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Challenges and Coping Strategies of Night Junior High School Learners in Learning Sequences and Series Through Mathematics in a Box

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ARTICLE INFO

Keywords: Night Junior High School, Mathematics in a Box, Challenges, Coping Strategies

Received : 1 November

Revised : 15 November

Accepted : 17 December

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ABSTRACT

This research aimed to explore the challenges and coping strategies of night junior high school learners in learning sequences and series through Mathematics in a Box. It involved a case study of a class of grade 10 Night Class learners in the Philippines. The principles of constructionism and symbolic interactionism backed up the thematic analysis of the data. During a six-week conversation, classroom observations and journal writing were done. Five learners participated in one-on-one interviews, and 10 in focus group interviews. Participants struggled with understanding, intricacy of rules, misconceptions, and with personal circumstances. Their coping strategies: dissecting the problem; speaking in a comfortable language; doing independent study; and reflecting on their answer. There is potential in using mathematics in a box to address challenges while learning sequences and series

INTRODUCTION

To make education accessible to children coming from underprivileged families, the inclusion of the Night Class was made possible in the Philippine Education System. The Night Class was specially designed to give working students in urban areas the opportunity to complete their secondary schooling (Department of Education Culture and Sports, 1997). Classes in the Night Class program begin at 4:00 or 5:00 p.m. and conclude at 9:00 p.m. However, studies have indicated that mathematics should be taught in the morning to kids in order for them to increase their grasp of mathematical topics since they are better at concentrating at this time of day (Turner, 2017).

One way to address the issue is to understand how learners think so that problems may be identified and solutions may be given immediately to address the challenges. The research attempted to describe the learners' challenges and coping methods as they went through their thought processes while using mathematics in a box.

Furthermore, one strategy that could help students understand math is by allowing them to “see” the problem at hand through tangible objects or concrete manipulatives. Concrete manipulatives are objects that students may use to represent an abstract idea (Moore, 2014). The use of concrete manipulatives is supported in the international arena by the National Council of Supervisors of Mathematics (2013), who stated that in order to develop the mathematical proficiency of every student in the classroom, educational leaders and teachers must systematically integrate the use of manipulatives at all grade levels. Locally, the use of concrete manipulatives in the teaching of Mathematics is highly recommended by the Department of Education (2016). Concrete manipulatives can be seen in the K to 12 Mathematics Curriculum Guide as one of the tools needed in teaching Mathematics together with measuring devices, calculators and computers, smartphones and tablet PC's, and the Internet. In the Philippine classroom, where resources are limited, teachers must utilize their ingenuity and

resourcefulness to build concrete manipulatives that would assist them in achieving success in the classroom (Jones & Tiller, 2017).

Mathematics in a Box is a teacher-created concrete manipulative that can fit within a box with maximum dimensions of 10.5 inches x 10.5 inches x 5 inches, making it easier for teachers to transport from classroom to classroom or to locations where underprivileged students want their services. Six Mathematics in a Box were created and verified for this research, covering the six-week discussion on sequences and series, the first concepts taught in Mathematics 10.

The purpose of this research was to look into the experiences of night junior high school students in learning sequences and series. It specifically sought answers to the following research questions: (a) What challenges do night junior high school students have understanding sequences and series? (b) What coping strategies do night junior high school students employ to deal with problems?

The Dynamic and Construction Principles of Zoltan Paul Dienes (1961) served as the foundation for the Mathematics in a Box teaching strategy. Zoltan Paul Dienes stands with notable theorists Jean Piaget and Jerome Bruner, but his views are primarily relevant to the teaching and learning of mathematics (Sriraman & Lesh, 2007). His Dynamic Principle asserts that tangible manipulative exercises must be presented to pupils in order to create the required experiences from which mathematical concepts may finally be constructed. Later on, mental activities can be used in the same manner. In addition, Dienes' Construction Principle implies that mathematical relations are formed as a result of reflective abstraction on physical and mental actions on tangible manipulatives (Dienes, 1961).

This research included firsthand interaction via class observations and interviews. These data sources were then used to generate meanings and interpretations. As a result, it is appropriate to premise this study on constructionism as an epistemology. Constructionism is concerned with the construction of meanings when one interacts with one's environment (Crotty, 1998).

This study's research perspective is symbolic interactionism. Symbolic interactionism, according to Herbert Blumer, is a theoretical framework that emphasizes that society is formed via recurrent encounters among individuals (Carter & Fuller, 2015). The researcher created meanings for how students acquired their understanding using Mathematics in a Box.

METHODS

This qualitative study is based on Yin's Case Study of a Single Case (2003). The single case study approach, according to Yin, is the optimum choice for a research that wants to investigate a single object or a single group. One reason for choosing a single instance is that it is a representative or typical case. The case in this study, Grade 10 students at a night junior high school in Iloilo, is representative of all students enrolled in a night junior high school in the Philippines. Furthermore, it satisfies the given characteristic of Merriam (1998) about case study: particularistic, heuristic, and descriptive.

It is particularistic in nature since it focuses on a specific context, which is teaching through Mathematics in a Box in analyzing the participants' mental processes. Moreover, this study is descriptive since it gives a full description of the participants' reaction, opinion, and reflection. Furthermore, this study is heuristic in the sense that it clarifies how the participants learnt mathematical concepts.

The participants of this research were 42 Grade 10 students registered in a Night Class Program at a public high school in Iloilo City, Philippines, during the first quarter of the 2018-2019 academic year. These are working students from low-income backgrounds from the city and province of Iloilo. The researcher obtained the relevant permissions and letters for the validators and principal of the school where the study was performed prior to the study's conduct. The researcher created the data collection tools (interview schedule and observation guide) as well as the teaching materials (Mathematics in a Box). The data collection period lasted six weeks, from June 18 to July 27, 2018. Sequences and Series were the topics covered. Mathematics is taught for four days per week at the Night Junior High School; the data collection was planned to encompass 24 sessions, but owing to unforeseen events like as class

cancellations due to typhoons and school activities, the actual data collection lasted only 20 days.

The first week's themes covered Arithmetic Sequence and the Mathematics in a Box utilized was "Thinking Inside the Box". Week 2 covered Arithmetic Means and Arithmetic Series, and the Mathematics in a Box utilized was the "Thinking Inside the Box". Week 3 focused on Geometric Sequence and made use of the "Go and Multiply". Geometric Sequence and Geometric Means were covered in Week 4 using the "Go and Multiply", and "Connect the Blocks" tools. Week 5 covered Geometric Series and the "Go and Multiply" was used. Infinite Geometric Series, Fibonacci Sequence, and Harmonic Sequence were topic covered in Week 6 using the "To Infinity and Beyond", "Busy Bee", as well as "Thinking Outside the Box".

Arithmetic Sequence, Arithmetic Means, Arithmetic Series, and the Harmonic Sequence may all be taught using "Thinking Inside the Box". The first term is represented by the green boxes, while the common difference is represented by the yellow boxes. All of the green boxes must have the same number of cylinders, as must all of the yellow boxes. The number of rows used represents the number of terms in a sequence.

Geometric Sequence and Geometric Series may be taught using the "Go and Multiply". The student begins by arranging any number of cubes ranging from one to ten on the board. Then he adds the equivalent number of cylinders to meet the request. For example, if the instructions state that the number of cubes must be doubled each time, the student must add another cube. There are now two cubes, so to double this, add another two cubes and repeat the process.

Additionally, the "Connect the Blocks" game may be used to teach Geometric Means. The teacher would be required to present two consecutive known terms from a geometric sequence, an unknown term, and another known number. The learner begins by calculating the number of cubes that correspond to the first term and then links the cubes. The same must be done during the second term. The lesser number of linked cubes is then stacked on top of the larger one. The common ratio of the series is the number of times the student had to stack the smaller number of cubes on top of each other to cover the complete area of the larger linked blocks. To get the value of the

unknown term, the student must multiply this common ratio by the previous term.

“To Infinity and Beyond” can be used to teach Infinite Geometric Series. The student creates another rectangle by combining the three largest rectangles. The student then removes the brown rectangle and substitutes three smaller rectangles. The student then moves the brown rectangle and replaces it with the three smallest rectangles before assembling rectangles of the same color except for the smallest brown rectangle. One-half of the total rectangles are represented by the green rectangle. This is the sum of the infinite geometric sequence. The triangles are utilized in the same manner.

Moreover, the Busy Bee may be used to teach Fibonacci Sequence through the reproduction of bees. A boy bee has one parent while a girl bee has two parents, a boy bee and a girl bee. Blue chips indicate male bees, while red chips represent female bees. Starting with a boy bee, the student must determine how many parents, grandparents, great grandparents, and so on this boy bee has.

During lessons, the researcher moved around and engaged with students, asking them questions on their conceptual understanding. The researcher took field notes on how students interacted with Mathematics in a Box. The researcher also filmed the teachings, but made sure to emphasize to the students that they did not need to adjust their conduct in class and should continue to act normally. All 42 participants attended at least 80% of the sessions (at least 16 hours of the 20 hours) and completed the journal writing (at least 10 out of 12 journal entries). In addition, the researcher conducted a face-to-face interview with five high performing learners to collect data on the challenges they experienced and their coping strategies. These sessions were also captured on video. Finally, 10 purposively selected individuals were interviewed in a focus group setting. Five of these participants are the top performing learners in class who also participated in the one-on-one interview, and the other five are the poorest performing learners based on the results of the formative assessments in order for them to share their insights and opinions on the use of Mathematics in a Box in order to strengthen the findings of this study. For the purposes of this study, the focus group interview was also video-taped.

The data collected through audio-video recordings of the lesson, journals, personal

interviews, and focus group discussions were triangulated. Inductively, the data were transcribed, processed, and interpreted. The patterns were discovered by the researchers using thematic analysis from various sources. Furthermore, the researcher of this study took the appropriate procedures to protect the identity of the research respondents. The respondents were identified using pseudonyms in the recorded observations of the discussion in the sessions. The replies in the interviews and focus group interviews all utilized the same pseudonyms. Some difficulties concerning the school may be discovered throughout the course of this investigation, but such issues were not included in the research findings.

RESULTS AND DISCUSSION

Problems Encountered by Night Junior High School Learners in Learning Sequences and Series Through Mathematics in a Box

Thematic analysis indicated the challenges that night junior high school students had when studying sequences and series using Mathematics in a Box. These challenges range from using Mathematics in a Box in the classroom to the students' personal circumstances. Night junior high school students (1) struggled with comprehension; (2) considered the complexity of the rules involved to be a stumbling block to learning; (3) had many misconceptions about previously taught math subjects; and (4) struggled with personal circumstances.

Comprehension

Comprehension is a skill that is imperative to a child's success inside the classroom. Without comprehension of the problem and/or instructions given in class, students cannot proceed to the next step of learning. They remain on that stage until such a time that they have already developed their skill in comprehension.

During the Focus group interview a student admitted that she had difficulty in understanding the problem. She said, “Hapos lang magsolve ma'am galling ang budlayan ko lang bala ma'am ang pag-intsindi sang problem. Indi ko ka-intsindi sang problem [It is actually easy to solve but what I find

difficult is understanding the problem. I cannot understand the problem, ma'am.].”

Furthermore, in separate one-on-one interviews, when asked to solve a problem about Geometric Sequence, Ela and Nicole were not able to solve the problem correctly. When asked about what part of the process they made the mistake, they both admitted that it was in the understanding of the problem. Nicole said, “Sa ano ma'am. Sa paghangop ko ma'am. Kay ano ma'am. Sa una una ma'am kay daw nag-ano bala sa mind ko ay arithmetic ni sa [It is in the understanding of the problem, ma'am. At first I thought it was arithmetic sequence.]”.

Furthermore, there were multiple times when the participants did not understand the problem that was presented to them. When the teacher asked what is the problem or what it is all about, the students either did not respond or misinterpreted the questions. For example, one of the Geometric Series questions inquired about John's total savings in four days if he deposits PhP 3.00 on the first day and the same amount the next day. The right answer is PhP 12.00, however several students insisted on PhP 45.00 since the amount of money that John puts doubles every day, according to them.

One of the students shared in her journal entry that the most difficult part of the lesson is on understanding the problem. Her exact words were, “To be honest sang pag inchindi sang question pero sang ginbasa ko balik balik na kuha ko asta na solve ko asta sa letter C [To be honest, it is on understanding the question but when I read it over and over again, I was able to answer until part C.]” Another one also shared, “It makes me difficult to solve the problem if you can't understand. [It is difficult to solve the problem if you can't understand it.]”

Complexity of Rules

The themes revealed that students learn when they are being provided with simple rules. However, if the lesson contains rules which are difficult to understand, they will have a difficult time in understanding such rules.

It was noted in the researcher's observation guide and the transcript of the Geometric Sequence class discussion that the students had difficulties grasping Geometric Sequence and the "Go and Multiply" when it was initially taught to them. The activity, which was scheduled to take 10 - 20 minutes, lasted an hour since the students were confused about how to utilize the “Go and Multiply”. The teacher had to go around the room and explain how to use the Go and Multiply to each group. Furthermore, the students struggled to comprehend Infinite Geometric Sequence through the “To Infinity and Beyond”. During the focus group interview, the majority of them stated that the “To Infinity and Beyond” Mathematics in a Box was the most challenging for them to operate. During the class discussion, it was also noted that the students were having difficulty obtaining the solution to use this Mathematics in a Box. This might be because this learning resource needs students to assume that the smallest brown triangle/rectangle is to be sliced to infinity, as opposed to other Mathematics in a Box where the answer is instantly visible.

Misconception of Previously Taught Math Concepts

Misconceptions about previously taught topics are a primary reason why students fail to completely comprehend the abilities necessary for their grade level. The duty of correcting these misunderstandings falls on the shoulders of the current teacher, and if not addressed early, the burden will get greater over time. This research study discovered misconceptions about the Addition Property of Equality, fractions, negative numbers, and the usage of the PEMDAS rule. The next excerpt shows students' misconception on the Addition Property of Equality.

Teacher: 16 equals a_1 plus?

Students: 12

Teacher: *Anhun ta dayun?* [What shall we do next?]

Ela: *Isayluhon* ma'am. [Change its position, ma'am.]

Teacher: Raise your hand if you know the answer.

Jig: *Isayluhon* ma'am. [Change its position, ma'am.]

Teacher: *Isayluhon sa?* [Shall we change its position?]

Jig: *Ma* 16 minus 12 [It will be 16 minus 12]

The next one shows the misconception of students in operations on fraction specifically in multiplication.

Teacher: OK. So let us simplify. How do we multiply fractions?

Jig: Copy the denominator and multiply the numerator.

Teacher: Copy the denominator?

Students: Cross multiply!

Aside from multiplication, students struggled with fraction subtraction. When asked what the difference is between one and two-thirds, the answers were one and one-half and one and one-third.

Personal Circumstance

Throughout the intervention, the researcher discovered that the students' individual circumstances have a significant impact on their performance in the classroom. Julie, a home worker for a family in Iloilo City, was noticed to be distant and inattentive during a discussion of the topic Geometric Sequence on one occasion. When asked what is wrong, she would simply say, "Wala ah [Nothing.]" She approached the teacher, weeping, after the class discussion, and pleaded for assistance. She explained that she is the family breadwinner, and the Php 4 000.00 she makes each month is sent to her family in Calinog, where she still has many younger siblings who need to attend school. She learned out a few hours before the class discussion that her father, who was in Manila at the time, has a new family and has left them for good. Furthermore, during the

discussion of the Fibonacci Sequence and the Harmonic Sequence, it was seen that some of the students were nervous and were chatting to one other. The teacher discovered that these students had been accused of stealing a packet of cookies from the canteen. They defended themselves, claiming that they could not do such an act. They may be poor, but they are not thieves, according to them.

On another occasion, while on her way to perform the intervention, the researcher was shocked to discover that the driver of the pedicab she was riding in was one of her 6-week intervention students. When the researcher invited the student to join her in class, the student merely stated that he would be missing that day due to work responsibilities. This incident demonstrates that, due to a lack of financial resources, school has become simply a secondary concern for many students. They must work at an early age in order to eat and attend school.

During the researcher's 6-week stay in the Night Class Program, she also saw that many pupils arrive at school without having eaten lunch or even a single meal for the day. Many students would complain about being unwell, and the Night Class faculty room would transform into a clinic, with teachers acting as nurses for these students. As a result, learning could not be maximized, and even though teachers wish to offer these students with the finest learning experience possible, it sometimes appears unattainable due to such conditions.. Figure 1 summarizes the problems encountered by night junior high school students in learning.

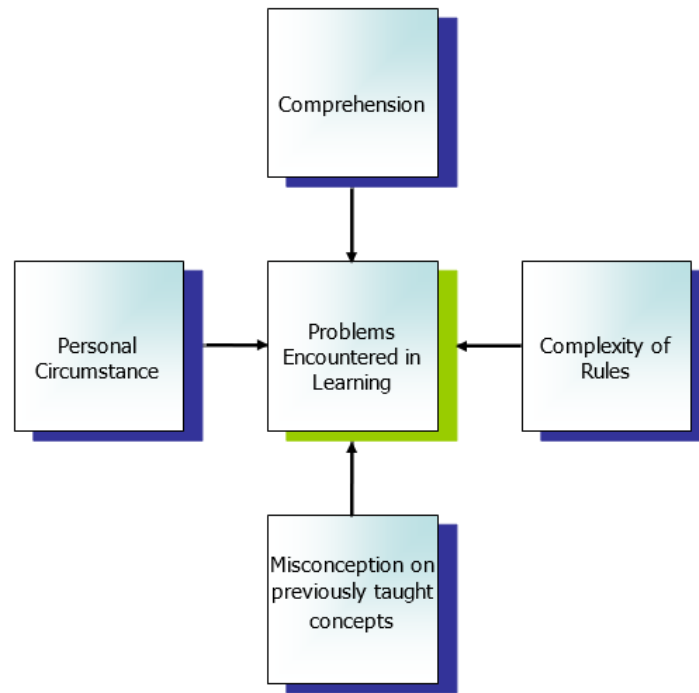


Figure 1. Personal Circumstance

Coping Strategies in Learning of Night Junior High School Learners

The preceding discussion revealed the problems encountered by night junior high school learners in learning. However, the said problems were addressed by the following coping strategies: (1) dissecting the problem into smaller understandable pieces; (2) speaking in a language they are comfortable with; (3) doing independent study; and (4) reflecting on their answer.

Dissecting the Problem Into Smaller Understandable Pieces

One of the difficulties in educating night junior high school students, or learners in general, is their capacity to grasp complex and long questions, particularly those written or spoken in English. A strategy that may assist students in grasping such problems is to educate them how to break the problem down into smaller, more manageable chunks so that they may comprehend the larger question. The following transcript explains how Bry was able to answer the question, "What is the difference between an arithmetic sequence and geometric sequence?" by employing the stated strategy.

Teacher: What is the difference between an arithmetic sequence and a geometric sequence? Bry, stand up!

Bry: (stands up) Wala ko kabalo, ma'am. [I do not know, ma'am.]

Teacher: Ngaa wala ka kabalo? [Why?]

Bry: (no response)

Teacher: Sa una ta nag ginleson, sa arithmetic, ga-ano kita? Ga-add, gasubtract, gamultiply or gadivide? [In our first lesson about arithmetic sequence, what operation are we doing? Addition, subtraction, multiplication, or division?]

Bry: Ga-add ma'am. [Addition, ma'am]

Teacher: Sa geometric, ga-ano kita? [How about in Geometric Sequence?]

Bry: Gamultiply, ma'am. [Multiplication, ma'am.]

Teacher: OK. Sit down.

Another example follows, this one on Arithmetic Sequence, where the problem was divided into smaller parts so that the students may understand the bigger question.

Ela: If the plant is 8 cm at beginning of the first week, what will be the height of the plant at the beginning of the 2nd, 3rd, and 4th weeks?

Teacher: OK. A gardener buys that is? How long?
How tall rather?

Students: 8 cm!

Teacher: 8 cm at the beginning of the?

Students: Week.

Teacher: What week? 1st? 2nd?

Students: 1st!

Teacher: Buot silingon, nagbakal sa sang tanum nga ang kataason? [Meaning, he bought a plant that is how tall?]

Students: 8 cm.

Teacher: 8 cm. Dasun ano pa gid ang hambal sa problem? What does the problem tell us?

Jig: What will be the height of the plant at the beginning of the 2nd, 3rd, and 4th weeks.

Teacher: At the beginning of the 2nd, 3rd, and 4th weeks. Sige. Does the plant grow taller?

Students: Yes!

Teacher: By how tall every week?

Students: 6 cm.

Students: 8 cm.

Teacher: Pila gid man bala?

Students: 6!

Speaking in a Language They are Comfortable with

Teaching and studying Mathematics gets more difficult when it is taught in a language that the students are uncomfortable with. Beth was asked how to apply the Thinking Inside the Box during the focus group interview. She began talking in English, but it was clear that she was having difficulties explaining herself. The teacher pushed her to speak in Hiligaynon, which she did. She then began speaking in Hiligaynon and was able to clearly explain how to apply the “Thinking Inside the Box” in the lesson.

During the intervention, students were frequently compelled to speak in front of the class. The students struggled with speaking and explaining in English. When this occurs, the teacher frequently encourages the students to communicate in a language with which they are familiar, and this usually works. Here's an example of a transcript that backs up the previous claim.

Jig: Because ma'am... ang ano ma'am... [Because ma'am... uhmmm]

Teacher: You can speak in Hiligaynon if you want.

Jig: Kay taga adlaw, 7 ang gina-add niya ma'am sa 49 days. 49 days na lang ma'am kay nagstart sa ma'am sa 5 ti 49 na lang bilin sa 50. [Everyday, for 49 days, we add 7. It is only 49 because the sequence started with 5 as the first term of the 50 terms.]

Teacher: OK. Very good. Kay ngaa sa first week may 7 kamu nga nakita diri? [OK. Very good. Can you see a 7 here in the 1st row?] (refers to the Math in a Box)

Students: Wala! [No!]

Teacher: Diin kita nagdugang sang 7? [Where did we start adding 7?]

Students: 2nd week!

Teacher: Sa 2nd week. Tapos ang ika 2nd nga 7, nagsugod siya sa? [In the 2nd week. And then the 2nd 7 can be found in?]

Students: 3rd week!

In the participants' journal entries, it was observed that most of them expressed their thoughts in Hiligaynon. Some also wrote in Filipino and some still preferred to write in English. One example of which is this: “Sa green nga box 4 ka bilog ang ibutang sa yellow naman 3 ka bilog ang ibutang kag sa 1st box 4 lang kabilog sa 2nd box 7 ka bilog sa 3rd box 10 ka bilog kag sa 4th box 13 ka bilog kag hindi pana ang answer kay ang pamangkot pila gid tanan ang natipon ya ang sabat 34 kay ang tanan nga ara sa box amo na ang answer. [We put 4 cylinders in the green boxes and 3 cylinders in the yellow boxes. The 1st row contained 4 cylinders, the 2nd row 7 cylinders, the 3rd row 10 cylinders and the 4th row 13 cylinders. But that is not yet the answer because the questions asks us about the total number of cylinders so we have to add all the cylinders and we get 34 as the answer.]”

Through Independent Study

Through independent study. One of the finest characteristics of night junior high school students identified by the researcher is their attention to their academics. Nicole admitted in a one-on-one interview that she struggled to keep up with

Geometric Sequence teachings, specifically identifying the common ratio. She was asked how she understood the topic.

Teacher: Pero subong, na-understand mo na? [But do you understand it now?]

Nicole: Huo, ma'am. Ginadivide ang second nga term sa first. [Yes, ma'am. We just divide the second term by the first term.]

Teacher: How did you understand it? Paano nga sang una indi ka kabalo, ano gin-ubra mo nga nakabalo ka na? [How did you understand it? What did you do to be able to understand the lesson?]

Nicole: Gintun-an ko sa balay, ma'am kung paano makuha ang common ratio. Kay nakita ko man ma'am sa libro sa pakaisa ko ma'am kung paano makuha ma'am ang common ratio. Gindivide ang second term sa first term. [I studied about getting the common ratio at home, ma'am. I read in one of the books of my cousin that the second term is being divided by the first term to get the common ratio.]

Teacher: So nagself-study ka? [So you did self-study?]

Nicole: Huo, ma'am. [Yes, ma'am.]

Moreover, it is evident throughout the intervention that some of the students already have knowledge about the lessons yet to be discussed. The next transcript shows that even before the term "arithmetic series" was presented to the class, one of the students already knew about it.

Teacher: Pedro climbed the tree and got 4 guavas for himself. He did this for 4 days and each day, he got 3 more guavas than the previous day while Juan just stayed there and waited. How many guavas did Pedro get in all?

Liza: Arithmetic Series.

Teacher: Very good. That is Arithmetic Series.

Here is another excerpt from the transcript of the lesson on Geometric Means. This was from the

beginning of the lesson when the teacher was not able yet to introduce Geometric Means to the class.

Teacher: Tonight, we are going to talk about Geometric Means. So do you have any idea what Geometric Means are? Yes, Mae.

Mae: Geometric Means is the indicated terms between two terms.

Reflecting on One's Answer

Reflecting on one's answer has been found to improve the learning of night junior high school students. Several times during the intervention, students were asked questions on the lesson, and sometimes, maybe because they were too eager to answer, they would respond without even thinking about it. When this occurs, the teacher does not explicitly provide the solution, but rather requires the students to ponder on their responses. Most of the time, this method helps the students in discovering their errors and subsequently providing a better or right response than the one they offered previously. Here are examples of such events.

Student: 355?

Teacher: How did you get 355?

Student: Nang. [Uhhmm.] Hehe. 50 times 7 plus 5.

Teacher: 50 times... ano tu man? [50 times... what is it again?]

Student: 50 times 7 plus 5.

Teacher: 50 times 7 plus 5. Are you sure?

Students: Indi! [No!]

Teacher: Diin ka ngkwa sng 50 times 7? [Where did you get 50 times 7?]

Student: Kay 50 ka 7, ma'am. [Because there are 50 7's, ma'am.]

Teacher: 50 ka 7? Sure? Ngaa sang 1st week may 1 ka na ka 7 aw? [50 7's? Are you sure? Do you have a 7 in your 1st week?]

Student: 49 lang gali, ma'am! 49 times 7 plus 5! [It's only 49, ma'am. 49 times 7 plus 5!]

Teacher: OK.

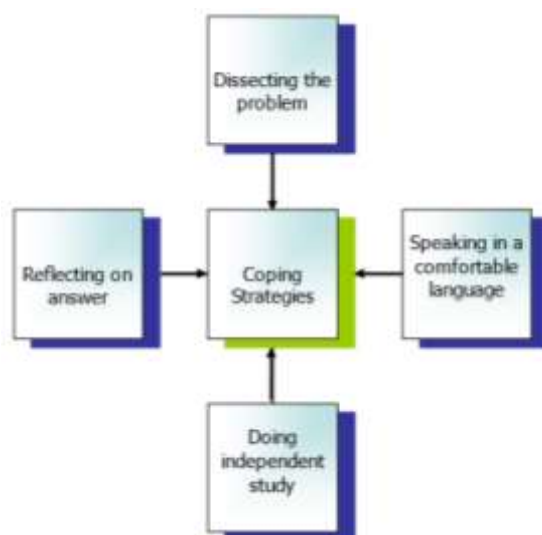


Figure 2. Summarizes the Coping Strategies Done by Night Junior High School Learners to Address the Challenges Encountered.

CONCLUSION

In view of the foregoing findings of this study, the following conclusions were drawn: The problems encountered by Night Junior High School Learners in Learning Sequences and Series using the Mathematics in the Box are the following: Comprehension, Complexity of Rules, Misconception of Previously Taught Match Concepts, and Personal Circumstance. These learners have learned to cope with the said problems by dissecting the problem into smaller understandable pieces, by speaking in a language they are comfortable with,

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through independent study, and by reflecting on one's answer.

This study's findings are compatible with Zoltan Paul Dienes' (1961) Dynamic Principle, which asserts that exercises involving concrete manipulatives must be provided to students in order to create the required experiences from which mathematical concepts may eventually be built. It is also compatible with his Construction Principle, which states that reflecting abstraction on physical and mental activities on tangible manipulatives leads to the construction of mathematical relations.

The findings of this study indicated the challenges that night junior high school students had understanding sequences and series, as well as their coping techniques. By knowing these, educators in the field of mathematics, particularly those responsible with teaching night junior high school students, might examine how vital it is to understand how learners learn so that they can tailor the curriculum to meet the requirements of these students.

The researcher recommends for curriculum developers to look into these problems and plan how to minimize such by adjusting the curriculum based on the needs of the learners. It is also recommended by the researcher that the coping strategies found in this study be applied by night junior high school learners whenever they encounter similar challenges inside the classroom.

ACKNOWLEDGMENT

The author would like to express her gratitude to the department of science and technology-science education institute for funding this research study.

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