

Storytelling in Teaching Mathematics on Students' Achievement and Self - Efficacy Level

Danelyn P. Geraldizo¹, Helen B. Boholano²

¹Head Teacher, Tal-ut National High School, Carcar City Division
Email id: danelyngeraldio@gmail.com

²Professor VI, College of Teacher Education, Cebu Normal University
Email id: boholanoh@cnu.edu.ph

Abstract: The study utilized descriptive - correlative research which aimed to determine the effectiveness of Storytelling in improving Mathematics performance and self - efficacy level of Grade 7 students in Roberto E. Sato Memorial National High School, Calidngan, Carcar City, Cebu, Philippines. A quasi - experimental research method was utilized using pretest - posttest control and experimental group design. Findings revealed that storytelling and conventional way of teaching has improved the performance of the two groups. However, storytelling has higher level of self - efficacy. Moreover, there was a positive correlation between the student's academic achievement and level of self - efficacy. This means that higher self - efficacy contributes to greater achievement of the students. Among the difficulties encountered by the students exposed to storytelling were English language barrier, unlocking of difficult words, complexity of the topic itself and some exercises in the book. The challenges met by the teacher - researcher while conducting this study were difficulty of the students in understanding the story, short attention span of the students, long preparation of stories and instructional materials and student's involvement was limited depending on the kind of story. Using storytelling in teaching Mathematics enhances the academic performance and level of self - efficacy of the students. Teachers teaching Geometry need to find relevant materials containing short stories or narratives.

Keywords: storytelling, academic performance, self - efficacy, geometry.

1. INTRODUCTION

Mathematics helps the man to give exact interpretation of his ideas and conclusions. It plays a predominant role in our daily lives and it is considered as an indispensable factor of our world's development. Mathematics also reveals great patterns that allow us to understand the things around us especially with arithmetic and geometry.

However, students have difficulties in conceptualizing abstract ideas in Mathematics causing the teachers to devise various strategies to help them teach concepts in this subject (Goral & Gnadinger, 2006). Among the strategies and devices used by educators in developing the mathematical competence of the students are calculators, workbooks, worksheets and manipulatives but literature is not often regarded as an aid in teaching Mathematics (Xu, 2016). These aim to increase the Mathematics achievement of students in this area.

According to the results of Programme for International Student Assessment (PISA) released last December 2019, Philippines scored 353 in Mathematics which made the country in second to the lowest in rank among 79 member and partner countries of Organization for Economic Co - operation and Development (OECD). This alarms the Department of Education to address urgent gaps and concerns in attaining quality education (Ciriaco, 2019). This concern prompts the department to shift its paradigm from access to quality.

Based on the results of TIMSS (Trends in International Mathematics and Science Study) in 2003, Philippines ranked 34th out of 38 participating countries in high school II Mathematics. This signifies the low performance of Filipinos in mathematical and logical reasoning. The Philippine National Achievement Test result, the Mean Percentage Score (MPS) in Mathematics was only 46.37 as indicated by Department of Education – National Education Testing & Research Center (NETRC). The quality of basic education is deteriorating and the country ranks among the poorest performers in East Asia (Fabriga, 2014).

For the past years, the results of the National Achievement Tests of Roberto E. Sato Memorial National High School showed that the school got a score of below the average benchmark in Mathematics with an average Mean Percentage Score (MPS) of 43.49% (Division Memorandum No. 177 s. 2019). Seminars on various teaching methodologies have been conducted but not including the use of literature in enhancing the performance of the students in this subject. This alarms the teacher/researcher to come up with a strategy that would help the students learn Mathematics in an engaging and meaningful learning experience.

In the Philippine setting, storytelling also plays a vital role in the preservation of the beautiful stories of the natives. This has also been used in the classroom setting to engage the students. According to Fuertes (2012), storytelling is an effective tool in transforming negative energy into constructive ways and brings positive transformative impact to people. The researcher hopes to increase the performance of the students in the area of Mathematics as this subject affects lifelong learning.

Thus, in this study, the researcher examined the effectiveness of Storytelling in improving Mathematics performance and self - efficacy level of Grade 7 students in Roberto E. Sato Memorial National High School, Calidngan, Carcar City, Cebu for the school year 2019 - 2020.

2. METHODOLOGY

For the realization of the purpose of this study, a quasi - experimental research method was utilized using pretest - posttest control and experimental group design. Both the control and experimental group were given a pretest and were exposed to their respective treatments and were assessed with a post - test. The control group was exposed to the Conventional Instruction which is following the learner's module prescribed by the Department of Education while the experimental group was exposed to Storytelling as a teaching strategy. A focused group discussion was also conducted to determine the challenges and difficulties encountered during the conduct of the study using the strategy.

The respondents of the research were the Grade 7 students of Roberto E. Sato Memorial National High School. There were two sections who served as the subjects of the study. Grade 7 St. Augustine was the control group and Grade 7 St. John was the experimental group. Both sections have forty (40) students. The lessons adopted in this study were the geometry lessons of grade 7 which are included in the curriculum guide mandated by the Department of Education. These lessons covered the key concepts in geometry including undefined terms, angles, polygons, circles and its geometrical relationships. For the empirical phase of the study, the researcher administered the pretest and posttest of the Geometry lessons in Grade 7 which is a 40 - item multiple choice type of test and designed to be answered in 60 minutes. This research instrument was a researcher-made test based on the table of specifications (TOS) in which the questions measured the skills of the students in remembering, understanding, applying, analyzing and evaluating across selected competencies in Geometry. The concepts and skills that were included in the test were anchored on the set of competencies prescribed by the Department of Education. The test questionnaire was already validated by experts to maintain the accuracy and validity of the results.

The questionnaire and the stories (interventions) were presented to the Education Program Supervisor in Mathematics of Carcar City Division, Mathematics Coordinator of the school and Math Major colleagues for a thorough examination and discussion. Pilot testing was already done to check its reliability. A Cronbach's Alpha of 0.74 was established to test the reliability of the questionnaire. Before the start of the experiment, lesson plans, stories and activity worksheets were prepared. These will be anchored on the competencies prescribed by the Department of Education. The lesson plans of the control group were anchored on Conventional style of teaching and the lesson plans for the experimental group used the storytelling strategy.

For the level of self - efficacy of the learners, the Mathematics Self - Efficacy Test by Malusay in her study "High Low Pairing Technique on Students' Mathematics Performance and Self - Efficacy was utilized." The research tool was pre - tested to both the control group and experimental group. For the entire experiment, the same content and skill were taught

to each group of students. At the start of the class session, the experimental group was given short stories integrated into the teaching of Geometry. For the control group, the conventional approach or any lecture/drill method was given. Formative assessments were utilized to support and evaluate the performance of the Grade 7 students. The Mathematics Self - efficacy Test was administered to the students before and after the experiment. After gathering the necessary data, they will be organized, tabulated, and interpreted to reach a conclusion on the effectiveness of storytelling strategy to the mathematics performance of the Grade 7 learners.

3. RESULTS AND DISCUSSION

This section presents the discussion, analysis and interpretation of the data on the performance and level of self - efficacy of the two groups in Grade 7 Geometry which were exposed to Conventional and Storytelling.

Students' Performance

The results of the Pretest and Posttest Mean Gain Performance in the Grade 7 Geometry Achievement Test of both the control and experimental groups are shown in Table 1. Difference between their scores from the pretest and posttest was determined to check if there is an increase or decrease of the students' scores after the intervention.

Table 1: Pretest and Posttest Mean Gain Performance in the Control and Experimental Groups

Learning Competencies	Test	Respondents							
		Control Group				Experimental Group			
		Mean	Mean Gain	P - value	T- value	Mean	Mean Gain	P - value	T-value
Undefined Terms	pre	0.925	0.650	0.510	-	0.700	1.15	0.046	-2.939**
	post	1.575			0.964 ^{ns}		1.850		
Kinds of Angles	pre	1.300	1.125	0.050	-	1.675	1.80	0.046	-2.869**
	post	2.425			4.274**		3.475		
Relationships of geometric figures	pre	1.025	0.225	0.480	-	0.825	2.75	0.004	-5.796**
	post	1.250			0.779 ^{ns}		3.575		
Relationships among angles formed by parallel lines cut by a transversal line	pre	0.925	1.350	0.004	-	1.200	1.05	0.001	-9.435**
	post	2.275			5.909**		2.250		
Polygons by convexity, angles and sides	pre	2.050	1.000	0.045	-	1.725	3.85	0.023	-2.812**
	post	3.050			1.965**		5.575		
Circles and the forms related to it	pre	2.075	0.175	0.772	-	2.025	1.775	0.015	-1.721**
	post	2.250			0.306 ^{ns}		3.800		
Problems involving sides and angles of a polygon	pre	1.875	0.250	0.531	-	2.075	1.45	0.030	-2.837**
	post	2.125			0.665 ^{ns}		3.525		
TOTALITY	pre	10.175		0.010	-	10.225	13.825	0.000	-
	post	14.95			2.097**		24.0		4.380**

** - significant

ns - not significant

Mean gain was determined to know the difference between the scores of the students in each learning competency. As shown in Table 1, the mean gain performance between the pretest and posttest performances of the control group has significantly increased with a p - value of 0.01 which is lesser than the level of significance of 0.05 and t – value of -2.097 which is greater than the critical t – value.

This implies that the students have significantly gained knowledge about the topics in Geometry. The learning competencies in kinds of angles, parallel lines cut by a transversal and polygons have significantly increased with p - values less than 0.05. This means that the learners gained enough knowledge and skills in these competencies through the conventional style of teaching.

Results also reveal that the competencies in undefined terms, relationships of geometric figures, circles and problems involving sides and angles of polygons have p - values greater than the level of significance of 0.05, hence, not significant. This implies that they have not attained mastery of the competencies as expected of them after one grading period in these particular concepts using the conventional style of teaching which includes the series of activities prescribed by the Department of Education. Nonetheless, the overall performance of the control group who was exposed in the conventional method of teaching by the researcher has significantly improved their performance. Following the learner’s module as prescribed by the Department of Education with mostly direct instruction as a way of teaching, the students learned the necessary concepts and skills in Grade 7 geometry. This further signifies that conventional style of teaching is still effective in enhancing the performance of the learners in learning Mathematics.

Meanwhile, the experimental group’s performance has significantly increased with p - value of 0.000 which is less than the level of significance of 0.05 and t – value of -4.380 which is greater than the critical t – value. This implies that students exposed to storytelling have better academic performance with the help of the narratives. With mean gain score of 13.825 which is relatively higher than the mean gain score of the control group by 9.05 of their mean scores. This means that the performance of the experimental group has increased greatly in the posttest from their pretest scores.

All the learning competencies in grade 7 Geometry have significant mean differences in their pretest and posttest scores. The learning competency in polygons has the highest mean gain score of 3.85 while the learning competency in parallel lines cut by a transversal has the lowest mean gain score of 1.05. It can be deduced from these results that students have learned a lot in various competencies through storytelling though there are still concepts that they still need to learn more like topic on transversal.

The results affirm the study of Toor and Mgombelo (2015) that storytelling strategy of teachers enhances both the being and cognitive aspects of the students and thus humanizes Mathematics. This means that storytelling allows the learners grasp a meaningful lesson and teachers are able to create a remarkable teachable moments with them. Furthermore, to sustain the interest of the students, there are different forms of stories: stories that explain, asks a question, stories that introduce and that intertwine. Most importantly, these would cater the needs of the students for optimum learning (Liljedahl and Zazkis,2009).

Mean Gain Difference between the Experimental and Control Groups

The mean gain difference between the experimental and control groups is shown in Table 2 that follows.

Table 2: Mean Gain Difference between the Experimental and Control Groups

Learning Competencies	Group	Mean Gain	Mean Gain Difference	P Value	T - value
• Undefined Terms	Experimental	1.15	0.64	0.429	-0.879 ^{ns}
	Control	0.51			
• Kinds of Angles	Experimental	1.80	0.675	0.185	-1.449 ^{ns}
	Control	1.125			
• Relationships of geometric figures	Experimental	2.75	2.525	0.023	-2.797 ^{**}
	Control	0.225			
• Relationships among angles formed by parallel lines cut by a transversal	Experimental	1.05	0.30	0.093	1.909 ^{ns}
	Control	1.35			
• Polygons by convexity, angles and sides	Experimental	3.850	3.765	0.009	-3.008 ^{**}
	Control	0.085			
• Circles and the terms related to it	Experimental	1.775	1.003	0.039	-2.119 ^{**}
	Control	0.772			
• Solves problems involving sides and angles of a polygon.	Experimental	1.450	0.919	0.015	-2.846 ^{**}
	Control	0.531			
• TOTALITY	Experimental	13.825	9.05	0.000	-6.334 ^{**}
	Control	4.775			

** - significant

ns – not significant

Comparison between the performance of the control and experimental groups after the intervention was made. The table above reveals that the mean gain difference between the experimental and control group of 9.05 is significant with p - value of 0.000 and t - value of -6.334. This also signifies that the experimental group has higher mean gain compared to the control group. This implies that storytelling is a more effective approach than the conventional method of teaching. Among the seven competencies, relationships of geometric figures, polygons by convexity, angles and sides, circles and the terms related to it and problems involving sides and angles of polygons have significant mean differences between the two groups. These results mean that learners have gained sufficient understanding on these competencies.

While competencies on undefined terms, kinds of angles and relationships of angles cut by a transversal show no significant mean gain difference between the experimental and control groups. This means that the performances of the students exposed to storytelling and conventional method are comparable. Both of these strategies in teaching have enhanced the performance of the students in these competencies though topic on transversal got the lowest mean gain difference.

In general, storytelling was a more effective approach in teaching Geometry lessons as it humanizes mathematics, increases the level of self - efficacy of the students and enhances their level of engagement through integrating literature in the teaching and learning process. According to Zazkis & Liljedahl (2009), to capture the students' attention in the introductory activity of presenting abstract concepts is challenging for the teachers. This needs a good storyline and a dramatic sequence to move students in an enjoyable learning experience than the usual pencil - and - paper tests.

Pre - Post Self - Efficacy Level of the Control and Experimental Groups

Self - efficacy of the grade 7 students was determined before and after the intervention was introduced. Table 3 shows the level of self - efficacy of the grade 7 students before and after the intervention.

Table 3: Pre - Post Self - Efficacy Level of the Control and Experimental

	<i>CONTROL</i>		<i>EXPERIMENTAL</i>	
	Mean Score	Description	Mean Score	Description
Pretest	2.77	Moderately Capable	2.65	Moderately Capable
Posttest	2.90	Moderately Capable	3.31	Highly Capable
	3.26 - 4.00 <i>Highly Capable</i>			
	2.51 - 3.25 <i>Moderately Capable</i>			
	1.76 - 2.50 <i>Slightly Capable</i>			
	1.00 - 1.75 <i>Not Capable</i>			

Self - efficacy refers to the belief of an individual in his capacity to achieve things to produce a specific performance. It allows the learners to be confident in controlling his motivation, behavior and environment (American Psychological Association (2018). Pretest and posttest were conducted to determine the level of self - efficacy of the students in Mathematics. As shown in Table 3, all students of the two groups have the same level of self - efficacy categorized as moderately capable. The control group got a mean score of 2.77 and the experimental group got a mean score of 2.65 during the pre - assessment. Their level of self - efficacy before the intervention is comparable. This signifies that the grade 7 students are not confident enough that they can solve problems in Mathematics. As their Math teacher, I have observed that students are hesitant to do problem - solving skills in math, do board works and share their answers because they are afraid to get the wrong answers. This could be one of the factors why they got a low score in their level of self - efficacy in the pre - assessment.

Meanwhile, the two groups got a higher mean score of their self - efficacy level compared to their pre-assessment scores. The experimental group got 3.31 which is categorized as highly capable while the control group got a mean score of 2.9 which is still categorized as moderately capable. Though there is an increase in the mean score of the control group but the results show that they are still moderately capable in doing Math activities.

This further means that storytelling has contributed to the self - efficacy level of the respondents. As observed by the researcher herself, students were very excited during Mathematics class and felt appreciated every lesson. Traces of fear to solve Math problems have been eliminated and belief in their capacity increases.

Storytelling in this research enhanced the level of self – efficacy of the learners towards Mathematics. With the results found, it can be deduced that both storytelling and conventional style of teaching can enhance the academic performance of the students but storytelling can further enhance the level of self – efficacy of the students compared to the conventional style of teaching. The results verify the results of Ayotola and Adedeji (2009) that enhancing the level of self – efficacy of the students will lead to a higher performance in the area of Mathematics. Self – efficacy as one of the important terms in human learning, is defined as the ability to accomplish tasks and affects motivation, action, efforts and achievement (Liu and Koirala, 2009).

Pretest and Posttest Mean Gain Performance on Student’s Self - Efficacy in the Control and Experimental Groups

Mean gain difference between the pretest and posttest scores of the students in both groups was measured to check if storytelling increases their self - beliefs towards learning Mathematics. The table below reveals the significance of the mean gain difference between the level of self - efficacy of both the control and experimental groups.

Table 4: Pretest and Posttest Mean Gain Performance on Student’s Self - Efficacy in the Control and Experimental Groups

Tests	Control Group		Experimental Group		Mean Gain Difference	P - value	T - value
	Mean Score	Mean Gain	Mean Score	Mean Gain			
Pretest	2.770	0.130	2.650	0.660	0.530	0.003	-
Posttest	2.900		3.310				3.030**

** - significant

ns – not significant

Self - efficacy in this study was determined to check if there is a significant difference on their beliefs that they can solve problems in Mathematics independently. Table 4 is the comparison on the effect of the conventional method of teaching and storytelling to the level of self - efficacy in Mathematics of the grade 7 students. Based on the figures presented, there is a significant mean gain difference between the level of self - efficacy of the both groups with p -value of 0.002 less than level of significance of 0.05. It can be noted that the experimental group has a higher self - efficacy than the students exposed to storytelling. This could mean that storytelling is more effective in enhancing the belief of the students that they can do more in Mathematics than the conventional way of teaching.

The results show similar results of the study of Ayodele (2011) that self – concept or self – efficacy is moderately correlated with performance in Mathematics. This suggests that teachers must develop the confidence and positivity of learners towards solving problems in Mathematics to enhance their Mathematical achievement.

Based on the related literature and studies discussed, Storytelling can be an effective tool for the students to enhance their mathematical ability, a skill which each one should master to develop his critical thinking skills and problem solving techniques. With stories to be part of the learning process of the students, the approach could be highly stimulating and engaging to the learners. Higher academic success could also be a result of high level of self - efficacy and motivation.

Relationship Between Self - Efficacy and Academic Performance

Self - efficacy in this study was correlated with academic performance in Mathematics in both the control and experimental groups. Table 5 reveals the significant relationship between the performance of the grade 7 students and their Mathematics self - efficacy of the control and experimental groups.

Table 5: Relationship Between Self - Efficacy and Academic Performance

	Control Group		Experimental Group		Totality	
	Performance	Self -efficacy level	Performance	Self -efficacy level	Performance	Self -efficacy level
Mean Score	14.95	2.900	24.05	3.310	19.500	3.105
P - value	0.049**		0.009**		0.029	
r-value	0.438 (moderate correlation)		0.657 (high correlation)		0.548 (moderate correlation)	

Other researches show that self - efficacy level affects the performance of the students in Mathematics. This could help boost their confidence and thus increases their performance or cause traumatic learning experience when this gets lower. Based on the table below, the control group obtained a p - value lesser than the level of significance of 0.05 and t – value of greater than the critical value. This value denotes a significant correlation between their performance and self - efficacy level. This means that the level of self - efficacy is a predictor of performance of the students. The higher the self – efficacy of the students, the greater is the tendency that the student will perform better in Mathematics. Looking at the results of the control group in their mean scores, their low performance could be attributed to low level of self - efficacy. Their Pearson – r value of 0.438 is described as moderately correlated.

The results then confirm the findings of Ayodele (2011) that self – concept or self – efficacy is moderately correlated with performance in Mathematics. The lower the belief of the students that they can learn this subject, the higher is the chance that they will perform low in Mathematics and vice versa. This suggests that teachers must develop the confidence and positivity of learners towards solving problems in Mathematics to enhance their Mathematical achievement. Moreover, it's fear sometimes that could hinder the students in learning Mathematics.

On the other hand, the experimental group obtained a p - value of 0.009 which is lesser than the level of significance of 0.05, hence, significant. Rejecting the null hypothesis means that there is a positive correlation between academic performance and level of self - efficacy. This implies that the group exposed to storytelling has higher performance because of their higher level of self - efficacy. This further means that self – efficacy is a predictor of student's performance in Mathematics. They appreciate their efforts and able to learn this subject in an enjoyable manner.

Researchers have also indicated that higher self – efficacy level is a good predictive of higher academic performance. Self – efficacy as one of the important terms in human learning, is defined as the ability to accomplish tasks and affects motivation, action, efforts and achievement (Liu & Koirala, 2009).

Difficulties Encountered by the Students

Focus Group Discussion (FGD) was conducted to identify the internal and external difficulties encountered by the students that might hinder them from learning the different competencies. During the FGD, the grade 7 learners freely shared their thoughts on the questions thrown to them by the researcher.

The figure below summarizes the internal and external difficulties encountered by the students during the conduct of the storytelling. It illustrates the themes emerged from the experiences of the students during the intervention.

Storytelling strategy of teachers engages both the being and cognitive aspects of the students thus humanizes Mathematics. This means that storytelling allows the learners grasp a meaningful lesson and teachers are able to create a remarkable teachable moments with them (Toor and Mgombelo, 2015). However, in this study, internal and external difficulties encountered by the students were found during the Focus Group Discussion. These themes of meaning that emerged were as follows:

Theme No. 1: Comprehension of the English Language

The participants identified barrier in understanding the story because of the English language used. Knowing that English is not their first - learned language and not used in speaking this, the grade 7 learners had a hard time comprehending the story presented by the teacher. The following are support feedback from the students,

“Maglisud mi ug sabut usahay Miss sa ubang parts sa story kay english kaayu. Makasabut mi ug maayo ug imuhang I translate tanan ug bisaya”. (“We sometimes don't understand the other parts of the story Miss because English language was used. We could understand better if you are going to translate all words to Cebuano dialect.”)

“Naay mag words sa stories Miss nga maglisud mig sabut kay di man kaayu mi mo iningles. Mas masabtan na namu Miss ug imuha na I unlock ug tagaan examples”. (“There are words in the stories Miss that we hardly understand because we don't know the meanings of those words. We would understand it better if you are going to unlock those words with examples.”)

These statements expressed by the participants characterize difficulty in understanding the story because of low comprehension of the English language. It can be noted that enhancing their comprehension with the different vocabularies, their level of understanding on the different competencies is also higher. These statements were manifestations that English as the medium of teaching was the barrier in their understanding of the stories. This finding is also supported by Sepulveda (2003) that language barrier has detrimental effect on the learning of the students.

The results are also supported by Sharma (2015) that learning Mathematics is strongly related with language and to succeed in Mathematics, the students must be able to use mathematical language correctly and completely understand it.

Another respondent remarked,

“Ang mga words gigamit sa stories ug mystery problems kay lisud na English man Miss”. (“The words used in the story and mystery problems are difficult to understand.”)

This implies that students encountered challenges with the English vocabularies used in the stories. Commonly with the students in public schools as a teacher - researcher, problems with grammar, syntax and vocabularies are usually encountered in comprehending stories.

Theme No. 2: Complexity of the Story

From the focus group discussion, storytelling really enhanced the students level of engagement and efficacy but there were concepts hard to learn because of its complexity. Stories in the statements of the students ignited their interest towards the subject matter but the problems in the story itself hinders them from going through the story, Nevertheless, storytelling can be a good strategy in igniting the interest, motivation and level of self - efficacy of the students despite the challenges that they have encountered. As respondent 3 narrated,

“Lisud sad usahay Miss ang mga mystery problems nga naa sa story. Kinahanglan imu jud sabtun kay masayup unya ka dili maluwas ang heroes sa stories’. (“It’s difficult sometimes to learn the topic because of the mystery problems found in the stories. You really need to understand the story to save the heroes in the story.”)

This signifies that the story itself is hard enough to learn because of the mystery problems that need to be solved. Mathematics itself is difficult and students have difficulties in conceptualizing abstract ideas in this subject (Goral & Gnadinger, 2006). Therefore, teachers must devise stories that are easy to understand to supplement the teaching and learning process. Respondent 2 also recounted,

“Naglisud ko sa story Miss usahay kay daghan ug problems I-solve nya makalimut ko unsaun pag solve.” (I had a hard time with the story Miss because there are lot of problems to be solved and I forgot how to solve them”.)

The accounts of the participants showed that they had an effort learning the topic because of the complexity of the story. It contains problems that need background knowledge on how to solve them. Such responses are reflective of the results of Sharma (2015) that complex mathematical discourse is not something that students are able to achieve due to interference of language and mathematical register.

Theme No. 3: Slow register of the Learning Competency

Participants expressed how challenging other learning competencies of Grade 7 geometry. The feelings of fear of not achieving the set standards is evident among them. As respondent 5 shared,

“Nindut kaayu ang story Miss kay malingaw mi pero naa may lisud mga topics miss parehas atung Transversal kay daghan porma ang angles. Kinahanglan nga malearn daan tung mga kinds of angles”. (“The story is enticing and enjoyable but there are competencies like that of transversals who need a good background of the different kinds of angles.”)

This implies that the participants identified topics they find difficult even if the stories enticed them to learn the competency. It has been ingrained in the minds of the students that the subject is difficult per se. This supports the results of this study that storytelling enhances the performance and self - efficacy of the students in totality but the students showed no significant improvement in the topics in parallel lines cut by a transversal. Respondent 8 recounted,

“Naglisud ko ug sabut sa ubang concepts Miss like transversal kay libug man. I review pa naku ang previous lessons una ko ka-relate.” (“I found a difficulty in other concepts Miss like transversal because it’s confusing. I need to review the previous lessons before I can relate to the topic.”

This signifies that the topic on transversal is the most difficult among the competencies introduced in the whole grading period. This further means that storytelling could motivate the students in learning concepts but in difficult lessons like this, mastery of the topic could be less attained.

This competency entails critical thinking in analyzing the forms and relationships of angles. Basic competencies must be met first so that students will have a mastery of these lessons. These findings are consistent to the study of Meerah & Tambychik (2010) that if students have deficiency in mathematical skills and cognitive abilities in learning Mathematics, this will inhibit them in learning problem - solving. Most of the learners found a difficulty in applying learned concepts to real - life situations.

Challenges Met by the Researcher in Using Storytelling in Teaching Geometry to Grade 7 Learners

Storytelling is not commonly used in teaching Mathematics and the researcher encountered several difficulties in the conduct of this study. Below are the challenges encountered by the teacher - researcher in using storytelling in teaching geometry to grade 7 learners.

The number one problem met by the researcher pertains to the language barrier of the students in understanding English texts. In using storytelling, the teacher must unlock difficult words found in the story and if possible, translate sentences to the first language learned by the students.

The second problem met by the teacher - researcher is the short attention span of the students. Knowing these are still grade seven learners, they are easily disturbed by some factors like activities outside the classroom and noise from other classrooms.

Another problem met by the teacher was the long preparation of stories, and instructional materials. In using storytelling, teachers must exert effort in crafting localized stories and in making instructional materials like PowerPoint presentations, hand-outs and the like.

Lastly, student’s involvement was not employed all the time because it depends on the kind of story intended for that particular topic. Mostly, it’s the teacher who controls the setting of the classroom.

4. CONCLUSION

It can be concluded that both storytelling and conventional strategies in teaching Mathematics are effective in enhancing the academic performance of the students but their level of self – efficacy is higher when they are exposed to storytelling.

REFERENCES

- [1] American Psychological Association. (2018). Teaching tip sheet: Self - efficacy. *750 First St. NE, Washington, DC*
- [2] Andrews, Dee, et. Al. (2010). Storytelling as an instructional method: Research perspectives. *Sense Publishers, Rotterdam, The Netherlands*, page 4-26
- [3] Ayodele, O.J. (2011). Self -concept and performance of secondary school students in Mathematics, *Journal of Education and Development Psychology*, 1(1), 176-183
- [4] Balakrishnan, Chandra. (2008). Teaching secondary school mathematics through storytelling. *Simon Fraser University, Burnaby, BC, Canada*
- [5] Cheema, J. (2018). Effect of math - specific self - efficacy on Math literacy: Evidences from a Greek survey. *Research in education. Volume 102 (1)*, 13 - 36
- [6] Ciriaco, C.M. (2019). DepEd vows to improve quality of education after PISA Showing, *BusinessMirror*, <https://businessmirror.com.ph/2019/12/06/depd-vows-to-improve-quality-of-education-after-pisa-showing/>

- [7] Connie, Seng Swee Hoon. (2017). Teachers' and students' perceptions of storytelling as a language teaching and learning resource. *University of Sheffield*
- [8] Eck, J. (2006). An analysis of the effectiveness of storytelling with adult learners in supervisory management. *The Graduate School University of Wisconsin - Stout*
- [9] Eldridge, N. (2009). To teach science, tell stories. *Issues in Science and Technology*, 25 (4), 81 - 84
- [10] Ellyat, W. (2012). Storytelling and the power of narrative. *Paths of Learning*.
- [11] Fabriga, R. (2014). Short stories in teaching geometry. *Cebu Normal University, Cebu City*
- [12] Frankfort, H., Wilson, J.A. and Jacobsen, T.. (1949). *Before Philosophy* (Baltimore: Penguin, 54
- [13] Fuertes, A. (2012). Storytelling and its transformative impact in the Philippines, *Wiley Online Library*, 29(3), <https://doi.org/10.1002/crq.21043>
- [14] Giesen, Janet. (2012). Constructivism: A holistic approach to teaching and learning. *Faculty Development and Instructional Design Center*. Northern Illinois University
- [15] Goral, Mary Barr & Gnadinger, Cindy Meyers. (2006). Using storytelling to teach Mathematics concepts. *APMC 11 Volume 1* s. 2006 pages 4-8
- [16] Gregor, Martha. (2010). Storytelling in the home, school and library, 1890 - 1920. *Graduate School of the University of Oregon*
- [17] Grose, C. (2010). Storytelling across the curriculum: From margin to center, from classroom to clinic. *Journal of the Association of Legal Writing Directors*, 7, 37-61
- [18] Hadzigeorgiou, Y. (2006). Humanizing the teaching of physics through storytelling: The case of current electricity. *Physics Education*, 41 (4), 42 - 46
- [19] Harmacher, D.W., & Guedes, C.B. (2017). The Conversation
- [20] Harris, R.B. (2007). Blending narratives: a storytelling strategy for social studies. *Social Studies*, 98 (3), 111 - 116
- [21] Hein, George. (1991). Constructivist learning theory. The Museum and Needs of People. *International Committee of Museum Indicators Conference*. October 15-22, 1991
- [22] Jones, D.M. (2002). Issues in the teaching and learning Geometry. In Linda Haggarty (ED), *Aspects of Teaching Secondary Mathematics*, 121 - 139
- [23] Koellner, K., Wallace, F. & Swackhamer, L. (2009). Integrating literature to support Mathematics learning in middle schools
- [24] Kosa, J.R. (2008). Tell a story. *Education Digest*, 74 (2), 43 - 47
- [25] Liu, X. & Koirala, H. (2009). The effect of mathematics self - efficacy on mathematics achievement of high school students. *NERA Conference Proceedings*. 30
- [26] Marroquin, C. & Young, E. (2006). Posing problems from children's literature. *National Council of Teachers of Mathematics, Vol (12)*, 362 - 366
- [27] McCoach, B. & Siegle, D. (2007). Increasing student Mathematics self - efficacy through teacher training. *University of Connecticut, Vol. 18*, pp. 278 - 312
- [28] Meerah, S.M. & Tambychik, T. (2010). Students' difficulties in Mathematics problem solving: What do they say?, *Procedia-Social and Behavioral Sciences*, 8, 142-151
- [29] Mello, R. (2001). The power of storytelling: how oral narrative influences children's relationships in classrooms. *International Journal of Education and the Arts*. 2 (1)
- [30] Murray, O. & Powell, R.M. (2012). Using storytelling strategies to improve student comprehension in online classes. *The Journal of Effective Teaching*. Vol. 12 (1), 46 - 52

- [31] Palmer, N. (2015). Euclid. *Ancient History Encyclopedia*
- [32] Pajares, F. & Miller, M.D. (1995). Mathematics self - efficacy and mathematics performances: the need for specificity of assessment. *Journal of Counseling Psychology*, 42(2), 190 - 198
- [33] Sharma, S. (2015). Language barriers in mathematics education: Some findings from Fiji. *7th ICMI - East Asia Regional Conference on Mathematics Education*, 543 - 549
- [34] Stachurska, Sylwia. (2013). Exploiting storytelling in a young learners' classroom. *Jan Dlugosz University*, pages 165 - 182
- [35] Toor, Amanjot & Mgombelo, Joyce. (2016). Teaching Mathematics through storytelling: Engaging the 'being' of a student in Mathematics. *HAL Archives - Ouvertes*. Retrieved from <https://hal.archives-ouvertes.fr/hal-01289881>
- [36] Wilburne, J.M. & Napoli, M. Connecting Mathematics and literature: An analysis of pre - service elementary school teachers' changing beliefs and knowledge. *School of Behavioral Sciences and Education, Penn State Harrisburg*, Vol. 2
- [37] Whitin, D.J. & Whitin, P. (2004). New visions for linking literature and mathematics. *Urbana: National Council of Teachers of English*
- [38] Xu, Bingqing (2016). Math Stories in Elementary Mathematics Education in China and North America. Western Graduate and Post Doctoral Studies. *Western University Scholarship@Western*. 1-145
- [39] Zazkis, R. & Liljedahl, P. (2009). Teaching mathematics as storytelling. *Sense Publishers*, Rotterdam, The Netherlands