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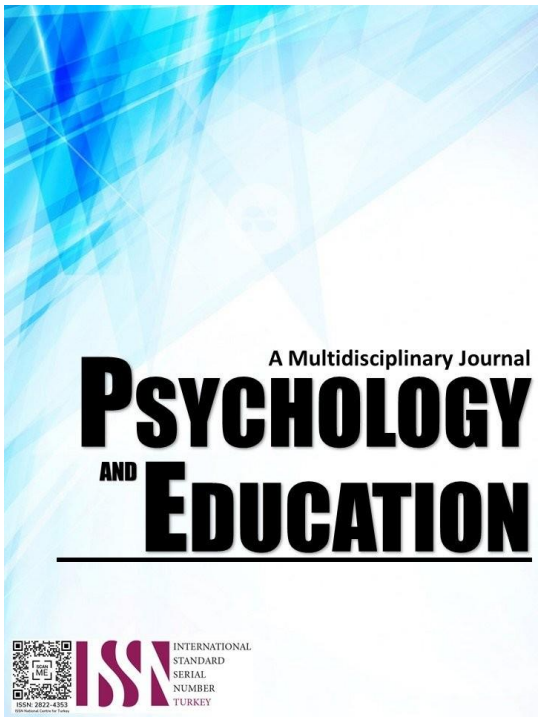

PSYCHOLOGY AND EDUCATION: A MULTIDISCIPLINARY JOURNAL

2023
Volume: 12
Pages: 306-311
Document ID: 2023PEMJ1062
DOI: 10.5281/zenodo.8251107
Manuscript Accepted: 2023-13-8

Psych Educ, 2023, **12**: 306-311, Document ID:2023 PEMJ1062, doi:10.5281/zenodo.8251107, ISSN 2822-4353
Research Article

The High School Students' Struggles and Challenges in Mathematics: A Qualitative Inquiry

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Abstract

Mathematics is important for a person to live a better life. It has a special position in the educational curriculum. However, it is well known that most students find mathematics challenging. This study examined the high school student's struggles and challenges in learning Mathematics. The Interpretative Phenomenological Analysis (IPA) anchored from the Modified Van Kaam Approach popularized by Moustakas was utilized in this study to come up with meaningful data on the struggles and challenges of the high school students in learning Mathematics. The subject of this research was chosen using a purposive sampling technique and the participants are all qualified according to the study's inclusion criteria. 10 high school students of Bartolome and Manuela Pañares Memorial National High School participated in the interview. Analyzing the causes is crucial before taking additional steps to enhance students' Math learning. Through an open-ended survey questionnaire, students were questioned about potential causes of their learning challenges. The researchers generated four themes from the gathered data, and these are the following: The Crux of the Matter, Stumbling Block, Get to Grips With, and Significantly Essential Matter. These themes were formulated based on the students' shared experiences in learning Mathematics. The study included cognitive, affective, and contextual factors that determine the struggles and challenges in learning Mathematics. The challenges that students have in learning mathematics include having trouble recalling information from previous classes, forgetting information easily, and having trouble understanding mathematical ideas. It has been observed that students who find mathematics to be extremely difficult tend to give up more easily than those who find the subject simple. The results also showed that teachers must understand the value of making classroom mathematics engaging so that the students will put effort in learning the subject. The result is presented in the context of the students' perspectives and learning methods.

Keywords: *mathematics learning, coping strategies, learning strategy, mathematics difficulty, learner beliefs, logical thinking*

Introduction

Mathematics is very important not just in the school curriculum but also in our daily lives. In everything we do, there's an integration of Mathematics. However, we can't deny the fact that most of the students nowadays dislike Mathematics although its significance is evident in our lives every day. According to Gafoor and Kurukkan (2015), students dislike Mathematics as they perceive it as a difficult subject. Their negative perception about Mathematics affects their self-efficacy and their approach towards the subject that leads to a lot of struggles and challenges in learning Mathematics. Students have difficulties in learning and understanding the subject, solving equations, remembering formulas and ways to solve problems.

Learning mathematics is not easy when you are not taught by the basic foundations of it. It is fun and engaging subject, but the students fail to recognize its beauty and importance in their lives. The students perceived that mathematics is difficult because they are not willing to learn and to love the subject. This pandemic taught people a lot of life lessons, one of which is the importance of education (Villar et al., 2022). Students experienced education freeze for almost a year, but the Department of Education finds way to continue the learning of the students by providing them modules to read and answer (Bahinting et al., 2022). This program is beneficial and significant to all the students who are willing to learn but most of them are tired in answering the modules (Riconalla et al., 2022; Emia et al., 2022; Olleras et al., 2022). The students are very dependent to their parents (Abucejo et al., 2022), brothers, sisters and relatives. They are not the one answering the modules (Ando et al., 2022). This research helps us to know the challenges and struggles of the students in learning mathematics (Cabello et al., 2021; Perez et al., 2022).

Mathematics' inherent nature is one of its issues. Students should be able to follow steps to get the right answers as they learn mathematics. The pupils are urged to put the steps into practice in an effort to accomplish this goal (Mangubat et al., 2022; Yamon et al., 2022). As a result, the learners memorize the steps and then automatically apply them (Alenezi, 2008). In everything that the students do, there should always a room for improvement. The students should have the eagerness to learn, willingness to accept failures and most specially trust their own self (Cariaga et al.,

2022). The students should believe that they can do it by simply practicing how to solve word problems, equations, and expressions. Through practicing, they are learning and start loving what they are doing.

There are two stages of teaching curriculum material to students: the first is writing textbooks that follow the curriculum, and the second is having a math instructor present the material to the class in line with the mathematics curriculum (Ozer & Sezer, 2014). A mathematics teacher should encourage students' interest in mathematics, support them academically and emotionally, and help them develop a good attitude toward the subject (Leon et al., 2018; Opdenakker & Van Damme, 2016; Yu & Singh, 2018). When a math instructor manages the classroom well, the students are more likely to pay attention to the arithmetic lesson (Wilson et al., 2005). However, the role of the students is also crucial to the teaching-learning process. According to Bonne and Johnston (2016) and Kalaycioglu (2015), a student's academic performance is influenced by their own academic self-perceptions, attitudes toward mathematics lessons, math anxiety, and whether they have future plans. The student's positive academic perception and feeling like a good student in mathematics class have a positive impact on his or her academic success (Chiu & Xihau, 2008; Dweck, 2000: Ramdass & Zimmerman, 2008). To help pupils understand abstract mathematical concepts, certain mediums, such mathematical aids, are required in mathematics teaching with varied strategies (Pableo et al., 2022; Segarino et al., 2022; Ugbamen et al., 2022). Teaching aids can be created in a variety of formats and media to help students learn concepts more effectively, reinforce topics they have already learned, and become more motivated.

Mathematics is an integral part of the curriculum in almost all countries of the world (Akhter, 2018). It is considered in many fields like engineering, accountancy, physics, etc. as a key subject because it is really essential and significant. In the Philippines specifically in Cebu, students suffered, stressed, and triggered in learning mathematics. This study aims to know the struggles and challenges of the high school students in learning mathematics. This study underscores the factors that the student's considered mathematics is difficult, does their environment affects their learning, and what will be the solutions to these problems. These are the questions that the researchers need to answer and propose for solutions or remediation.

Research Questions

This study explicated the high school students' struggles and challenges in learning Mathematics. In particular, the answers to the following questions provided information for this study:

1. What can you say about the subject Mathematics?
2. Is Mathematics your favorite subject in school? Why or why not?
3. What are your struggles and challenges in learning Mathematics?
4. What do you think are the factors affecting these challenges?
5. What do you think are the ways on how to overcome your struggles and challenges in learning Mathematics?

Literature Review

Teachers are aware of the constant challenges' students face, particularly in mathematics. In educational contexts, students' challenges with the digital divide and limited access to the internet have been noted. Access to digital resources and language are both crucial for learners to comprehend mathematics (Dieker et al., 2022).

Education in mathematics is viewed as a vital developmental ability necessary for adaptive functioning in the data-driven world of the modern era, as well as a foundational numeracy competency (Palmer et al., 2014). According to Dienes (1960), mathematical ideas can only be properly grasped when they are conveyed via a range of actual, physical representations. He divided these ideas into three categories: pure mathematical, notational, and applied. His teaching methods focused on math labs, and he praised the usage of MAB for creating an ideal setting for early learning that allowed for the development of the place-value notion. He proposed six steps that the teaching of mathematical concepts must go through: free play, games, community-searching, representation, symbols, and formalization. Additionally, according to Dickson, Brown, and Gibson (1984), many specialized words have a legitimate role in mathematics and must be used in both teaching and studying the subject.

According to Hart (1989), a person's attitude toward mathematics is a combination of their beliefs about arithmetic, their behavior, and any feelings they may have that are connected to it. With the help of mathematics education, students are developing high level of mental abilities, such as logical reasoning, creative thinking, problem solving, and decision making, which can greatly contribute to both

individual and society growth (Krueger & Lindahl, 2001).

The reasons why students avoid taking this course unless it is required were also investigated (Brown et al., 2008; Murray, 2011; Nardi & Steward, 2003). Students' excuses for not participating in class included the following: mathematics is dull, challenging, useless, and poorly taught (Murray, 2011). The reason given by British high school students who chose not to enroll in a mathematics course was that they believed it would not be useful for their future occupations, in which they would not be likely to succeed (Brown et al., 2008).

Based on literature review, it reveals that studies that focus on the difficulties of students have with mathematics particularly in high school, are fairly constrained. With the aforementioned information in mind, this study was created to assist learners who performed poorly in Mathematics due to the challenges and struggles they encountered. It is anticipated to address them to help these students perform better. Thus, this study sought to learn the struggles and challenges encountered by the high school students in learning mathematics.

Methodology

Research Design

This study is a qualitative inquiry research aiming to identify the high school students' struggles and challenges in Mathematics. Using a broad methodology known as a qualitative inquiry research, qualitative researchers can investigate social situations. The research question presupposes that people use "what they see, hear, and feel" to interpret their social interactions (Rossman & Rallis 2017). This study aimed to know the struggles and challenges that high school students faced in their Mathematics lessons.

Sampling Technique

To select the participants of this study, purposive sampling technique was used. Purposive sampling is a technique in choosing the qualified participants according to its inclusion criteria.

The inclusion criteria are as follows;

(a) the participants should be a high school student and

(b) the participants should have currently enrolled for this school year.

Data Collection

The research data were collected upon the approval of the letter consent by the school principal. Then, the students were informed about the study, and it was explained that the participation was voluntary. Participants were given forms or questionnaire that need to be answered. Also, students were advised not to write any personal information in the questionnaire. Lastly, it was stated that all the data gathered will be examined and evaluated.

Research Rigor

To sustain the rigor of this study, researchers used Whittemore et al.'s (2001) quality criteria. Furthermore, this quality criteria examined more into Credibility and Authenticity; and (b) Criticality and Integrity. In addition, the study's rigor was strengthened when the researchers utilized bracketing (Cabello & Bonotan, 2022). According to Alase (2017), bracketing is important in employing impartiality and avoiding biases in conducting the study.

Ethical Consideration

The researchers assured ethical consideration in the study. The participation of the study is voluntary and with proper consent. Participants were informed about the purpose of the study and all the data gathered kept confidential.

Data Analysis

The Interpretative Phenomenological Analysis (IPA) anchored from the Modified Van Kaam Approach popularized by Moustakas was utilized in this study. The first of the seven tenets of analyzing data were sorting the experiences of the participants which also known as horizontalizing. Next, simplifying the experiences into different components where the highlights were examined. Third, creating themes being grouped to produce a primary theme. Fourth, comparing the data sources that confirms the invariant constituents. Fifth, constructing unique analysis from its textural descriptions. Then, creating the description of the composite structure of the data began. And lastly, synthesize and summarize all the lived experiences of the participants.

Results and Discussion

The researchers gathered, analyzed, and interpreted the data. The researchers developed four essential themes: 1. The Crux of the Matter; 2. Stumbling Block; 3. Get to Grips With; 4. Significantly Essential Matter. The result is presented in the context of the high school students' attitude towards learning the subject Math.

Theme 1. The Crux of the Matter

The discovering the truth of Mathematics relies on reasoning logically rather than observing the standard of truth. It is a fact that Mathematics is useful yet difficult in nature. The researchers asked participants about their perception towards Mathematics as a subject. To know whether Math is their favorite subject or the least favorite. In addition, it gives the students an opportunity to share their insights about the subject. Mathematics places significant intellectual demands on pupils by its very nature. It entails steps that could seem abstract and unrelated to life. It has often been demonstrated that this exerts enormous demands on students' limited working memory capacity (Reid, 2009).

Participant A said that,
"Math is an interesting subject as it allows me to exercise my brain and it help us to understand the world."

Participant B mentioned that,
"Math allows me to play with numbers and improve my problem-solving skills. It is hard yet fun."

Participant C said that,
"Mathematics is quite hard and difficult because I always find it hard every time I answer or encounter math problems."

Participant D expressed that,
"Mathematics is the most difficult subject I had during class because it has difficult problem solving that I can't answer and ended up saying maybe I can copy with my classmate's answers."

Participant E said that,
"Mathematics is not the subject that is easy to understand, so Mathematics is not my favorite subject. It is very difficult to understand."

Theme 2: Stumbling Block

In learning Mathematics, it can't be denied that there's a lot of factors affecting learning, challenges and struggles encountered. The students have the privilege to share their experiences towards learning the subject. It is their time to voice out and be heard to all the readers of this research. When it comes to difficulty, kids in Kerala rate 8 in mathematics higher than all other subjects. The explanations given by students for this are all somehow related to the nature of mathematics. Discontinuity in the teaching and learning process is the most important factor in the difficulty of mathematics (Gafoor & Sarabi, 2015).

Participant A said that,
"One of the challenges and struggles I've encountered in learning Math is my lack of patience, because Math involves plenty of multiple items in solving world problems."

Participant B answered that,
"My struggles and challenges in Math are having to repeat the process repeatedly which can quickly bore me, and it makes me impatient. It affects my motivation to learn."

Participant C uttered that,
"I always forgot and get confused when solving Math problems. I can't understand when the teacher discusses and when I solve a problem myself, I always got confused and it's very hard for me."

Participant D said that,
"I don't know how to solve big problems. That's why I struggle hardly just to get the answer and it challenges me during I get the wrong one."

Participant E mentioned that,
"It has so many formulas and calculations that we need to do just to get the one correct. It needs patience, skills, memorization, and basic knowledge about Math."

Theme 3: Get to Grips With

In life, we encountered many obstacles that can break our hearts, but we always find ways and means to overcome these shortcomings. Thus, in Mathematics despite its difficulties, it's also having answers to the problems. Different choices that might be made as coping mechanisms can have an impact on a student's academic performance and even cause them to fail. Math learning involves a variety of strategies. Schools frequently adopted the conventional approach of instruction, which helped students develop a better attitude toward mathematics (Akinsola & Olowojaiye, 2018).

Participant A said that,

"To do more practice and analyze the problems thoroughly."

Participant C said that,
"I must open my mind to fully understand the lesson and practice more so that I can master it."

Participant D mentioned that,
"By studying hard to never forget what the teacher has discussed in the class and always remember that it is worth it to try harder."

Participant E answered that,
"To listen more to the teacher, study the problem and focus on the topic."

Participant F uttered that,
"Learn to love and appreciate the subject as well as the teacher because without them we don't have someone to guide and facilitate us to learn Math."

Theme 4: Significantly Essential Matter

Math is a useful tool for developing mental rigor and supports logical thinking. Additionally, understanding Mathematics is essential for learning other academic areas. Wherever you go, you can see and encounter Math. The buildings, roads, etc., involves Math, it is very significant to all of the people around the world. The study of technical subjects and proficiency in mathematics will help students succeed in the job market and find employment (Hodaňová & Nocar, 2016).

Participant A said that,
"It is important in this modern world since we use Math in our everyday lives as persons."

Participant C uttered that,
"I think it will help the youth if ever they will run their own business someday."

Participant E mentioned that,
"One of the impacts of Mathematics among the youth of today is solving many problems just to get the correct answer and it can cause stress to the students."

Participant F answered that,
"Math is useful in our everyday doing like knowing how to large the area is and building houses and other structures involves Math."

Participant G expressed that,
"Inspires and enhances my knowledge to become future engineers or educators someday."

Conclusion

Mathematics is indeed perceived as a difficult subject among the Grade 10 students and teachers is one of the factors that caused this difficulty in learning Mathematics. There struggles and challenges may be addressed by providing enhancement and remediation programs. The researchers think that it would be beneficial for the students to have a consistent and constant follow-up by the Mathematics teachers. These programs may be realized by giving the students and teachers enough time to meet during the week. In the said programs, there will be a variety of assessments and methods that will used which will be done by the students and will be facilitated by the teachers in a more intimate way. In addition, students' attitude towards the subject plays an important factor in learning Mathematics. With the guidance of the teachers, students should realize the significance of learning Mathematics to be able to put into practice everything that they will learn in real life situations. The researchers wish to recommend to the Department of Education, the implementer of the MELC to make adjustments of the learning competencies to attain students' mastery of each competency. DepEd may offer sufficient time for the teachers and students to conduct enhancement and remedial classes every Friday. With this intervention, the researchers believed that life-long learning may be established among all students.

References

Abucejo, C. M., Amodia, J. B., Calorin, R., Deo, N. F., Fuentes, M. J., Lamila, K. N., ... & Minyamin, A. (2022). Going Back to Elementary Years: The Parents Lived Experiences in Modular Distance Learning. Psychology and Education: A Multidisciplinary Journal, 2(6), 477-489.

Acula, D. D., & Suaiso, O. T. (2007). Factors Related to Students' Learning Difficulties in Mathematics. TIP Research Journal Quezon City, 4(1), 1-1.

Akhter, N., & Akhter, N. (2018). Learning in Mathematics: Difficulties and Perceptions of Students. Journal of Educational Research (1027-9776), 21(1).

Ando, K., Basilisco, J., Deniega, A., Gador, K., Geraldo, P. J., Gipulao, W. E. M., ... & Minyamin, A. (2022). Learning without Learning in the New Normal: College Education Students Lived Experiences in Blended Learning Modality. Psychology and Education: A Multidisciplinary Journal, 2(6), 455-464.

BAHINTING, M. A., Ardiente, M., Endona, J., Herapat, M. A., Lambo, D., Librea, H. J., ... & Minyamin, A. (2022). Stronger than the Internet Connectivity: A Phenomenology. Psychology and Education: A Multidisciplinary Journal, 2(6), 465-476.

Cabello, C. A. (2022). Higher education professors in blended

learning modality of teaching: The silent tears of heroes towards resiliency. Journal of Positive School Psychology, 6(3), 6171-6183.

Cabello, C. A., & Bonotan, A. M. (2021). Designing and validating an instrument to assess the wellness of business process outsources' customer service associates. Asia Pacific Journal of Multidisciplinary Research, 9(1), 1-11.

Cabello, C. A., Abadiano, M. N., Mabitad, A., Pulma, D. B., & Hipe, A. (2021). Gamification in Education: The Motivation-Exploration-Implementation Theory. Turkish Online Journal of Qualitative Inquiry, 12(7).

Cariaga, J., Tomada, G. R., Velonta, J., Villagonzalo, K., Gaco, G. J., Ugbaniel, J., ... & Cabello, C. (2022). Enriching the Teaching of Pie Chart Using Cooperative Learning as A strategy: A Quasi-Experimental Research. Psychology and Education: A Multidisciplinary Journal, 4(2), 137-146.

Dieker, L. A., Greer, M., & Lannan, A. (2022). Seven equity ideas for students with language-based needs in mathematics. Middle School Journal, 53(5), 33-39.

Emia, A. J., Lamosao, R., Lamosao, R., Silagpo, A. M., Cantila, J., Albite, C., ... & Minyamin, A. (2022). The Pre-Service Teachers' Uphill Climb in the New Normal: Stories to Tell. Psychology and Education: A Multidisciplinary Journal, 2(6), 529-540.

Gafoor, K. A., & Kurukkan, A. (2015). Why High School Students Feel Mathematics Difficult? An Exploration of Affective Beliefs. Online Submission.

Guner, N. (2020). Difficulties Encountered by High School Students in Mathematics. International Journal of Educational Methodology, 6(4), 703-713.

Mangubat, N., Bucotot, M. C., Salatan, J., Tolentin, J., Villanueva, M. A. F., Lumangtad, S., ... & Cabello, C. (2022). The Technology and Livelihood Education Teachers in Modular Instruction: A Qualitative Inquiry. Psychology and Education: A Multidisciplinary Journal, 4(2), 121-136.

Mulwa, E. C. (2015). Difficulties Encountered by Students in the Learning and Usage of Mathematical Terminology: A Critical Literature Review. Journal of Education and Practice, 6(13), 27-37.

Olleras, J. L., Dagwayan, M., Dejacto, A. M., Mangay, J. R., Ebarsabal, M., Diaz, D. J., ... & Minyamin, A. (2022). The Life of the Laters: Students Procrastination in Accomplishing Academic Deadlines in Online Learning. Psychology and Education: A Multidisciplinary Journal, 2(5), 444-454.

Pableo, J., Adiong, F., Alberca, R., Ansag, M., Antone, C. M., Asma, L., ... & Cabello, C. Improving the Discussion of the Different Kinds of Plants through Computer Simulation.

Perez, Z. O., Minyamin, A. V., Bagsit, R. D., Gimena, G. B., Dionaldo, W. V., Padillo, E. S., ... & Cabello, C. A. (2022). Research capability of faculty members in Higher Education Institution: Basis for Research management plan. Journal of Positive School Psychology, 6(3), 6215-6226.

Rameli, M. R. M., & Kosnin, A. M. (2016). Challenges in mathematics learning: a study from school students' perspective. Universiti Teknologi Malaysia.

Riconalla, P. G., Quiñanola, K. K., Devila, J., Zozobrado, J., Estoque, R. M., Capito, N., ... & Minyamin, A. (2022). The Lived Experiences Aged Instructors in Online Classes: Their Struggles and Coping Mechanisms. Psychology and Education: A Multidisciplinary Journal, 3(1), 1-11.

Salma Jan & Dr. Sherwin Rodrigues (2012). Student's Difficulties in Comprehending Mathematical Word Problems in English language learning contexts

Segarino, G. M., Labisig, J., Calmerin, L., & Cabello, C. (2022). SIMS as Intervention in Enriching the Teaching of Fundamental Operations in Mathematics: An Action Research. Psychology and Education: A Multidisciplinary Journal, 5(1), 11-20.

Ugbamen, J., Acruz, E., Causin, S. E., & Cabello, C. (2022). Enriching the Discussion of Convergent Plate Boundary by Utilizing the Video Instructional Support: An Action Research.

Villar, M. C. G., Filipinas, J. P., Villanueva, J. B., & Cabello, C. A. (2022). The Transition, Transformation, and Adaptation from Modular-Printed Instruction to Limited Face-to-Face Classes: A Phenomenology.

Yamon, L. A., Batusbatusan, J., Raboy, J., Manlunas, L., Tabanao, J., Dichos, C. F., ... & Cabello, C. The Kitchen is Sinking: A Phenomenological Study of the Technology and Livelihood Teachers in the New Normal.

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