing world. They studied the Mobile Impact on Education. They concluded that the mobile's portability, simplicity, and affordability make it a natural fit for education initiatives in places where PCs and internet connectivity may be scarce.

Furthermore, some studies focused on the adoptability of mobile phones in the developing countries. Mobile phones are increasingly adopted in the developing world [4]. This is evident in the Philippines where most of the population has the access to mobile phones.

Thus, it is very timely to implement mobile learning strategy. It is timely to envision a future where the mobile devices play a pivotal role in education in developing countries [1]. There is much evidence that mobile technologies are playing an increasing role in education. The use of handheld technologies provides a major opportunity to enhance access to learning and provide a motivating learning opportunity [2]

Evidence of the role of mobile phone-facilitated m-Learning in contributing to improved educational outcomes in the developing countries of Asia was determined by exploring the results of six m-Learning pilot projects that took place in the Philippines, Mongolia, Thailand, India, and Bangladesh. They found the lack of existing evidence on the impact of the use mobile learning on promoting an effective learning outcome [6]. More studies must be done to determine the impact of the mobile learning in improving the academic performance of the learners

4. Results and Discussion

This part presents the gathered and processed data using tabular form, interpreted, and analyzed to provide a better and clear understanding on the problems.

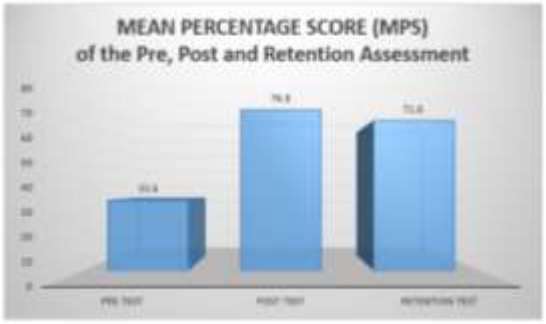

Figure 1: *Mean Percentage Scores of the Pre, Post and Retention Assessment*

The figure shows the trend in the MPS of the Pre, Post and Retention assessment. The figure shows that an increase in the MPS was evident after the accumulated pre assessment MPS of 33.6 % to a post assessment MPS of 76.8 %. The garnered scores in the Post Assessment was used to compute the Chi Square Value. Chi Square is use in hypothesis testing to predict the relationship between two variables.

Table 1: *The Computed Chi Square (x2) of the Post Assessment Scores*

	Post Assessment
Chi (x^2)	2.2
Critical Value	55.76
alpha	0.05
Chi (p value)	1

The computed chi (p value) of the post assessment scores is 1 which is greater than 0.05 which signifies to accept the Null Hypothesis. Table 1 shows that there is no significant difference between the post assessment scores and the expected scores after using the android phone in teaching science concepts. This also suggests the potential use of android phones in teaching science concepts.

Moreover, Table 2 shows that there is no significant difference between the retention assessment scores and the expected scores.

Table 2: *The Computed Chi Square (x2) of the Retention Assessment Scores*

	Retention Assessment
Chi (x^2)	8.5
Critical Value	55.76
alpha	0.05
Chi (P value)	1

The hypothesis from the post and retention assessment of this study further validates the study conducted in 2013 about the potential of smartphones in teaching modern physics concepts [5]. However, one of the constraints of the study is that not all students bring their android phone or may not have the access to mobile devices as shown in Table 3.

But the frequency shows that almost half of the class has the access to android phones thus a significant number of mobile phones can be used in class.

Table 3: Percentage Frequency of the Students who bring Android Phone in School

Students Who Bring Android Phone In School	Percentage Frequency (%)
Always	47.5
Often	5
Sometimes	20
Rarely	10
Never	17.5
Total	100 %

Based on the results of the survey, 62.5 % agreed the usability of android phones in playing videos related to the topic as shown in the figure below. Using mobile devices for educational purposes is becoming a common expectation of learners.

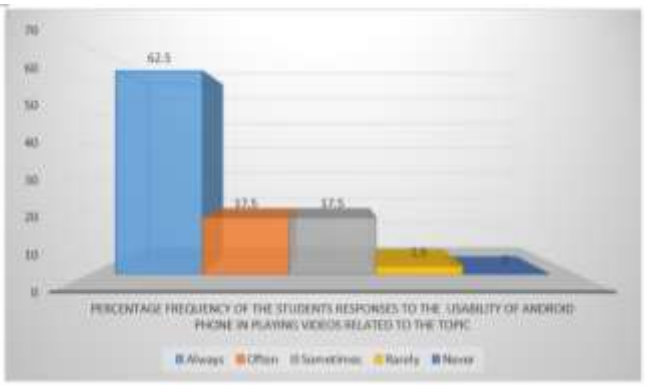

Figure 3: *Percentage Frequency of the Students Responses to the usability of android phones in playing videos related to the topic.*

Hence, there is a great potential that android phone could be a helpful tool in the teaching and learning process in the classroom especially in the Philippine setting. Mobile phones are increasingly adopted in the developing world [4]. This is evident in the Philippines where most of the population has the access to mobile phones.

5. SUMMARY

The study evidently shows an increase in the pre assessment MPS of 33.6 % to a post assessment MPS of 76.8 %. It also reveals that there is no significant difference between the post assessment scores and the expected scores after using the android phone in teaching science concepts. Further, results of the survey says that 62.5 % agreed to the usability of android phones in playing videos related to the topics.

6. CONCLUSION

The findings of this study suggest that mobile technologies have the potential to provide new learning experiences and could improve not only the academic performance of the students but also the retention of the students.

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