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Learning Experiences of Students in a General Education Course in Mathematics

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ABSTRACT
Providing students the avenue to express themselves and how they view their course learning is essential to motivate them and building their confidence to learn. Many studies were already conducted on the student's perception of the course using quantitative methods to determine the factors contributing to the enhancement and development of educational programs. The course's learning experiences are not well-known. Hence, this study determined students' learning experiences in a general education course in Mathematics. By using a descriptive qualitative design, this study involved interviews with ten students pursuing a nursing course at a university in Northern Philippines during the school year 2019-2020. Using semi-structured interviews, questions on perceptions, feelings, and thoughts about the general education course -- Mathematics in the Modern World – were asked of the student participants. Consequently, to analyze the data, the researchers made use of a thematic approach. Based on the in-depth analysis, the student's learning experiences can be summarized in two major themes: appreciation and criticism of the course. Some students appreciate the course because it is enjoyable, educative, helpful, and good. They also viewed the course as an essential subject in college. Others criticize the course stressing it was confusing, boring, and difficult. Because of the technical elements and analytical skills, the participants were confused and had trouble learning the course. Accordingly, this aspect must be considered in the course design, educational programs, and curriculum enhancement.

Keywords: Lived Experiences, Mathematics in the Modern World, Qualitative Design, Viewpoint in Learning

1. INTRODUCTION

From the viewpoint of different individuals, not only of what is said but also from studies conducted, Mathematics is perceived differently. Average students found the course enjoyable (Yilmaz, Altun, and Olkun, 2010), interactive and effective (Wang, Chang, Hwang and Chen, 2018), happy and fun (Turgut and Turgut, 2020), helpful (Piday, n.d.; Looney Math, n.d) and good (Famous Mathematicians, n.d.) through teachable moments (Clements and Sarama, 2018), new combined approach (Samuel and Warner, 2019), high motivation (Fuqoha, Budiyono, and Indriati, 2018), positive attitude (Newton Math Pathways, n.d.), positive disposition to mathematics (Llagas,2021), and active participation (McFeetors and Palfy, 2018; Udjaja, Guizot and Chandra, 2018). On the other hand, students find Math difficult (Fleming, 2019), confusing (Bulaon, 2018), and boring (Kislenko, Grevholm, and Lepik, 2007). Students suffer various difficulties and challenges, such as low motivation in learning Math (Fouze and Amit, 2017). Students can hardly solve worded math problems due to fear of problem-solving, poor comprehension, lack of knowledge of the problem presented, procedural errors, and difficulty level of the problem (Taban and Cadorna, 2019). Most students concluded that Mathematics is a complicated subject (Kislenko et al.). Many studies have been conducted to identify challenges or difficulties hindering the appreciation of mathematics and the acquisition of skills the students need (Cadorna, Cadorna, and Taban, 2021). Lastly, Darvishzadeh, Shahvarani, Alamolhodaei and Behzadi (2018) mentioned that experiences in teaching mathematics have indicated that most students have weaknesses in solving mathematical problems.
Studies also found that math anxiety is a common phenomenon (Ramirez, Gunderson, Levine, and Beilock, 2013) among nursing students (Lindley, 2015). Many nursing students struggle with computations related to

ratios, decimals, and unit conversions (Brown, 2006; Bagnasco, Galaverna, Aleo, Grugnetti, Rosa, and Sasso, 2016; Pierce, Steinle, Stacey and Widjaja, 2008). Many students do not understand decimal number systems (Arkell & Rutter, 2012). Nursing students view numeracy courses as irrelevant (Marks, Hodgen, Coben, and Bretscher, 2015).

Many other studies were also conducted using quantitative methods on the perception and performance of students in general education courses. Pitts and Johnson (2017) found that students' performance in general education courses was significantly related to Sports Management courses. Nonthamand and Suaklay (2021) mentioned that decision-making was the primary self-regulation behavior of students in general education courses. In the study conducted by Nelson and Garver (2010), the course general education came out most effective in hard-applied life fields. On the other hand, it came out least effective both in the fields, hard pure life and soft applied life. Dela Rosa and Vargas (2021) showed that in general education courses, students were indicative of good performances.

Moreover, the study by Whitehall, Hill, Yost, and Kidwell (2016), revealed a relationship between participation in general education courses and social and psychological outcomes. Alkhateeb, Abushihab, Alkhateeb, and Alkhateeb (2021) concluded that students were highly aware of metacognitive reading strategies used in general education courses. These studies were conducted to determine the reasons for these perceptions of the course, and the most used quantitative methods.

Little is known about the students' learning experiences in a general education course in Mathematics. Furthermore, Mathematics in the Modern World is new to the current curriculum, and difficulties would be perceived to arise (Roman & Villanueva, 2020). Hence, this study was conceptualized. This study determined students' learning experiences in a general education course using a descriptive qualitative design through a thematic approach. The results of the study could help educators design or develop educational programs based on the student's learning experiences. It would also validate the quantitative results of studies conducted.

Theoretical Underpinnings and Literature Review

This study is anchored on the following theoretical bases: the Theory of Planned Behavior (TPB) and the Theory of Experience. These theories can help one see things from another's perspective to understand the lived experiences of these nursing students in the Mathematics in the Modern World course.

The Theory of Planned Behavior (TPB), as expounded by LaMorte (2019), postulates the attention of an individual when engages in a behavior in a given space and time. This attempts to exemplify behavior where people can manifest control of themselves. This further explains that motivation and ability both determine the manifestation of behavior. Ryan and Carr (2010) mentioned that TPB is through the evaluation of data or information at hand which prompts individuals to make logical and reliable decisions. When a behavior is elicited by the individual, he does so because of his/her drive to engage in it in the same manner that his/her act is controlled. It helps us understand how people's behavior can change (Arafat and Ibrahim, 2018). Students' behavior is determined by their intention to engage in Mathematics in the Modern World course.

Likewise, the Theory of Dewey is centered on experience. The philosopher's aim to describe how people learn and develop is represented by this experience theory. It implies that experience and growth are closely related. The experience resulting in an increase must meet the dual criteria of continuity and interaction. An experience is also rooted in a specific moment and location. It depends on how recent experiences relate to those from the past and the future, on the material and social context of an individual's circumstances, and on how that person interacts with others in the learning environment (Stark, 2020). Students develop appreciation or fear towards the Mathematics in the Modern World course through their interaction with their learning environment and their past experiences related to the course.

2. METHODOLOGY AND TOOLS

This study used a qualitative design conducted during the School Year 2019-2020 at the University of Northern Philippines to determine the learning experiences of selected nursing students in a general education course -- Mathematics in the Modern World. Phenomenology has been used for the purpose of exploring happenings involving humans. In phenomenology, the researcher needs an awareness of basic assumptions to make important methodological decisions (Sundler, Lindberg, Nilsson, and Palmer, 2019). The study used a semi-structured open-ended written interview instrument in Google Forms. Research ethics were adequately observed in the conduct of the study. Ethical approval for this study was obtained from the University of Northern Philippines Ethics Review Committee. When the conduct of the study was approved, potential participants were informed through a consent form. After they signed the form, the semi-structured open-ended written interview instrument in Google Forms was sent. Each response was examined and discussed after being individually assessed. Data were coded and analyzed through a thematic approach suggested by Van Manen (2016), determining the participants' learning experiences. A careful and deliberate review of transcripts was done looking into themes that emerged. Then, the texts' dialogue with the keywords and thoughts was created. Finally, the researchers analyzed the themes based on experience components to the whole until all possible

interpretations were elicited. Every sentence is examined, and significant themes are found via this procedure. The themes were also validated by external auditors who have taught or taken the course. Then, these motifs are reconfigured into a narrative of the individuals' lived experiences (Polit & Beck, 2010). The study used a thematic analysis approach suggested by Van Manen (2016) to determine the participants' learning experiences.

3. RESULTS

Ten students were chosen through targeted sampling to guarantee that appropriate data was acquired. The participants' learning experiences in a general education course are shown in the table below. Regarding the ways in which students learned during the course, two primary themes and seven subthemes were developed.

Table 1: of summary of themes

Theme	Sample Verbatim Responses	Codes	General Description of the theme
1. Appreciation of the course (60%)			
a. Enjoyable	"I do enjoy this particular subject…" (P1) "Mathematics in Modern World for me is a fun … subject." (P7) "This active and energize because it is not boring." (P3) "Subject is full of fun, and I usually find it exciting." (P4)	enjoy fun active and energize fun, exciting	The respondents find pleasure and a sense of enjoyment in learning the course.
b. Educative	"Mathematics in Modern World for me is an educative… subject." (P10) "more learnings are expected." (P4) "I do like Mathematics because I'm gaining a lot of knowledge from it." (P8)	educative lot to learn gaining a lot of knowledge	The course provides the respondents the opportunity to acquire information.
c. Helpful	"Mathematics puts to order patterns in the world." (P7) "Mathematics helps predict ways or actions of things in the world." (P1) "We used it every day like in our daily activities." (P3)	helps organize helps predict used it every day	The course is an avenue where the respondents find practical applicability.
d. Good	"I can perceive it good and enough with the help of the instructor as well as the handouts given to us." (P4)	good	The respondents find Math in a positive light where instructors are viewed as facilitators of learning.
2. Criticism of the course (40%)			
a. Confusing	"It was not that hard but some parts are a little bit confusing to learn." (P2)	little bit confusing	Because of the technical elements of the course, the respondents find a little confused and experience difficulty in learning the course.
b. Boring	"I find it boring for it is not about numbers and formulas and graphs anymore." (P6) "I feel sleepy whenever I attend it." (P9)	boring sleepy	The respondent's subjective perception of Math is boring. Familiarity and likeability of the course could be factors of this viewpoint.
c. Hard	"It is a hard subject." (P7) "I do not enjoy the topic for It is hard for me to cope-up with the patterns of solution."(P5)	hard subject hard for me to cope-up	Mathematics engages one to use analytical skills. When one has not honed this skill, they will most likely dislike and find the course hard as experienced by the respondents.

The table shows that 60% of the nursing students appreciated the general education course while 40% criticized it. There are more students who appreciated the course than criticized it. The course was enjoyable, educative, helpful, and good for some. For others, it was confusing, boring, and hard. As reflected in the different sample verbatim responses, they have varied reasons for experiencing such. Moreover, a general description of themes was given to better understand the students' experiences.

4. DISCUSSION AND CONCLUSIONS

This phenomenological study was conducted to determine students' learning experiences in a general education course. Two major themes were constructed, and seven subthemes emerged in the study.

Appreciation of the Course

The major theme, "Appreciation of the Course," indicated that students had experienced the course positively as enjoyable, educative, helpful, and good.

Many participants enjoyed the course. Some of them find the course fun to study.

Participant's interest in the course could root in previous pleasant experiences in a similar course; for example, in the case of Participant 1, he enjoys the course mainly because his experiences in his lower years could have molded him to like it. This conforms to the studies of Turgut and Turgut (2020) that learning mathematics is usually happy-enjoyable-fun and that of Yilmaz, Altun, and Olkun (2010) that average students found the course enjoyable unless they understand it. This is very true; if only students were taught the know-how, there is a higher chance that they would like the course. One cannot possibly like something unless one understands it. Wang, Chang, Hwang, and Chen (2018) prove that course learning becomes enjoyable, interactive, and effective through the development of computer educational games.

Other participants learn much during the teacher's discussion of the subject well. This participant's experience is addressed to the subject teacher handling the course. It turned out to be a teacher-factor issue as a result. If the teacher has a mastery of the course and has the appropriate strategy in teaching the course, studying the course will yield favorable outcomes for the students. In short, students will find the course educative.

Pupils learn more educative experiences through active participation and reflection using their reasoning (McFeetors & Palfy, 2018). Further, they understand that the course has significant applications in one's life. This finding is supported by Clemens and Sarama (2018) who found that a course is best taught through a learning moment that is both wonderful and satisfying.

Also, participants mentioned that the course helped them understand the world. The participants' point of view about the course is helpful, thereby seeing the course as a tool to provide answers to not only man-made but also natural phenomena. Also highlighting this is Piday (n.d.) that the course helps us tell time and with our finances. It allows us to have better problem-solving skills, understand the world better, and shop for good sales. Teachers should not only teach students a course that only emphasizes a list of skills to be mastered, but one that inspires students to become problem solvers, creators, debaters, authors, and question seekers (Looney Math, nd). Udjaja, Guizot, and Chandra (2018) proved that interactive learning game supports and helps students to understand course materials and learn the course interactively and interestingly.

The participants elaborate that experience in the course is like a free-flowing river. Some perceived the course as an easy one due to the teacher's pieces of advice and teaching. They meant that by engaging in a teacher-student relationship, they could understand concepts, do activities in the course, and enjoy the teaching-learning process in this subject.

Positive relationships with teachers help pupils learn, which increases their motivation to study. This result contradicts the claim of Fleming (2019) that math is complicated because it takes time and energy. Also, math is challenging because of a lousy teacher, somebody told that math is hard, poor reading habits, and many concepts are abstract.

Moreover, many focused on the teaching style and personality of the teacher. However, they stated that the course is good, a safe answer to give. These participants probably do not love the course, but because of the teacher's effort, their experience is somewhat pleasant. Additionally, the majority of participants expressed their positive regard for the course. This could be because the course is a good exercise for the brain and is also used in drug treatments, as claimed by Famous Mathematicians (nd).

In all of these, the participants were motivated and willing to learn because they appreciated the course. They feel energetic, excited, enjoyable, and fun when motivated to learn the course. Almost all of them were attending the class and did activities regularly. The same finding can be noted in Fuqoha, Budiyono, and Indriati (2018), which showed that students are highly motivated to learn math.

In addition, their teachers were kind and approachable, making them willing to learn the subject. Their willingness pushed them to exert more effort in studying, like reading from different references and asking their teachers' and classmates' assistance.

Newtown Math Pathways (nd) mentioned that a student's disposition or attitude toward math is integral to their success. The learner's confidence and ability to explore alternatives and ways of solving a problem demonstrate the willingness to learn.
The students appreciated the course since it was enjoyable, educative, helpful, good, and easy at some point.

Criticism of the Course
On the other hand, the major theme, "Criticism of the Course," indicated that not all students could experience the course very positively. They found the course confusing, boring, and hard.
Other participants experienced the course as a not-so-easy subject to study. They stated that some parts are confusing and not easy to follow. Because the course involves complicated problem-solving tasks, the participants stressed that the course is not an easy subject. They find it confusing due to the long process of solving problems. The same finding was claimed by Bulaon (2018), who concluded that math is confusing due to many factors. These factors include the polysemous nature of many mathematical words, the way the teacher in the classroom uses the terms and phrases, the use of confusing words and phrases, and syntax in word problems. This made students anxious about Mathematics. Early identification and treatment of math anxiety are essential to prevent this from snowballing and leading students to avoid math courses (Ramirez, Gunderson, Levine & Beilock, 2013). Samuel and Warner (2019) proposed a combined method in Mathematics could both help reduce students' experience of anxiety and help them elevate their likelihood of math.
Despite students' high motivation, they are still bored with the mathematics lessons for some reasons. Moreover, few participants find the course boring since they are no longer challenged and feel sleepy attending it. They are learners who get bored quickly if they do not engage in complex tasks. This type of attitude poses a challenge for the teacher handling the course. The teacher will have a hard time managing students like this if the teacher is not flexible and mindful of the needs of his students. This finding agrees with the results in the study of Kislenko, Grevholm, and Lepik (2007), wherein many students agreed that mathematics is boring.
Whether the teacher likes it, students will still find the course hard. As in the case of other participants, they found the course a hard subject because, perhaps, the participants did not learn to like it early in their life. This type of learner challenges the teacher to introduce the course as fun and easy for the students. Some students do not find the course enjoyable; instead, they detest it. This could root in unpleasant experiences when these students were studying Math in primary or secondary. Another possible reason, as some students experience, is that they were not taught how to like this subject; another reason could be that they had a terror teacher and that Math should be a subject they should dislike for them. This finding conforms with the results of Kislenko et al. (2007) that most students find Mathematics a struggle.
Students suffer various difficulties and challenges, such as low motivation to learn Math (Fouze and Amit, 2017). Since students perceived the course as difficult, they were pressured and unmotivated. As Fleming (2019) stresses, time also makes them feel pressured. Many students find less time for studying Math which causes them to struggle with the subject.
The findings show that the participants hold various views. Some students appreciate the course because it is enjoyable, educative, helpful, and good. Others criticize the course as confusing, boring, and difficult. These elements must be considered in the designing of the syllabus, educational programs, and enhancement of the curriculum.
The downside of qualitative research is not being able to cover and explore all that needs to be covered. However, in this way, an in-depth study of a few is extracted. Consequently, themes can be revealed more likely when interviewing a larger number of participants not included in this study. Therefore, the need to increase the number of participants is highly recommended when future studies shall be conducted to further explore more aspects of the learning experiences of the course.

5. SUGGESTIONS FOR FUTURE RESEARCH

Related studies using a quantitative approach can be done to determine which strategies could be helpful and effective in teaching Mathematics to nursing students. A further research study on devising appropriate instructional material that can be readily used by teachers in the delivery of their lessons can also be conducted.

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