

Enriching Understanding on Division of Polynomials Among Selected Grade-10 Students Through VVTS (Visayan-Video Tutorial Strategy)

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ABSTRACT

This study aimed to determine the effectiveness of the Visayan-Video Tutorial Strategy as an intervention to enrich student's understanding of the Division of Polynomials among selected Grade-10 students in Liloy National High School. A pre-experimental one-group pretest-posttest research design was utilized employing 10-item separate tests to measure the students' pretest and post-test performance. The researchers utilized a t-test to analyze if a significant difference existed between the pre-test and post-test performance of the selected Grade-10 students of Liloy National High School. The results revealed that the pre-test performance of Grade-10 students is very low which ranges from 'did not meet expectations' to 'fairly satisfactory' grading scale. The Grade-10 students achieve higher grades in their post-test performance ranging from 'satisfactory', 'very satisfactory' and 'outstanding' grading scale after utilizing the Visayan-Video Tutorial Strategy (VVTS) as an intervention to the students. There is a significant difference existed between the pre-test and post-test performance of the Grade-10 students in Liloy National High School. Based on the results of the study, it is safe to conclude that Visayan-Video Tutorial Strategy (VVTS) is an effective tool used for learning.

Keywords: Visayan-Video Tutorial Strategy, Division of Polynomials, Intervention, Strategy, Experimental Research

Introduction

Math is vital in our world today. Everyone uses mathematics in our day to day lives, and most of the time, we do not even realize it. Without math, our world would be missing a key component in its makeup (Schuster, 2020). More than just a set of isolated facts and concepts, mathematics provides us with "ways of knowing", thinking and understanding (Bernardo, 1998). Mathematics provides students with the essential skills in reasoning, decision-making, and problem-solving to help them make sense of many aspects of our rapidly changing world (FAPE, 1988). One cannot deny the practical uses of mathematics in, for example, making wise purchases, measuring distances, finding locations, estimating expenses, and anticipating future problems to

find solutions early enough, to name a few (Ogena & Tan, 2006). Mathematics education in the Philippines is one of the priority concerns of the Department of Education (DepEd) especially at this moment where everybody is facing the huge challenge, the COVID-19 pandemic. Amidst this present situation, DepEd continues to work for the cause of the students and improvise ways to facilitate the learning and teaching process. DepEd has implemented different learning modalities to achieve quality education and to continue despite these challenges. Education in rural communities has always been a concern for years. Access to quality education coupled with important learning resources remains limited. And with the pandemic in the picture, the problem was multiplied in folds (Rell, 2020). The state of education is a constant struggle for both learners and teachers. Lack of electricity, absence of internet connection and network signal, road access, natural calamities, and unstable security are just a few of the factors. Modular learning, based on the survey conducted by DepEd on school opening, was the most preferred learning delivery of parents for their children this school year. Under modular learning, materials can be printed or in digitized form (“Teachers air problems on modular learning system,” 2020). Modular learning is seen to play a significant part in the "new normal" of education in schools situated in remote areas. The Schools Division of Zamboanga del Norte has adopted Modular Distance Learning. This involves individualized instruction that allows learners to use self-learning modules (SLMs) in print or digital format/electronic copy, whichever is applicable in the context of the learner, and other learning resources like Learner’s Materials, activity sheets, study guides, and other study materials. The learners may ask assistance from the teacher via email, telephone, text message/instant messaging, etc. Where possible, the teacher shall do home visitation to learners needing remediation or assistance. Any member of the family or other stakeholder in the community needs to serve as a para-teachers (TeacherPH, 2020). According to the researchers’ perspective and observations, many students have experienced problems in understanding concepts of mathematics through self-learning modules, particularly in Liloy National High School. From this idea, the researchers have intervened to cope with the existing problem in their school. The mentioned intervention is in a form of a video tutorial about the division of polynomials in vernacular form. Thus, the researchers wish to find out the effectiveness of this intervention to the selected Grade-10 students of Liloy National High School.

Literature Review

Elmore (2002) states that in many classrooms, mathematics teaching and learning is confined to strategies that are in the prescribed textbooks, and students who do not understand the solution are regarded as beyond redemption. Additionally, Naroath (2010) asserts that the role of a mathematics teacher is to create an environment in which students explore multiple strategies for solving mathematical problems. Such exposure will likely help the students understand how and why certain strategies work. Also, Deveaney (2009) states that his respondents favored the video tutorial, 75% reported that tutorials were enjoyable and interesting, 84.6% indicated that they met their needs, 100% reported that it was straightforward and easy to understand. Moreover, Allison (2015) found that teachers use videos to reinforce, motivate, and provide authentic content. Isiaka (2007) concluded that video is an effective medium for teaching/learning in schools. Also, Deveaney (2009) concluded that video is a viable tutorial for online courses. Kay (2012) added that video learning should also be able to attract students' attention to learn. It is appropriate for students to easily understand the material presented. It is true that in the past few years the availability and usage of online videos have grown exponentially. The role of videos or non-textual resources is expanding in the field of teaching, learning and research (DeCesare 2014; Johnson, Adams, and Cummins, 2012; Pai, 2014). One reason could be that videos work well for the human brain. Research says that every human brain has three core intelligences – verbal, visual, and musical (Gardner, 1983, 1993, 1999, 2005; Gardner & Hatch, 1989; Kagan & Kagan, 1998; Marks-Tarlow, 1995; Williams, Blythe, White, Li, Sternberg, & Gardner, 1996) and videos include all three. Videos also engage both left and right brains (Berk 2009). The left brain is seen as the verbal, mathematical, and logical side (Miller, 1997) whereas the right brain is viewed as non-verbal, creative, and musical (Jourdain, 1997; Polk & Kertesz, 1993). The usage of videos has increased due to the benefits of videos and their apparent connection with the human brain. In 2009, Kaufman and Mohan reported that 40% of the faculty surveyed believed they would use more online video in the future. In 2012, Moran, Seaman and Tinti-kane reported that 90% of surveyed faculty find videos online for teaching purposes. About 41% of faculty in traditional classes (as opposed to online and blended classes) used videos regularly. The 2013 “Online Video 2013 Report” from the Pew Research Center reported that the percent of adults with online access who watch or download videos has increased from 69% in 2009 to 78% in 2013. People from ages 18-49 watch online videos at the highest rate. YouTube is the driving force among adult users for posting, watching, and downloading online videos (Purcell, 2013). Pai (2014) also recommended YouTube, Google videos, PBS, and several other educational websites as the easiest way to start locating videos for teaching, as many videos are already available for free on such sites. Regardless of the challenges, it is obvious that the production and consumption of videos is exploding. In 2014, Pai reported that videos are considered a most powerful medium of learning. Similarly, Sherer and Shea (2011) encouraged faculty and students to incorporate online videos in college courses to enhance lectures, assignments, class discussion, class examinations, and at the same time help students achieve the learning objectives of the course. A recent study by Allison (2015) reported that 85% of teachers use instructional videos, typically once a week, and even more use

them once a month. The study also found that teachers use videos to reinforce, to motivate, and to provide authentic content. According to teachers, the advantages of using instructional videos are maximizing instructional time, using multi-modal instruction, and fostering motivation.

Methodology

The researchers utilized the Pre-experimental One-group Pretest – post-test research design to determine the effectiveness of the Visayan-Video Tutorial Strategy (VVTS) to the Grade-10 students of Liloy National High School in the topic “Division of Polynomials”. The study was limited to Grade 10 - Opal, Amethyst, Gold, Jade, Ruby, and Emerald students of Liloy National High School who are currently enrolled in this school year 2020-2021. The researchers utilized two separate self-made instruments to assess the learning of the respondents about ‘Division of Polynomials’; one is for the pre-test and the other is for the post-test. The instruments consist of a 10-item test, subdivided into easy, average, and difficult. Test items of pre-test and post-test have a different structure but of the same concept about the given topic. The researchers conducted first the pre-test to the least performing student-respondents. Then, after getting the results of the pre-test, the researchers made a move to introduce the intervention which is the Visayan-Video Tutorial Strategy (VVTS) to the respondents. The respondents were asked to access the YouTube channel where the tutorial video about the ‘Division of Polynomials’ was uploaded and let them watched the video. After giving the intervention throughout the week, the researchers have conducted the post-test. Lastly, the researchers tallied the scores of the pre-test and post-test results and submitted them further for statistical analysis.

Results and Discussion

The mean of pre-test performance for males and females is 70 and 71, respectively, described as “Did not meet expectations”. This means that both sexes have difficulty in dealing with the topic ‘division of polynomials’, evident on the grand mean of 71 described as “Did not meet expectations” as shown in Table 1. It can be concluded that their pre-test performance is very low. Although most of the sections failed the pre-test, only section Ruby earned an average of 75 for both males and females described as “fairly satisfactory”. Generally, this implies that most sections in Liloy National High School have almost the same performance as the pre-test conducted on the topic ‘Division of Polynomials’ ranges from “did not meet expectations” to “fairly satisfactory” performance. This may be the result of modular distance learning where students cannot comprehend what is written in the self-learning modules compared to face-to-face classes where they can observe the explanations both written on the board or the discussion of the teacher.

Table 1. The Pre-test Performance of selected Grade-10 students of Liloy National High School before employing the Visayan video tutorial strategy (VVTs) on Division of Polynomials.

Section	Male		Female		Total	
	\bar{x}	Des	\bar{x}	Des	\bar{x}	Des
Amethyst	68	DNE	71	DNE	70	DNE
Emerald	65	DNE	64	DNE	65	DNE
Gold	72	DNE	74	DNE	73	DNE
Jade	72	DNE	74	DNE	73	DNE
Opal	68	DNE	68	DNE	68	DNE
Ruby	75	FS	75	FS	75	FS
Total	70	DNE	71	DNE	71	DNE

Legend: DNE –Did not meet expectations; FS-Fairly Satisfactory

Table 2 showed male respondents earned an average of 89 described as ‘very satisfactory’, while female respondents got an average of 91 described as ‘Outstanding’. This means that both male and female respondents have passed the post-test conducted and achieve higher grades because of the Visayan-video tutorial strategy, which is evident in their grand mean of 90 described as ‘outstanding’. As to sections, only sections ‘Emerald’ and ‘Ruby’ earned a ‘very satisfactory’ post-test performance with an average of 87 and 86, respectively. Besides, sections ‘Amethyst’, ‘Gold’, ‘Jade’ and ‘Opal’ attained an ‘outstanding’ post-test performance with an average of 90, 93, 92, and 94, respectively. On the other hand, it is noticeable that male respondents from section ‘Emerald’ got the lowest post-test performance with an average of 81 described as ‘satisfactory’. In general, the Grade-10 students have ‘satisfactory’, ‘very satisfactory’, and ‘outstanding’ post-test performance on the division of polynomials after they watched the video tutorial given to them as intervention.

Table 2. The Post-test Performance of selected Grade-10 students of Liloy National High School before employing the Visayan video tutorial strategy (VVTs) on Division of Polynomials.

Section	Male		Female		Total	
	\bar{x}	Des	\bar{x}	Des	\bar{x}	Des
Amethyst	87	VS	93	O	90	O
Emerald	81	S	92	O	87	VS
Gold	95	O	90	O	93	O
Jade	93	O	91	O	92	O
Opal	93	O	94	O	94	O
Ruby	87	VS	84	S	86	VS
Total	89	VS	91	O	90	O

Legend: O-Outstanding; VS-Very Satisfactory; S-Satisfactory

Table 3 reveals that the pre-test performance of the Grade-10 students of Liloy National High School on the topic ‘division of polynomials’ is 71 described as ‘did not meet expectation’, while the post-test performance is 90 described as ‘outstanding’. The table also shows the (N=30) number of respondents utilized in this study is 30, with the standard deviation of 4.85 and 6.72 for pre-test and post-test performance, respectively. The table also indicates the t-value of – 14.082 with df of 29, and p-value of 0.000 at $\alpha 0.05$ level of significance. This result denotes that there is a significant difference in the pre-test and post-test performance of Grade-10 students of Liloy National High School after employing the Visayan-Video tutorial strategy (VVTS) as an intervention to the respondents. This means that the intervention ‘Visayan-Video Tutorial Strategy’ is effective for this set of respondents. This further implies that this video tutorial is an effective tool for learning and can be used with other students who experience difficulty in dealing with polynomials, particularly on how to divide polynomials.

Variables	\bar{x}	N	SD	t – value	df	p – value @ $\alpha 0.05$ level of significance	Interpretation
Pre-test performance	71	30	4.85	-14.082	29	0.000	Significant
Post-test performance	90		6.72				

Conclusion

The pre-test performance of Grade-10 students of Liloy National High School was considerably very low due to the modular distance learning situations where students cannot comprehend what is written in the self-learning modules compared to face-to-face classes where they can observe the explanations both written on the board or the discussion of the teacher. The post-test performance of Grade-10 students of Liloy National High School has increased and they achieved higher grades after utilizing the Visayan-video Tutorial Strategy (VVTS). The intervention employed has changed the grades of the students from very low to high which resulted in a significant difference in the means of the pre-test and post-test performance of the Grade-10 students in Liloy National High School. Therefore, it is safe to conclude that the Visayan-video Tutorial Strategy (VVTS) is an effective tool to be used in learning.

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