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Video Podcast (Vodcast) as Complementary Aid in Teaching Algebra

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Abstract

Technology had been widely integrated in the 21st century teaching-learning process in the field of mathematics education in order to meet the demands and needs of the digital native students. This study aimed to determine the effectiveness of video podcast on the performance of the students in learning Algebra. The study utilized a quasi-experimental design through purposive sampling to compare the learning of groups after the use of video podcast. Using t-test at 0.05 level of significance, computed value for the measure of difference of the pretest score which is less than the p-value which means that there is no significant difference between the pretest mean scores of the two groups. Results on the posttest mean scores of the control and experimental groups indicates that the strategies being employed in control group and in experimental group played a vital role in improving learners' performance in algebra. Using the t-test at 0.05 levels of significance, the computed t-value for the mean gain scores of the two groups was less than the p-value which entails no significant difference between the mean gain scores of the two groups. The results connote that teaching strategy employed on the control and experimental groups offers a positive impact on students' performance. Therefore, the performance of the experimental group which utilized video podcast was as effective as to the performance of the control group which utilized traditional method of teaching in learning Algebra.

Keywords: Algebra, video podcast, and vodcast.

1. Introduction

A force that greatly affect and changed human endeavor in the present is information and communication technology (ICT). ICT has enormous impacts over two or three decades in the field of human endeavor like medicine, tourism, business, law, banking, engineering and architecture. However, lack of influence of ICT had been observed in the field of education that far less change than other fields have undergo (Adesote et al., 2013).

Ittigson & Zewe (2003) cited that technology is essential in teaching and learning mathematics. It has been claimed that ICT improves the way mathematics should be taught and enhances student understanding of basic concepts. However, most educators find it more challenging to teach mathematics to students in the digital world. Mathematical learning experiences tend to be experiential and meaningful if students will be able to view the process and concept in a modern way like video podcast also known as vodcast. Thus, video podcast used by some teachers in the fields aimed to uphold the learning instruction into an everyday classroom practices to meet the demand of mathematics to connect with the present generation of learners also known to be digital natives as a strategy in teaching rather than of the traditional way of teaching.

Mathematical academic communities try to make changes in the area of instructional design, faculty and research to be as competitive globally in the academic training of the youth. These three aspects cannot be denied to be major factors in breaking down borders and increased collaboration as globalization asserts (Cabillan, 2007).

Bongey, et. al., (2006) also noted that the majority of Higher Education Institutions' students might perceive podcast technology to be an effective technology for supplemental learning. However, other research like Abt & Barry (2007) question whether this perception is "enough to make a larger impact on learning than reading the same material". This explains the bridging importance of having positive student perception transfer over to student satisfaction.

The study of Larisma et al. (2017) further explained and elaborated that to enhance students' learning, video podcast instruction can be integrated into the teaching learning process especially in learning different competencies about trigonometry.

This study aims to determine the effectiveness of video podcast as complementary aid in teaching Algebra and as a technology that can be integrated into an everyday mathematics classroom without sacrificing the essence and learning of the different competencies in order to meet the demand of the digital world and the needs of the new generation that would help improve the teaching-learning process.

2. Literature Review

The study of Keong, et. al (2005) give emphasis that more effective teaching process can be achieved through the use of ICT as well as enhance the students' capabilities in understanding basic concepts. Campbell, 2008 states that numerous conceptual literature indicate that there are significant impact of the vodcasts as tools in instruction.

According to Stoten, 2007, classroom remains the essential components of distance education delivery that lead to an idea that the traditional classroom methods of orientation have included didactic instruction with some element of self-directed, computer-based education or clinical demonstration included. A podcast can be used as an adjunct to the current methods of self-directed learning. Advantages of podcasting include unlimited access to the material, the ability to show and narrate demonstrations of skills or the use of equipment, assurance that all students receive consistent information, cost-effectiveness, and improved learning.

Ng'ambi et.al (2011) asserted that podcasts is a potential tool to transform student's social and entertainment spaces into learning spaces. It has shown that such transformative change requires tight coupling of podcasts into pedagogy. It highlights the effective use of podcasts to students in supporting teaching and learning.

Bongey, et al. (2006), investigates the implementation of podcasts in a traditional undergraduate college biology course offered in a small parochial college in Midwestern United States. In this study, a professor provided podcasts of his lectures to his students. This professor had strong prior practice of providing lecture audio to his students. In order to determine whether the availability of podcasts had an effect on students' course attendance, Bongey and her colleagues (2006) conducted two surveys involving two biology classes. Of the 246 students who were asked to participate, 166 responded. Through a mixed methods approach, the researchers analyzed survey frequency of response, percentages, and answers to open-ended questions. Bongey et al. (2006) determined that "the response to the main questions from the survey and the student self-reported comments strongly suggest that having podcast lectures available to students does not lead to large decline in class attendance". A major limitation to this study was in possibly skewed results. The surveys directly asked students if it affected their attendance, leaving students to answer in a manner that fit their personal description of adequate attendance.

Edirisingha et al. (2007) elaborated how important supplemental materials are to enhance education especially in the modern time of millennial. Edirisingha and company also stressed that vodcasting also becomes an integral part of the news and communications world which made it as a hot trend among undergraduate students. Edirisingha and colleagues (2007) stated that podcasts are "being used increasingly as a supplementary or alternative means of delivering content by the media, entertainment and journalism industries. Further, the majority of these podcasts are free to download, so that dissemination of news via this medium is not impeded by financial constraints.

In the study of Lee and Chan (2007), they discovered that podcasts has a means to provide the learner with the opportunity to interact with the supply content enough to facilitate learning. The researchers believed that podcast have the possibilities to develop a "rich interactivity, total connectivity, and powerful processing" for college students. Lee and Chan (2007), highlighted that "the high level of interactivity" indicated that students enjoyed the convenience of reviewing materials several times before course exams. Further, a summative survey showed that students preferred listening to the podcasts on computers rather than mobile devices. Therefore, students needed to study with podcasts much like they would with traditional notes, as an active process.

Lord (2008) also gives emphasis on the importance of positive student perceptions of podcasts prior to their use. He studied undergraduates in a Spanish course to understand the value of developing positive perceptions about how podcasts can help develop new skills and knowledge through the students' attitudes when being challenged with new content. Although the main focus of this study was on how podcasts helped students develop pronunciation skills in the Spanish

language, students' attitudes were also measured before and after the podcast use. The findings indicated that 11 out of 19 students understood the role that podcasts play as learning tools, as they "gained more positive attitudes" (p. 365). Those who showed a negative attitude were not fare as well with the help of podcasts to develop pronunciation. This study and others (i.e., Parson et al., 2009) illustrate the importance of a positive attitudes is before introducing podcasts as educational tool.

Research Objectives

This study generally aimed to determine the effectiveness of using video podcast as complementary aid in teaching Algebra. Thus, it focused on five objectives, namely: (1) identify the pre-test and post-test scores of the students in the experimental and control groups, (2) determine the mean gain scores of students exposed to video podcast (vodcast) method and the traditional method, (3) determine the significant difference between the pre-test scores in terms of video podcast (vodcast) method and the traditional method, (4)determine the significant difference between the post-test scores in terms of vodcast method and the traditional method, (5) determine significant difference between the mean gain score of the students exposed to video podcast (vodcast) method and traditional method.

3. Methodology

Quasi-experimental research design was used in this study. This design was considered appropriate for this study because it attempted to find out the effect of video podcast (vodcast) versus traditional method as a teaching strategy in teaching mathematics through the pre-test post-test scores of the respondents from the mathematical competencies leading to identifying its difference on the students' performance of the Grade 7 students of San Isidro National High School, San Isidro, Leyte in Algebra.

The research subjects of this study were the 90 Grade 7 students of San Isidro National High School being chosen through purposive sampling. The two sections, Pythagoras and Descartes, were heterogeneous group of the students with 45 equal number of students each.

Both the experimental and control groups answered simultaneously a teacher-made questionnaire which was being pilot-tested to different Secondary School with Cronbach's alpha value of 0.80 with good internal consistency. After the pretest, the experimental group were exposed to the video podcast (vodcast) instruction and the control group were exposed to the chalk and talk as the traditional method of instruction. The topics that were discussed were under the competencies during the third quarter when the study was conducted. The same exercises were given to every group to test if both groups learned from their respective teaching methods. The answer sheets for each competency were collected and checked to determine if both groups were ready to proceed to the next topic. After the discussion, the posttest was simultaneously administered to both groups. Upon completion of data gathering, the researcher employed the Arithmetic Mean to obtain the pretest and posttest mean scores and the mean gain scores of each of the two groups.

T-test for two correlated samples was used to determine the significant difference between the pretest and posttest means of each group at a level of significance of 0.05. The said test was employed to find out if the control group and the experimental group gained from their respective instruction.

And finally, students were interviewed regarding their experiences on the use of video podcast (vodcast) as part of the teaching-learning process.

4. Results

Results indicates that the strategies being employed in control group which is a traditional "chalk & talk" method and in experimental group which is video podcast, played a vital role in the contribution of the improvements on the learners' performance in their mathematical skills. Control group with a mean score of 19.56 and experimental group had a mean of 19.42 which give only a difference of 0.14, thus indicates no significance. With this results, it can be implied that students' learning on mathematical skills could be developed if traditional and video podcast will be combined in the teaching-learning process.

Table 1. Pretest, Posttest and Mean Gain Scores of the Control and the Experimental Groups

Group	Number of Cases	Pretest Mean Score	Posttest Mean Score	Performance (Mean Gain Score)
Control Group	45	13.64	19.56	5.92
Experimental Group	45	13.51	19.42	5.91

Table 1 shows the pretest and posttest mean scores of the two groups consisting of 45 respondents each.

Table 2. T-test Measure of Difference of the Pretest Scores of the Control Group and Experimental Group

Pretest Mean Scores		$T\text{-test}_{obt}$	$T\text{-test}_{crit}$	Interpretation at $\alpha = 0.05$
Control Group	Experimental Group			
13.64	13.51	- 0.18	1.99	Not significant

Table 2 shows the measure of difference of the pretest mean scores of the experimental and control group.

The difference between the pretest mean scores of the control and experimental groups is 0.13. A test for significance of this difference obtained a computed t-value of -0.18 which is lesser than the critical t-value (at level of significance, α =0.05) of 1.99. Thus, there is no significant difference between the pretest mean scores of the students under the two methods of instruction.

Table 3. T-test Measure of Difference of the Posttest Scores of the Control Group and Experimental Group

Pretest Mean Scores		$T\text{-test}_{obt}$	$T\text{-test}_{crit}$	Interpretation at $\alpha = 0.05$
Control Group	Experimental Group			
19.56	19.42	- 0.13	1.99	Not significant

Table 3 shows the measure of difference of the posttest mean scores of the experimental and control group.

The difference between the posttest mean scores of the control and experimental groups is 0.14. A test for significance of this difference obtained a computed t-value of 0.04 which is lesser than the critical t-value (at level of significance, α =0.05) of 1.99. Here, the null hypothesis is accepted. Thus, there is no significant difference between the posttest mean scores of the students under the two methods of instruction. This means that the video podcast (vodcast) used by the experimental group is as effective as the traditional "talk and chalk" strategy.

It also highlights the state of being identical of the two groups in terms of their performance. The interpretation of the average of the two group is not significant, meaning each group which were the subject of the study were identical in terms of their performance in algebra particularly on polynomials.

This implies that video podcast (vodcast) as a strategy in teaching employed on the experimental group is an effective strategy in learning the mathematical concepts and could improve performance of the students in algebra specifically on polynomials.

Table 4. T-test scores of the Mean Gain Scores of the Control Group and Experimental Group

Group	Number of Cases	Mean Gain Scores	$t\text{-test}_{obt}$	$t\text{-test}_{crit}$	Interpretation at α = 0.05
Control	45	5.92	0.00	1.99	Not significant
Experimental	45	5.91			

As revealed in Table 4, there is no significant difference in the pretest and posttest mean gain scores within the control and experimental groups. The control group had a mean gain score of 5.92 while the experimental group had a mean gain score of 5.91. With the computed t-value of 0.00 which is lower than the critical t-value of 1.99.

The results connote that the teaching strategy employed on the control and experimental groups offers a positive impact on students' performance. This further implies that video podcast (vodcast) was effective and beneficial to the students.

5. Conclusion

Based on the findings of this study, the researcher concluded that since there was a significant difference between the pretest and posttest scores of each group, both the traditional and the video podcast (vodcast) methods of instruction were effective in teaching Algebra. And so, since there was no significant difference between the mean gain scores of the two groups, both are considered to be equally effective.

Recommendations

With the different findings and the conclusion of this study, the following were being recommended: (a) for better performance of the student and connect to the modern digital world as part of technology integration into the teaching-learning process, video podcast (vodcast) instruction can be used together with traditional methods. (b) schools should have an equipment like computers, projectors or SMART TV to be utilized on the teaching-learning process, and (c) another similar studies maybe conducted to all other academic subjects considering various factors that may affect the performance of students exposed to video podcast (vodcast) instruction like computer skills, presence of the teacher, attitudes of students, and others.

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