STIMULATING GRADE 8 STUDENTS' MOTIVATION AND ADMIRATION IN LEARNING MATHEMATICS THROUGH INFUSING MATHEMATICIANS' AND SCIENTISTS' PHENOMENAL STRUGGLES

Balila, Jayson D.

Completed 2020

TABLE OF CONTENTS

II. ABSTRACT

This study aims to regain students' motivation in learning Mathematics whenever they lost it due to some circumstances in class. Moreover, this study intends to invigorate them to learn the subject with admiration. The intervention used was the phenomenal struggle stories of the famous scientists and mathematicians which was administered through age-old art of storytelling. The participants were the twenty students of Grade – 8 section Molave of B'laan National High School. This study utilized the simplest form of data triangulation which uses a variety of information or data sources in order to increase the validity of results and give more detailed and balanced picture of the situation. Survey questionnaires and interviews revealed coherent results indicating the effectiveness of the intervention in stimulating students' motivation and admiration in learning Mathematics.

Key words: *students' motivation, students' admiration, phenomenal struggles, learning Mathematics*

III. ACKNOWLEDGMENT

First and foremost, praises and thanks to the God Almighty, for His showers of blessings throughout my research. Through His guidance, I completed this study.

I would like to express my deep thanks to Ma'am Janet R. Octura, SEPS in Planning and Research of the Division of Davao Occidental, for giving me the opportunity to do this research. Her dynamism, vision, sincerity and motivation have deeply inspired me.

My sincere gratitude to the ASDS of our beloved Division, Dr. Jinky B Firman, CESE, for believing in my capacity in doing research.

My special thanks to Edward F. Dizon, Head Teacher – I of Linadasan Elementary School, for acting as my research adviser. His exceptional skills in research made this study complete. I am truly grateful for what he has offered me.

I am also grateful to the members of the Davao Occidental Research Facilitators: Ma'am Michelle Rose M. Casis, Sir Leif Ralex W. Campaner, Ma'am Thelma B. Vigor, Ma'am Dareen Joy R. Bongan and Sir Aladen Varquez, for the friendship and invaluable assistance.

Eventually, I would like to thank my family: my parents Edgardo and Luzviminda, and my son Tope, for giving me endless love, and inspiration which significantly helped me conquer all kinds of challenges.

IV. CONTEXT AND RATIONALE

It was July, 2018, when I was having my class in Mathematics in one of the sections of the Grade 8 department of my station – B'laan National High School, when I noticed that majority of my students were lethargic. I am fully aware that I had rendered the usual enthusiasm I showed to them every time I conducted my class. Another wonderful morning, I was teaching another set of students from the Grade 7 department, using my prepared Power Point Presentation when the same incident happened. My students were lifeless, lacking vitality, and showing no interest of learning the lesson. The school year has just started and yet most of my students' interest in learning Mathematics was disappointing and quite alarming.

To find out what was really going on, I called the attention of some of these students and talk to them in a usual conversation. They honestly revealed that they don't like mathematics because its lessons were always hard. They even found the process boring and burdensome and learning it was never fun. The students also shared that they hated Mathematics so much since elementary. At times, it gets into a point that they cannot afford to invest even a little amount of interest in learning its concepts. Because for them, it was just useless, for eventually they would only understand a little, or worst nothing.

However, during assessment, not all of them failed. Some of the students' scores were fine but not good enough. When I confronted those students who had fine scores, they promptly replied that they seemed to understand our lesson. Besides, they added that if only they have the same interest of learning our lesson just like in the other subject areas, their scores must have gotten higher.

Due to these revelations, I became so concerned of regaining their motivation in learning the different Mathematics lessons, and developing admiration on the subject. Consequently, when I conducted my following class and experience the same problem, an impulse from within urged me to stop my discussion and told the students a story about the life of Thomas Alva Edison and how her mother incredibly motivated him to pursue his life and earned the title "*The Genius of Century*" for pioneering the light bulb which significantly help the humanity, despite of violent criticisms and rejections. Upon telling the story, focus and interest manifested in each of the students. They were heeding carefully, making sure that they won't skip any part of my story, gotten themselves in complete seriousness. After the storytelling, all of my students seemed to be incessant in terms of learning the lesson I was teaching. It is then that I realized, that my students only lack motivation to keep moving or persevere to learn Mathematics lessons.

As the term motivation itself indicates, it is a motive force, same thing that prompts, incites action. Motivation seems to be the biggest single factor affecting learner's success. One of the factors influencing the full success of the learners in learning is the person's motivation (Tuan, L., 2012). The student's learning is facilitated most effectively when they are motivated, so a less able student who is highly motivated achieves greater success than the more intelligent student who is not well motivated. Being motivated is one of the most important factors in learning (Abdelrahim, I., & Humaida, I, 2012). Many teachers and scholar in the field of Mathematics pedagogy believe that learners will be more successful if they are motivated. Also, motivation is

accepted by both teachers and researchers as one of the factors that influence the rate and success of learning mathematics (Mao, Z., 2011).

As their Mathematics teacher, I'm absolutely afraid that my students' interest in learning mathematics lessons will totally disappear someday. I do not want them to think Mathematics as a subject that cuts off their interest in going to school. I do not want them to have negative perception on my subject. I do not want them to admire other subjects and hate Mathematics. What I want is, for them to love Mathematics no matter how simplified or cumbersome the processes and methods are, and to appreciate the real purpose of learning it, which can make their respective lives better. Thus, I concluded that there is really a need to perform an immediate action about this problem. Consequently, this action research was conducted.

Moreover, the findings of this study will be beneficial to the secondary teachers whose problems are related to heightening students' interest and attentiveness in their various lessons in the field of Mathematics. Teachers in other subject areas, such as Science can also benefit from this study.

V. INTERVENTION/INNOVATION/STRATEGY

When it comes to my pedagogy, I'm quite obsessed. Thus, every time I finished my class, I always do self-assessment by asking questions such as: How did it go and is it satisfying and helpful to my students? Was my topic today really understood by my students? Did everything go well? And, did I make a difference? How can I improve my teaching styles?

Starting from that moment when I had my realizations regarding the students' lack of motivation and admiration in Mathematics, I kept on thinking about it over and over again. And every time I thought about it, I also thought of viable solutions that might solve the disappointing and alarming situation I'd been currently into. I thought about intrinsic and extrinsic motivation, and positive and negative reinforcement. However, there was a peculiar surge of certainty within me, insinuating that telling phenomenal struggle stories of famous mathematicians and scientists to students could be a very effective motivation and can significantly improve students' interest to admire mathematics lessons. Consequently, I searched over the internet to look for ways on how to turn this into a very effective intervention. Fortunately, I found one creative way on using story-telling as an intervention. This was used in a study published by American Psychological Association on 2016. I carefully strategized this intervention and found an efficient way of using it.

This intervention was composed of three stories: Intellectual Struggle Stories (ISS), Life Struggle Stories (LSS) and Achievement Stories (AS). These stories are about the life of the famous scientists and mathematicians of all times, which was administered through Story – Based Instruction before, in the middle, and in the end of the lesson proper.

Why are we using the age-old art of storytelling to confront students' beliefs about mathematics learning? One reason is that stories can powerfully impact people's attitudes, beliefs, and behaviors (Kaufman & Libby, 2012; Oatley, 1999). For instance, stories are "self-involving" and shape readers' perspectives and emotions (Miall & Kuiken, 1998). The most impactful stories are usually detailed, honest, personal, and

involve struggles: “When you want to motivate, persuade, or be remembered, start with a story of human struggle and eventual triumph” (Zak, 2014). Such stories are memorable because people become emotionally involved in the lives of the characters, see the world as they do, or imagine situations that may be similar to theirs. Second, stories often describe actions that a character takes to complete a goal (Black & Bower, 1980). People tend to recall action processes that are involved in the pursuit of a goal better than descriptions of what characters look like (Black & Bower, 1980).

A number of science educators have suggested that scientists’ personal narratives, anecdotes, or life stories are valuable resources that can be used to inspire students’ science and mathematics learning (Eshach, 2009; H. Hong & Lin-Siegler, 2012; Lin & Bransford, 2010; Martin & Brouwer, 1993; McKinney & Michalovic, 2004; Solomon, 2007). Embedded in these narratives are usually scientists’ role models who provide templates of the actions or behaviors that are needed to achieve specific goals. Narratives also convey the message that the road to scientific discovery involves failed attempts and mistakes. Highlighting this process not only enhances recall and understanding of the information embedded in the story (Black & Bower, 1980) but also portrays scientists as relatable role models to connect students emotionally. For instance, bringing in the backstory of a successful scientist may help students realize that their own struggles are common in science but, more importantly, possible to overcome (H. Hong & LinSiegler, 2012).

The famous scientists and mathematicians used in the intervention will serve or function as role models.

Role models provide examples of success in a given area one wishes to emulate and achieve (Asgari, Dasgupta, & Gilbert Cote, 2010; Asgari, Dasgupta, & Stout, 2012; Aspinwall, 1997; Blanton, 2001; Dasgupta, 2011; Davies, Spencer, & Steele, 2005; Haines & Kray, 2005; Hoyt & Blascovich, 2007; Lockwood, 2006; Lockwood, Jordan, & Kunda, 2002; Lockwood & Kunda, 1997; Marx & Roman, 2002; McIntyre, Paulson, & Lord, 2003; Seta, 1982; Wood, 1989). They also have the potential to affect observers' attitudes toward a given domain and participation in that domain because they exemplify that attitude (Dasgupta, 2011). For example, children often learn the value of being generous by observing role models who are generous. When adults behave generously, children tend to also behave generously (Rushton, 1975).

Extensive research has shown that people attend to role models who possess the following characteristics: (a) they display competence (Williamson, Meltzoff, & Markman, 2008), (b) they succeed on goals that are construed as attainable (Lockwood & Kunda, 1997, 1999), and (c) they are viewed as relevant or similar to the self (Goethals & Darley, 1977; Markus & Kunda, 1986; Markus & Nurius, 1986; Markus & Wurf, 1987; Wood, 1989). Role models are often used to demonstrate heroic actions and morals, but here I use role models to reveal famous scientists and mathematicians' limitations and how to work through such limitations.

The administering of the Story-Based Instruction intervention was administered during the students' regular time in their mathematics subject. It was composed of 12 stories from 4 remarkable mathematicians and scientists of all times, since the intervention is divided into 3 kinds of stories namely: Intellectual Struggles Stories (ISS),

Life Struggle Stories (LSS) and Achievement Stories (AS). Thus, each kind will have 4 stories each.

These stories were presented before, in the middle and in the end of the lesson proper through Power Point Presentation or booklet, depending on where the students were convenient. Reading these stories aloud to the students was highly advised, to be efficiently understood and comprehend. At times, thoughts of the stories were delivered using vernacular to promote absolute understanding. The stories that were presented before the lesson will be the LSS, which entitled as "*Challenges are Made to Overcome!*" and was all about the difficulties and struggles of the 4 chosen mathematicians and scientists. The stories that were presented in the middle of the lesson were the ISS, which entitled as "*Just Keep Trying!*", and was all about the intellectual struggles of the same 4 mathematicians and scientists in their personal lives, such as poverty and having to flee the Nazis. Eventually, the stories that were presented at the end of the lesson were the AS, which entitled as "*I Did It!*" and was all the four mathematicians' and scientists' achievements.

The said intervention was administered twice in a week to avoid diminishing of students' interest of the activity. In every week, there was only one mathematician/scientist stories in focus. Since, there were 4 mathematicians/scientists chosen, thus the conduction of the intervention ended in a month.

The class of the 20 participants had a total population of 62. Conventional routine of the class remained and there was no separation of students that happened. Every student of the Grade – 8 section Molave experienced the administration of the

intervention. However, only the participants received questionnaires and underwent series of interviews and discussions.

The administering of the Story-Based Instruction intervention lasted for a month and administered during the students' regular time in their mathematics subject. It was composed of 12 stories from 4 remarkable mathematicians and scientists of all times, since the intervention is divided into 3 kinds of stories namely: Intellectual Struggles Stories (ISS), Life Struggle Stories (LSS) and Achievement Stories (AS). Thus each kind will have 4 stories each.

These stories were presented before, in the middle and in the end of the lesson proper through Power Point Presentation or booklet, depending on where the students were convenient. Reading these stories aloud to the students was highly advised, to be efficiently understood and comprehend. At times, thoughts of the stories were delivered using vernacular to promote absolute understanding. The stories that were presented before the lesson will be the LSS, which entitled as "*Challenges are Made to Overcome!*" and was all about the difficulties and struggles of the 4 chosen mathematicians and scientists. The stories that were presented in the middle of the lesson were the ISS, which entitled as "*Just Keep Trying!*", and was all about the intellectual struggles of the same 4 mathematicians and scientists in their personal lives, such as poverty and having to flee the Nazis. Eventually, the stories that were presented at the end of the lesson were the AS, which entitled as "*I Did It!*" and was all the four mathematicians' and scientists' achievements.

The said intervention was administered twice in a week to avoid diminishing of students' interest of the activity. In every week, there was only one

mathematician/scientist stories in focus. Since, there were 4 mathematicians/scientists chosen, thus the conduction of the intervention ended in a month.

The class of the 20 participants had a total population of 62. Conventional routine of the class remained and there was no separation of students that happened. Every student of the Grade – 8 section Molave experienced the administration of the intervention. However, only the participants received questionnaires and underwent series of interviews and discussions.

VI. ACTION RESEARCH QUESTION

The focus of this research was to address the lethargic behavior of my students during Mathematics class. Wherein, if this kind of incident will happen again, I will immediately have my strategy on how to retrieve their attention back on my lesson, fired up and doubly motivated to learn the varied lessons in my subject. Thus, this research sought to answer the question:

How do infusing scientists' and mathematicians' phenomenal struggles stimulate students' motivation and admiration in learning Mathematics?

VII. ACTION RESEARCH METHODS

a. Participant and Other Sources of Information

Twenty students of Grade – 8 section Molave of B'laan National High School, were chosen to become the participants of the study. Ten (10) students were from the top performing students of the previous grading period in Mathematics and the other ten

(10) were from the lowest rank of the same grading period and learning area. The participants were chosen this way in order to maintain the balance of the level of intelligence of the participants, ensuring that the intervention was administered to all levels and kinds of secondary learners.

The Top 10 Performing Students. Three of these students were consistent on being "*With High Honors"* since grade 7. They were the frontlines of our school when it comes to competitions in all learning areas especially in Mathematics. They were responsible, reliable and possessed excellent leadership during my class. Their perseverance in educating themselves in Mathematics was quite admirable. Five of these students were consistent on being "With Honors" since grade 7. They were still considered as the frontlines of our institution, but not mainly in Mathematics. Still, all of them were responsible and reliable. Mathematics was their second or third option when it comes to choosing a subject that they'd love most. The two of these students were inconsistent as honor students. Their perseverance in learning Mathematics depend on their mood. Nonetheless, these two can still be trusted when it comes to leadership and accomplishing tasks regarding Mathematics activities.

The 10 Students from the Lowest Ranks. All of them share common issues when it comes to their academics especially in Mathematics. They commit frequent absences, shows no interest in learning the lessons, never participate in any board works and oral recitation, often came late, and never persevere. Whenever they saw mathematical problems, they frowned instantly. They were just so silent during my class. Some cannot perform even a single and simple task related to Mathematics.

b. Data Gathering Procedure

Before the data gathered, ethical issues concerning confidentiality, consent, access, and human participants' protection were dealt.

Minor assent form was to the participants since all of them were 15 years old below. The consent was translated into vernacular and was read by a gatekeeper aloud in front of them for full understanding. The consent was retrieved after a day giving ample time for the participants to contemplate. Upon approval, the researcher immediately commenced the administration of the intervention.

In order to gather the data needed and to explore the effectiveness of the intervention, the following methods were used: (1) class observation; (2) Student Voice Survey/Student Questionnaire; (3) Student Group Interviews and Discussions; and (4) Administrative Staffs Questionnaires.

Class Observation. I, the researcher was observed by the selected administrative staffs from our school. The following staffs were the Principal, the Head Teacher, School Governance Chairperson and School Guidance Counselor. They mainly focused on how I administer the intervention, its effectivity, and how does it affect the students' motivation to keep themselves inspired and admire mathematics lessons.

Students' Voice Survey/Students' Questionnaire. The chosen 20 students were given questionnaires after the administration of the intervention which include statements/indicators and open-ended questions focusing on the activity/intervention, and the impact of it in making them motivated to learn their lesson. These questionnaires asked the students to comment on how effective they felt the

intervention had been, and how they thought it could be improved. Since this was a researcher-made questionnaire, I submitted it to the principal, head teacher, school governance chairperson and school guidance counselor for validation. The questionnaires were gathered and collated for data analysis.

Students Group Interview and Discussions. When the administering of the Students' Voice Survey/Students' Questionnaire was through, the chosen 20 respondents were gathered in a room and took part in an informal group interview and discussions to confirm and provide additional details regarding the effectiveness and impact of the intervention.

Administrative Staffs' Questionnaire. This questionnaire asked the Principal, the Head Teacher and the Governance Program Head to evaluate the entire duration of the conduct of the intervention and its impact to the students. This questionnaire underwent validation as well by the mentioned authorities since it was also a researcher-made. The questionnaires were gathered and collated for data analysis.

c. Data Analysis

This study utilized the simplest form of data triangulation. This method uses a variety of information or data sources in order to increase the validity of results (Naeem, 2019). The basic purpose of this approach in this research was to help in giving more detailed and balanced picture of the situation (Altrichter, 1996).

Consequently, administrative and students' questionnaires were analyzed descriptively, while classroom observations, students' informal interviews and discussions, and observation of behavior provided confirmation and additional details

regarding the effect of the intervention on stimulating students' motivation and admiration in learning Mathematics.

The researcher – made administrative and students' questionnaires used a 4 – point Likert Scale to analyze the effectiveness of the intervention:

Range	Scale Interval	Description	Interpretation
4	3.26 – 4	Strongly Agree	The indicator is highly manifested and observed in all occasions.
3	2.51 – 3.25	Agree	The indicator is manifested and observed most of the time.
2	1.76 – 2.5	Disagree	The indicator is seldom manifested and observed.
1	1 – 1.75	Strongly Disagree	The indicator is never manifested.

VIII. DISCUSSION OF RESULTS AND REFLECTION

Classroom Observation

The authorities I requested to observe my class during the whole conduct of my study agreed to give comments written on a small sheet of paper after every observation to note the significant features of the intervention and identify the reasons why it was effective. The comments that reappeared mostly during the eight times of observation were the following: (1) Most of the students relate to the stories and reflect upon it; (2) The stories caught the students' attention and free them from the stereotypical mindset regarding Mathematics; (3) The stories diverted the students' belief that Mathematics has always been a difficult subject; (4) The intervention motivate the student to learn Mathematics even more; (5) The intervention is a good way to set a

pleasant mood as they begin learning different Mathematical equations; (6) The intervention is positively drawing away the negative mentality that most of the learners felt upon learning Mathematics; (7) The intervention promotes interaction; and (8) The stories boost students' interest in learning Mathematics.

Most of the comments during the observations were positive and all the observers showed appreciation and adherence that the intervention used in this study was really effective. I even received series of compliments from them every class observation. Hence, based on the class observations, the intervention was effective in stimulating students' motivation and admiration in learning Mathematics.

Students' Voice Survey/Students' Questionnaire

The result of the students' voice survey/students' questionnaire conforms the comments given by the authorities who observed my class as shown in the table below:

Table 1. Mean, Description, and Interpretation of each Indicator Used in the Student Questionnaire

Indicator	Mean	Description	Interpretation
1. I feel motivated every time I heard the stories.	4	Strongly Agree	The indicator is highly manifested and observed in all occasions.
2. The stories increased my interest in studying and learning the lessons in Mathematics.	4	Strongly Agree	The indicator is highly manifested and observed in all occasions.
3. The stories helped me not to give up on lessons which I didn't understand at first.	3.7	Strongly Agree	The indicator is highly manifested and observed in all occasions.
4. I enjoyed hearing all the stories.	3.9	Strongly Agree	The indicator is highly manifested and observed in all occasions.
5. The moment I heard the stories, I idolize the characters and wanted to be just like them.	3.45	Strongly Agree	The indicator is manifested and observed most of the time.

6. The characters in the stories influenced me a lot.	3.75	Strongly Agree	The indicator is highly manifested and observed in all occasions.
7. The stories helped me to focus my attention on learning Mathematics lessons.	3.8	Strongly Agree	The indicator is highly manifested and observed in all occasions.
8. I wanted to keep hearing such kinds of stories.	3.95	Strongly Agree	The indicator is highly manifested and observed in all occasions.
Grand Mean	**3.82**	**Strongly Agree**	**The intervention is highly effective.**

Table 1 disclosed the mean, description, and interpretation of the indicators used in the students' questionnaires. It is very noticeable that all of the indicators acquired mean ranging from 3.45 – 4 which description is "Strongly Agree" and interpreted as "highly manifested and observed in all occasions". Thus, the intervention is highly effective.

Surprisingly, in the open-ended questions section, eighteen out of twenty students answered "*None!*" in the question "*If there's something you don't like on the strategy, what is it?*" Thus, only two students commented and their comments were just the same – "*Ang akong dili ganahan kay namatay ang bida*" (*I really do not like that the characters in the stories eventually died*"). In another question, the students were confronted about their experiences during the whole duration of the conduct of the intervention and fortunately, each of them obtained handful significant lessons about the importance of education especially when one is related to Mathematics. Besides, they wanted to keep on hearing such kind of stories. The following are the comments that represent what the majority of the students answered in the said question: (1) "*I want to*

hear more inspirational stories because these encourage me to study hard, be strong and follow my dreams"; (2) "*I wanted to be like Ramanujan. I want to learn more and more, not only in Mathematics but in all subjects*"; (3) "*The Mathematicians and the Scientists influenced me a lot as a student*"; and (4) "*I learn a lot from all the stories. I learn not to give up on what will happen because all of these are only trials. Challenges are made to overcome!"*

These results simply mean that there were no issues regarding the implementation and administration of the intervention. However, for one-month duration, few of the participants were still struggling to learn the concept of the lessons I taught them until the very end. But, their perseverance to learn the lessons considerably changed and it was remarkable. Moreover, they were not afraid anymore to try solving the problems no matter how complicated these were at their first glance.

Students Group Interview and Discussions

The interview and discussions were intended to be informal in order to promote genuine participation of the twenty participants. It lasted for about thirty minutes. The main purpose of this method was to provide confirmation to the survey questionnaire results and to gather additional information why the intervention was effective. All the significant answers uttered by the participants were documented.

I started with a little introduction and expressed gratitude for the participants' outstanding cooperation and participation during the whole conduct of the study. Afterwards, I immediately commenced the interview. My questions were: (1) What do

they like about the intervention? (2) Why do they like it? And (3) does the intervention affect their performance in my subject? How?

Astonishingly, when I asked the first two questions to the participants, they mostly answered the statements/indicators written on the survey questionnaires. The difference was, they responded using the vernacular. When one participant expressed his/her idea, majority of the participants agreed and ignites another participant to express what he/she had in mind. All of them kept on standing one after another because they wanted their ideas to be heard. In fact, most of the time, we used to laugh every time a participant shared his/her thoughts because he/she was full of emotions and vitality resulting into funny gestures and stammering. All of them had plenty of things to say thus, the interview was totally joyful and satisfying! Aside from the statements/indicators found in the students' questionnaire, the following were the most significant answers that came out: (1) "*Ganahan ko sa mga stories Sir kay nakakat-on ko na mahimong isog ilabina aning Math*" (*"I really like the stories Sir because I learned to brave especially in dealing Math subject."*); (2) *Ganahan kaayo ko sa mga stoies Sir kay gitabangan ko na makarealize na dili dayon mo-give up sa mga challenges sa akong kinabuhi og kinahanglan jud diay ko mag study aron modaghan samot akong makat-onan*" ("*I really like the stories Sir because it helped me realize not to give up easily in life and I really need to study to learn more"*); (3) *Natutunan ko na kung meron kang pangarap sa buhay, dapat nating tuparin at wag tayong susuko at wag tayong mawalan ng pag-asa dahil God is good all the time.*"("*I learned that do not give up on your dreams, make it come true, don't lose hope because God is good all the time*."); (4) *Ang giganahan nako sa mga stories kay nakatabang sa pagdungag sa akong pagsabot*

sa Math" ("*What I like about the stories is, it helped me to better understand Math*"); and (5) *Malipay ko makadungog sa mga stories Sir kay marag ako ang bida kay pare-parehas mi og giagian na kalisod*" ("*I am very happy upon hearing the stories Sir because I feel that I am the main character because we share the same hardships"*). These results truly confirmed the results of the students' survey questionnaire.

The joyful scenario ended and shifted into a more serious situation when I asked the participants the last question – Does the intervention affect their performance in my subject? How? The students were starting to get silent and some were staring at each other. The general reaction of the participants signify that they are doubtful about what they are going to answer. So, I gave them a little time to think. Finally, one brave participant stood up and said "*Nakaapekto jud and mga stories sir kay tungod sa mga stories, mas grabe akong pagpaningkamot sa pag answer sa mga exercises na gihatag nimo sir. Mas nidagko man gani akong scores sa mga quiz sir.*" ("*The stories had really significant effect Sir because due to it my perseverance it answering the exercises you had given was unwavering. My scores have gotten higher*"). But another participant immediately added "*Pero kung dili ka maminaw sa pag explain kung giunsa ang process sa pag solve, kay sa story raka naminaw, wala gihapon*!" (*But if you only listen to the stories, not on the process of how you are going to solve the given problem, everything is useless"*). This is really true. No matter how attentive the participants are during the storytelling, but in the discussion of the lesson they are not listening, nothing will change. The participants' reactions were likely the same. They were all pointing out that the stories keep them motivated and inspired to learn the lesson however, if one

doesn't have the interest in listening to the discussion, they will still find Mathematics difficult.

Administrative Staffs' Questionnaire

The result of the administrative staffs' questionnaire also conforms the results of class observation, student questionnaires, and interview, as shown in the table:

Table 2. Mean, Description, and Interpretation of each Indicator Used in the Administrative Staffs' Questionnaire

Indicator	Mean	Description	Interpretation
1. Students showed an increase in motivation every time they heard the stories.	4	Strongly Agree	The indicator is highly manifested and observed in all occasions.
2. The stories elevated students' interest in studying and learning the lessons in Mathematics.	3.67	Strongly Agree	The indicator is highly manifested and observed in all occasions.
3. The stories helped the students not to give up on lessons which they didn't understand at first.	3.67	Strongly Agree	The indicator is highly manifested and observed in all occasions.
4. Students enjoyed hearing all the stories.	4	Strongly Agree	The indicator is highly manifested and observed in all occasions.
5. The moment the students heard the stories, they show appreciation on the characters of the stories.	3.67	Strongly Agree	The indicator is manifested and observed most of the time.
6. The characters in the stories influenced the students.	3.67	Strongly Agree	The indicator is highly manifested and observed in all occasions.
7. The stories helped the students to focus their interest on learning Mathematics.	4	Strongly Agree	The indicator is highly manifested and observed in all occasions.
8. The students want to hear such kinds of stories.	4	Strongly Agree	The indicator is highly manifested and observed in all occasions.

Grand Mean	**3.83**	**Strongly Agree**	**The intervention is highly effective.**

Table 2 disclosed the mean, description, and interpretation of the indicators used in administrative staffs' questionnaires. It is very noticeable that all of the indicators acquired mean ranging from 3.67 – 4 which description is "Strongly Agree" and interpreted as "highly manifested and observed in all occasions". Thus, the intervention is highly effective.

Nonetheless, the observers had written ways on how to improve the intervention/strategy I used. One observer wrote "*Sometimes, the students were not capable of understanding what was being presented*". It is because the characters of the stories were born in different places, which means they have diverse norms and traditions which were totally different from the participants. Therefore, there was a need of thorough explanation in order to create pictures in their mind of what was I am talking about. At times, despite the effort on explaining, some can still hardly understand because they didn't even have the smallest idea about it due to the remoteness of our place. Another observer wrote, "*Short video clips about the story can also help in motivating the students, because they will see a real glimpse of characters' life*". Although the focus medium of administering the intervention was through age-old art storytelling as mentioned in the "Innovation, Intervention and Strategy" section, considering this suggestion is highly advisable, for the observer's point was significantly true. A study entitled, "Learning through Digital Media Experiments in Technology and Pedagogy", states that videos don't have to be long for it to be captivating. Actually,

Shorter segments may place greater emphasis on close viewing and resultant comprehension. Through the use of technology, video presentation arises in teaching and in learning. It is currently utilized in introducing ideas, lectures, discussions and updates. Video-based materials on specially produced educational videos, documentaries, NEWS and films appear in many programs these days (R.T. Scholz, 2011).

Reflection

Motivating students in learning Mathematics comes handy when infused with storytelling. Through stories, students free themselves from the false notions about the subject. They were conspicuously empowered to face whatever difficulties they are about to encounter. As Kaufman, Libby (2012) and Oatley (1999) stated in their respective studies, stories can powerfully impact people's attitudes, beliefs, and behaviors.

However, if a teacher wants to distinctly make the students admire Mathematics and remembered as an icon in this subject, the stories must be honest, personal and above all, involve struggles and triumph. According to Zak (2014), when you want to motivate, persuade, or be remembered, start with a story of human struggle and eventual triumph.

Furthermore, it is suggested that stories must be contextualized in order for the students to have explicit understanding about the characters' life. If there are certain parts of the character's life which are perceived to be difficult for the students to comprehend, it is better to remove these parts for these will only baffle them and can

cause a decrease in their interest and spend some of their learning span for pointless explanations. Explaining the setting of the story is one of the vital information that every student must understand because this had a huge connection in the character's sufferings and struggles. Thus, contextualizing it is on top priority. Select stories whose characters' norms and customs are quite similar to the students. Choosing phenomenal struggle stories without considering the similarity of their customs and traditions will result into a reduced amount of effectivity of the intervention.

Students' motivation and admiration in Mathematics will greatly improve by using the intervention – storytelling about the phenomenal struggles of famous mathematicians and scientists, however, this will not guarantee that their performance in Mathematics will also improve dramatically. As what the findings from the students' survey questionnaire revealed, some of the students were still struggling to learn the concepts of the lessons starting from the beginning of the conduct of the intervention until the very end. Moreover, student group interview disclosed that students' performance will never change if their interest and motivation will only be boosted in listening to the stories and lose in the discussions and assessments. These findings simply mean that teachers in Mathematics should continue the enthusiasm, vitality and vigor they showed during the storytelling in teaching the concepts of the lessons. They should also teach like they are still telling stories to the students to keep the motivation and interest up to the very end of the class.

In general, storytelling about mathematicians' and scientists' phenomenal struggles can help students in their endeavors in Mathematics. According to Zazkis and Liljedahl (2009), storytelling in teaching Mathematics can help in understanding complex

thoughts and ideas, because it encourages students to focus and think harder. Balakrishman and Shirley (2008) also stated that storytelling in teaching Mathematics can create a favorable environment for learning, and reduces students' tensions and improves students' memory for what they learn.

Due to these reflections, the following recommendations are made:

1. Use storytelling before the lesson proper in order to catch students' interest, keep them motivated and free them from the stereotypical false notions about Mathematics.
2. Whenever the students' behavior is getting out of control or whenever their showing signs of boredom, utilize the intervention to regain their interest.
3. Teachers in Mathematics must acquire skills in explicit storytelling in order to teach the subject with remarkable enthusiasm and promote absolute interest among learners at all times.
4. Use struggle stories with eventual triumph in storytelling, for these stories have greater chance of motivating and making students admire Mathematics.
5. Contextualize the content of the chosen phenomenal struggle stories.

IX. ACTION PLAN

AREA OF FOCUS	OBJECTIVES	ACTIVITIES/ METHODS OR STRATEGIES	RESOURCES	TIME FRAME	ESTIMATED COST
Materials for the participants' booklets and other needs	To purchase 10 reams of bond papers, staples, 5 bottles of glue, 5 permanent markers, 5 white board markers and 3 bundles of pen.	Looking for stores that sells plenty of school supplies with great discounts	BERF	February, 2020	Php 10,000
Administration of the intervention	To conduct the intervention to the participants for a month.	The intervention will be administered to the participants. There will be two sessions of administering the intervention per week. Each week the characters of the phenomenal struggles with eventual triumph stories will change.	BERF	February – March, 2020	Php 10,000

Gathering Data through Students' Questionnaires and Student Group Interview and Administrative Staffs' Questionnaire	To gather and collect the data to be tabulated and analyze.	Participants will be gathered in a room to answer the survey questionnaire. When everyone is done, group interview will commence to confirm their answers on the survey questionnaire and to provide additional information about the intervention. Administrative staffs who observe the practitioner's class will also answer the survey intended for them after the whole administration of the intervention.	BERF	March, 2020	Php 10,000
Dissemination of the Findings of the Study	To disseminate the findings of the study to the target audience.	Findings of the study will be disseminated during District Research Trainings and Congress.	SDO of Davao Occidental	April, 2020 onwards	Php 500.00/research training or congress

X. REFERENCES

Senol Sen & Ayhan Yilmaz (2012). The effect of learning styles on students' misconceptions and self – efficacy for learning and performance. Faculty of Education, Haceteppe University, Ankara, 06800, Turkey.

Dr. Zulfiqar Ali, S Bala Bhaskar (September 2016). Basic Statistical Tools in Research and Data Analysis. Sheri Kashmir Institute of Medical Sciences, Soura, Jammu and Kashmir, Srinagar, India.

Seyedeh Sara Jafari (October 2013). Motivated Learners and Their Success in Learning a Second Language. Department of Foreign Languages, Abadeh Branch, Islamic Azad University, Abadeh, Iran.

Susana Claro, David Paunesku & Carol S. Dweck (May 2016). Growth Mindset Tempers the Effects of Poverty on Academic Achievement. Graduate School of Education, Standford University and Department of Psychology, Stanford University, Stanford.

Xiadong Lin – Seigler, Janet N. Ahn, Jondou Chen, Fu – Fen Anny Fang and Myra Luna – Lucero (2016). Even Einstein Struggled: Effects of Learning About Great Scientists' Struggles on High School Students' Motivation to Learn Science. Teachers College, Columbia University; University of Washington; Teachers College, Columbia University; American Psychological Association.

Fernando B. Orines (Coordinator), Jesus P. Mercado, Josephine L. Suzara &Catalina B. Manalo (2012). Next Century Mathematics 7. Pheonix Publishing House, Inc., 927 Quezon Ave., Quezon City.

Jackie Zubrzycki (February 2016). Learning About Great Scientists' Struggles Can Motivate High School Students. http://blogs.edweek.org/edweek/curriculum/2016/02/learning_about_great_scientist_1.html

Kira M. Newman (May 2017). According to a new study, reading about scientists' struggles can help students who aren't doing so well in science.

Rachel Sewell (2013). An investigation into whole-school literacy strategies and their effect on writing skills.

Joshua Coulson (2013). Can you teach the academy's Christian values through sport?

XI. FINANCIAL REPORT

First Tranche

Title: STIMULATING GRADE 8 STUDENTS' MOTIVATION AND ADMIRATION IN LEARNING MATHEMATICS THROUGH INFUSING MATHEMATICIANS' AND SCIENTISTS' PHENOMENAL STRUGGLES

Name of Researcher: Jayson D. Balila

Item No.	Date	Reference (OR #)	Payee/ Particular	Unit of Issue	Item Description	Price	Quantity	Total
1	01/28/2020	1445	E-Finds School and Office Supplies	Ream	Long Bond Paper (substance 20)	Php 230.00	5	Php 1,500.00
2	01/28/2020	1445	E-Finds School and Office Supplies	Ream	Short Bond Paper (substance 20)	Php 200.00	5	Php 1,000.00
3	01/28/2020	1445	E-Finds School and Office Supplies	Ream	A4 Bond Paper (substance 20)	Php 220.00	5	Php 1,100.00
4	01/28/2020	1445	E-Finds School and Office Supplies	Piece	Permanent Marker (Pilot)	Php 45.00	20	Php 900.00
5	01/28/2020	1445	E-Finds School and Office Supplies	Piece	Ball pen (Titus)	Php 8.00	50	Php 400.00
6	01/28/2020	1446	E-Finds School and Office Supplies	Box	Fastener	Php 40.00	5	Php 200.00
7	01/28/2020	1446	E-Finds School and Office Supplies	Piece	Stapler No. 35	Php 120.00	10	Php 1,200.00
8	01/28/2020	1446	E-Finds School and Office	Box	Staple No.	Php 56.00	10	Php 560.

			Supplies		35			00
9	01/28/2020	1446	E-Finds School and Office Supplies	Piece	Glue (Elmers)	Php 49.00	20	Php 980. 00
10	01/28/2020	1446	E-Finds School and Office Supplies	Piece	Scissors	Php 48.00	10	Php 480. 00
11	01/28/2020	1447	E-Finds School and Office Supplies	Piece	Double Sided Adhesive	Php 34.00	10	Php 340. 00
12	01/28/2020	1447	E-Finds School and Office Supplies	Pack	Photo Paper	Php 70.00	10	Php 700. 00
13	01/28/2020	1447	E-Finds School and Office Supplies	Roll	Duct Tape 48 mm x 3 mm	Php 65.00	10	Php 650.00
14	01/28/2020	1447	E-Finds School and Office Supplies	Bottle	Brother Printer Ink (BTD60)	Php 380. 00	5	Php 1,900. 00
15	01/28/2020	1447	E-Finds School and Office Supplies	Bottle	Brother Printer Ink (B5000 - M)	Php 380. 00	5	Php 1,900. 00
16	01/28/2020	1447	E-Finds School and Office Supplies	Bottle	Brother Printer Ink (B5000 – C)	Php 380. 00	5	Php 1,900. 00
17	01/28/2020	1447	E-Finds School and Office Supplies	Bottle	Brother Printer Ink (B5000 – Y)	Php 380. 00	5	Php 1,900. 00
18	02/12/2020	0344	Four Brother's Eatery		Catering Service	Php 7,500 .00		Php 7,500. 00
							Total	Php 25,110 .00

Second Tranche

Title: STIMULATING GRADE 8 STUDENTS' MOTIVATION AND ADMIRATION IN LEARNING MATHEMATICS THROUGH INFUSING MATHEMATICIANS' AND SCIENTISTS' PHENOMENAL STRUGGLES

Name of Researcher: Jayson D. Balila

Item No.	Date	Reference (OR #)	Payee/ Particular	Unit of Issue	Item Description	Price	Quantity	Total
1	03/03/2020	0345	Four Brother's Eatery		Catering Service	Php 7,500.00		Php 7,500.00
							Total	Php 7,500.00

SUM OF FIRST TRANCHE AND SECOND TRANCHE

ITEM NO.	ITEM DESCRIPTION	AMOUNT	TOTAL
1	First Tranche	25,110.00	25,110.00
2	Second Tranche	7,500.00	7,500.00
		TOTAL	**32,610.00**

Prepared by:

JAYSON D. BALILA
Researcher