

**TEACHER'S PEDAGOGICAL APPROACH AND LEARNING
COMPREHENSION IN MATHEMATICS**

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In Partial Fulfillment of the Requirements
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Research 413
(MTH 413)



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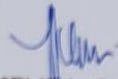
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ACCEPTANCE SHEET

This thesis entitled "TEACHER'S PEDAGOGICAL APPROACH AND LEARNING COMPREHENSION IN MATHEMATICS" prepared and submitted by James Galagala, Delfiero Ibanez and Fritz Niger Mendoza in compliance with the requirements in the Research subject under the Department of Teachers Education, UM Panabo College, Panabo City, hereby accepted.



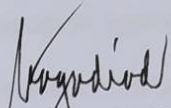
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ABSTRACT

The researchers aimed to determine the relationship between teacher's pedagogical approach and learning comprehension in mathematics among grade 12 senior high school students of UM Panabo College. The independent variable in the study was teacher's pedagogical approach. The indicators of teacher's pedagogical approach were students' perception of learning from online discussion, online discussion motivation and enjoyment and instructor role. On the other hand, the dependent variable of this study was learning comprehension in mathematics. The indicators of learning comprehension in mathematics were Effortful math, Useful math, Math persistence, Math confidence, Understand math concept, Word problem and Non-prescription math. The researchers used a quantitative non-experimental correlation method, and statistical tools used were, Mean and Pearson Product Moment Correlation Coefficient (r). The result of the computation is r - value is 0.624** not less than 0.05. Moreover, the null hypothesis was rejected. In other words, there is significant relationship between teacher's pedagogical approach and learning comprehension in mathematics among grade 12 senior high school students. It implies that teacher's pedagogical approach has evident impacts on learning comprehension in mathematics. In other words, teacher's pedagogical approach could affect the learning comprehension in mathematics among grade 12 senior high school students of UM Panabo College.

Keywords: *Teacher's pedagogical approach, Learning Comprehension in Mathematics*

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CHAPTER 1

THE PROBLEM AND ITS SETTINGS

Background of the Study

As observed in the past decade, some problems were noticed in the students' learning, specifically, the learning comprehension in mathematics. Many countries having headaches due to the problem in learning comprehension in mathematics of the students. Mathematics is a subject that needs comprehension and critical thinking because it made the whole world functional. Basically, mathematics revolves constantly in this world that even in the smallest part of a society compose of mathematics explanations.

In Bangkok, Thailand (Phonapichat P., Wongwanich S. & Sujiva S. (2014), based on the result of national test result, the students were lacking skill in understanding and comprehending mathematical problem-solving. It implied that the overall students' learning comprehension in mathematics is slightly below average. With this matter, it is also said that the students are having a hard time on comprehending the mathematics.

The same problem was also noticed in the Philippines; according to Imam O., Abas-Mastura M. & Jamil H. (2013), the learning comprehension of Filipino students in mathematics is continuously dropping in international and national mathematics tests for the past decade, and it became more challenging to the Philippine education. The Department of Education thinks that the poor learning comprehension in mathematics caused low outcome. Due to this, the Department of Education (DepEd) gives more attention to this matter.

Moreover, the researchers previously interviewed various random mathematics teachers in Panabo City, knowing if learning comprehension towards mathematics becomes a problem. Based on the three teachers being interviewed by the researchers, the majority of the mathematics teachers found out that it is difficult for them to discuss and employ learning components to a particular lesson in mathematics. With these, the researchers noticed that this problem in learning comprehension in mathematics needs to study further to determine if a teacher's pedagogical approach has a significant relationship to learning comprehension in mathematics.

Statement of the Problem

The study aimed to determine the relationship between the teacher's pedagogical approach and learning comprehension in Mathematics among grade 12 senior high school students in the UM Panabo College.

More specifically, it sought answers to the following questions:

1. What is the level of teacher's pedagogical approach in terms of:
 - 1.1. student's perception of learning from online discussion;
 - 1.2. online discussion motivation and enjoyment; and
 - 1.3. instructor role?
2. What is the level of learning comprehension in Mathematics in terms of:
 - 1.1. effortful math;
 - 1.2. useful math;
 - 1.3. math persistence;
 - 1.4. math confidence;

- 1.5. understand math concepts; Word problem; and
 - 1.6. non-prescription math?
3. Is there a significant relationship between teachers' pedagogical approach and learning comprehension in mathematics?

Hypothesis:

The null hypothesis was tested at a 0.05 level of significance, which stated no significant relationship between teacher's pedagogical approach and learning comprehension in mathematics.

Theoretical and Conceptual Framework:

This study was anchored in the study of Yuanita, P., Zulnaldi, H., & Zakaria, E. (2018) that using effective teaching strategies can increase learning comprehension in mathematics. Teachers must be encouraged to use pedagogical approaches that complement the mathematical problem solving skills of students. The teaching and learning procedure inside the classroom will determine the effective teaching approach. The efforts of teachers using effective teaching strategies should be doubled in order to increase the learning comprehension in mathematics of students.

In addition, having or adding a learning comprehension strategy to a particular math class can help to learn, and the strategy can help students understand more about the topic in mathematics (Walkington, 2018).

Kapur, R. (2020), stated that pedagogical approaches is one of the fundamental factors in promoting student in achieving academic goals or enhancing learning comprehension in mathematics. Hence, the instructors

need to ensure they put into practice the pedagogical approaches in an effective manner.

As shown in Figure 1, the independent variable is the teacher's pedagogical approach having indicators of: *student perception of learning from an online discussion*, which refers to self-assessment of students in an engaging online class and the accessibility to the internet; *online discussion motivation, and enjoyment*, which relates to the student's personal experience that tackles communication; and *instructor role*, which refers to effective and efficient class discussion.

The dependent variable is learning comprehension in mathematics with the following indicators; *effortful math*, which refers to teaching systems to acquire an understanding of how to impart numerically in the study; *useful math*, which refers to mental level and openness to Mathematics; *math persistence*, which refers to 21st-century skill; *math confidence*, which refers to uplifting outlooks among students towards math; *understand Math concept*, which refers to Math educating will be a significant factor in a successful mathematical educating and perpetual learning; *word problem*, which refers to problem-solving that includes various psychological cycles; and *nonprescription math*, which refers to not giving a learning climate which is helpful.

Independent Variable

Dependent Variable

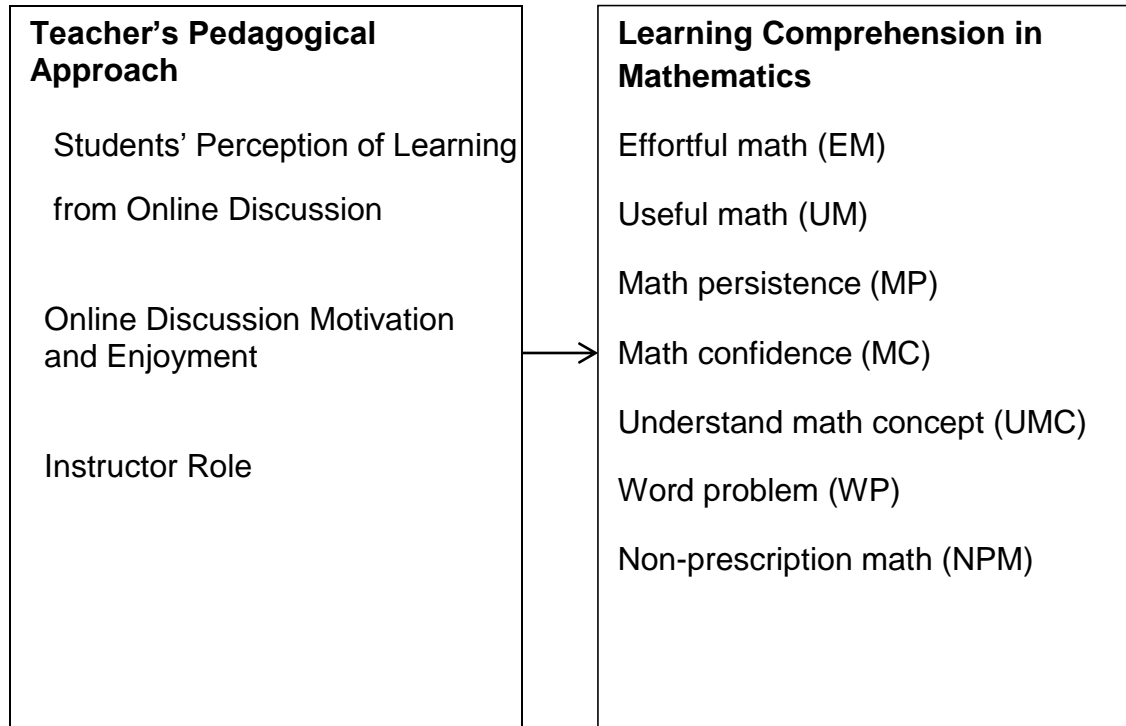


Figure 1: The Conceptual Framework Showing the Variables of the Study

Significance of the Study

The following are the beneficiaries of this study:

School. The result of this study will help the school deal with the students' problems in learning comprehension in mathematics because this research will help them teach, especially in this time pandemic.

Teachers. The result of this study will help them know that pedagogical approach can help improve the students' learning comprehension in mathematics to which problems can be identified and resolved. Students. The result of this study will help them in the learning process, especially in making reports. Students nowadays prefer to use computer-aided instruction to deliver the topic correctly, and any media platform's influence greatly affects their learning process.

Future Researchers. This study will help future researchers who conduct similar research to get some information and ideas that can improve their research.

Definition of Terms

Some of the terms used in this study are herein defined to convey the meaning intended by the researchers and establish a common frame of preference.

Pedagogical Approach. The broad principles and methods of education used in teaching practice (Lockyer, L. 2008). This study represents students' perception of online discussion learning, motivation and enjoyment, and instructor role.

Learning Comprehension. A complex cognitive process involving the intentional interaction between reader and text to extract meaning (Femino, G. & Letendre, C. 2008). This study represents effortful math, practical math, persistence, confidence, understanding math concepts, word problems, and non-prescription math.

CHAPTER 2

REVIEW OF RELATED LITERATURE

This section presents the different concepts and ideas of the other authors and institutions relevant to the studies.

Teacher's Pedagogical Approach

The teachers encouraged to apply various pedagogical approaches because it was proven that this has bigger impact on the students. Selecting from approaches that range from thinking strategies to integration of technology in an effective manner is an important aspect that needs to be recognized. The use of consistent approaches and strategies ensures the students can effortlessly move from one lesson to another, one instructor to another instructor and from one academic year to another. The students and the instructors need to possess the required confidence in the implementation of job duties in an efficacious manner (Pedagogical Approaches, 2014).

In Dabaad sub-region, Garissa District, the teacher used suitable teaching strategy which is encouraging strategy. The strategy decided to apply in the students of mathematics. It created impact to the students and later on accomplishes a mathematical problem (Shavelson; McDonwell, and Oakes 1987).

The same study was also conducted by Muema, J.S. & Mulwa, D. & Mailu, S. (2018), another teaching strategies was also apply in the student and it create positive relationship towards the students. The students' achievement

in mathematics and ICT clearly stated that techniques used were complementing the learning comprehension of the students.

However, according to Center for Development Studies, (2010) the teacher-centered approach shows ineffective academic learning, which not contributes to the skill development in their school years, such as critical thinking and problem solving when it comes to learning mathematics. Teachers' pedagogical competence affects the student's learning performance and has factors such as language skills, socioeconomic status, financial resources, and the volume of students in specified classrooms. (Liakopoulou,2011).

The same study was also conducted by Tebabal and Kahssay (2011), the instructors utilize the proper strategy and teaching method that best suits the student and suit the destinations and wanted results. The vast majority of the conventional strategies were instructor- focused with no movement for the students making them detached. Along these lines acquiring information from the educator without building their commitment level with the topic, the methodology is least applicable, more hypothetical, and remembering

Students' Perception of Learning from Online Discussion the instructive foundations in influenced regions are looking for stop-gap solutions to keep educating; however, note that the learning quality relies upon digital access and effectiveness. The internet gaining climate shifts significantly from the conventional study hall circumstance regarding students' inspiration, fulfillment, and interaction (Bignoux & Sund 2018).

Online discussion meetings set an environment developing a sense of community and engaging students in collaborative discussions, making them meaningful learning activities. The main benefit of such activities for students is

creating new knowledge and sharing it with peers. Online discussions open up a new perspective on students' writing skills and expose them to a range of alternative viewpoints. Students' attitudes and expectations in such type of online collaboration were analyzed to present students' perception of learning in the online discussion environment. It indicates certain benefits and positive overall perception though some problems were identified and potential solutions were highlighted (Krasnova T. & Ananjev A. 2015).

Mbati (2013) considers online conversations an incredible persuading apparatus both for understudies and instructors. Understudies need another new methodology that will make their learning interaction seriously engaging. In this regard, online conversations offer new thrilling freedoms being a rousing asset.

Lapadat (2002) believes that online conversations improve basic deduction as they are composed and significantly further upgrade the higher request thinking processes. Cook (2008) additionally guarantees that online discussions can create abilities associated with basic reasoning. They can assist understudies with thinking about elective perspectives, foster new experiences, draw upheld ends and fabricate contentions by giving text-based or narrative proof.

Online Discussion Motivation and Enjoyment the discoveries show that students' inspiration has a critical relationship with their support in online conversation exercises at times two and three. Understudies' apparent interaction, self-sufficiency, skill, and relatedness affect their online conversation conduct. The inspiration for taking part in online conversations was self-announced multiple times all through the semester. This conversation

additionally found that understudies' characteristic inspiration and their apparent worth of online conversations stayed at a moderate-undeniable level after some time, although the evident worth had a critical drop from the mid-highlight the finish of the semester (Yang Q. 2014)

online learning are incorporated in inherent. It examines the full of feelings and social issues in web-based learning conditions. It points out the significance of understanding students' inspiration in taking an interest in online conversations. Also, in offbeat learning, members access course materials deftly on their timetables. Understudies are not needed to be together simultaneously. Mail correspondence, the most seasoned type of distance schooling, is an asynchronous conveyance innovation, as are message board gatherings, email, video and sound accounts, print materials, voice messages, and fax. As noted before, demeanor toward the class and trust in innovation abilities is identified with investment in online conversations (Keller, J. M. 2008).

The instructive distance expansion in correspondence, especially correspondence among students and their colleagues, is an improvement that has been made to give distance schooling students however many of the changes as could be allowed as they would get in a face to face training (Paavola, S., Lipponen, L., & Hakkaraine, K. 2002 & Palmer, S., Holt, D., & Bray, S. 2008 & Reeve, J. 2005). Intrinsic inspiration arises precipitously from interior propensities and can propel conduct even without the guide of intrinsic rewards or ecological controls. Inspiration alludes to the motivator or energy that drives a person to make a move (Siemens, G. 2009).

Instructor's role customarily, the part of an educator, was as a homeroom director answerable for student's scholarly presentation. Less

consideration has been paid to the teacher's jobs in making learning encounters or how they when all is said and done, foster new showing styles than that which has been given to the student's instructive practice or the learning subject. Entirely introduced in online e-learning, low maintenance has consistently been a significant issue, yet the reception of free learning (Berge, Z.L.; Huang, Y.P 2004) shows the worked on yield of standards for dependability and improved accomplishment in assessments.

Comparative exploration shows that the educator's dynamic scholarly contribution will, in general, expand student interest and ability to accomplish and self-improve (Midgley, C.; Feldlaufer, H.; Eccles, J.S. 1989). Subsequently, the educator association in scholarly observing diminishes understudy dropout rates, and at last, is certainly identified with the student scholastic accomplishment. Given this, we expect that the educator as a facilitator in the unbending substance characteristics—the framework and the substance— and simultaneously, a supervisor of the adaptable substance characteristics— test and movement—is engaged with the learning conditions and student fulfillment.

Learning Comprehension

Learning Comprehension is principal to academic success, however indeed students who are great decoders may not have the abilities they ought to make the foremost of what they're reading. Learning comprehension does not fair happen; it is the result of a complex set of abilities that can and must be intentioned instructed. A key to progressing comprehension is instructing students to screen and reexamine their understanding of content. This includes learning how rapidly to advance through fabric, counting when to halt and re-

read confusing or basic sections. In addition, knowing how and when to apply the taking after comprehension techniques will improve comprehension (Knapp S. 2021).

In the study of Akbaşı, S. et al (2016), the learning comprehension has affecting the success of the students. It indicates that learning comprehension contributes positively or negatively to the accomplishment in the mathematics and sciences courses. Ahmadi, S. M. (2016), also said that learning comprehension plays a vital role in the study of the students. Moreover, the study shows that learning comprehension skills can be enhance through the assistance of the teachers and appropriate learning materials and activities.

In the study of Gilakjani, A. P., & Sabouri, N. B. (2016), learning comprehension also be found in listening comprehension. In that the listening comprehension strategies was reviewed. The result showed that if the students having a hard time in listening, the learning comprehension of the students were affected. So, listening comprehension of the students is being enhanced and the result is that, the students learning comprehension also increase.

Effortful Math (EM) Math, all things considered in present status-based educational programs. It follows that students whose first language isn't Standard Australian English require delicate instructing and learning and learning systems to comprehend how to impart numerically in study halls. The Language of Math study led in north Queensland clarified that the "basic need to center on language expressly has gotten progressively apparent all through the task with narrative proof announcing that understudies showed that they

might have the essential information and abilities, yet language can be an obstruction to conveying information" (Davidson, 2005, p. 8).

In connection, Sarra, C. (2009) recommends that for Native understudies to succeed, "the enchantment shots are: accepting a positive Native understudy personality; Native initiative in schools and networks; elevated standards for teacher-student connections; and creative, adaptable and responsive staffing and school demonstrating".

Students are bound to partake in Mathematics on the off chance they esteem or are intrigued in the subject. McPhan et al. (2008) announced that understudies' absence of interest and enjoying for arithmetic during their center school training was a significant one of five factors, the others being their: past accomplishment in science; arithmetic self-idea; and, discernments in regards to the convenience and trouble of arithmetic. Of these five components, proof proposes that the first is prevailing (Watt, 2005).

As it likewise includes the limit concerning arranging, what's more, delay gratification, it would help youngsters arrange and utilize systems when adapting to class undertakings just as remembering long haul objectives (Best and Miller, 2010; Eisenberg et al., 2010).

Under this interpretation, better inhibitory capacities have been related to higher scores in youngsters' arithmetic exhibition in preschool and kindergarten (Blair and Razza, 2007) just as in grade school ages (Welsh et al., 2010; Oberle and Schonert-Reichl, 2013).

Useful Math (UM) at a mental level, openness to Mathematics helps foster a scientific brain and aids better association of thoughts and exact articulation of considerations. At a more broad level, far away from managing

the higher numerical ideas, the significance of science for a typical man supported. An average person is, as a rule, progressively subject to the utilization of science and innovation in the everyday exercises of life; the job of math has without a doubt been reclassified. Mathematics is around us (Alabi I. 2012).

Moreover, According to Alabi 2012, Realizing math can be specifically fulfilling and engaging. The underpinnings of regular daily existence are progressively numerical and innovative. For example, making buying choices, picking protection or wellbeing plans, and casting a ballot proficiently all call for quantitative refinement.

Man is a social creature, and human existence relies on the co-activity of one another. Gathering work helps social abilities. The capacity to cooperate on errands with others can construct different social skills. To carry on with a public activity, numerical information is required; in light of the give and take interaction, business and industry rely on the information on mathematics. The change in the social design concerning the cutting edge offices like a method of transport, method for correspondence, and progress in the field of mathematics and innovation is because of arithmetic, as it were. In this manner, arithmetic has assumed a significant part in not just understanding the advancement of society yet additionally fostering the general public (Alabi, 2012).

Persistence Mathematics (PM) according to Common Core Initiative (2010), the standards in mathematics support the importance of persistence to mathematical problem solving, calling it a 21st-century skill.

It's anything but an assessment of the outcomes. Critical thinking is one of the Normal Center State Guidelines in Math (Common Core Initiative, 2010). As Schoenfeld (1992) illustrated, advance, critical thinking requires critical thinking openings that require diligence all through the undertaking. Merriam-Webster dictionary (2014) characterizes diligence as the quality that permits somebody to continue accomplishing something regardless of whether it is troublesome. The Common Core Initiative (2010) idea features the significance of advancing steadiness during critical thinking in math.

Even though non-intellectual components, like perseverance, are significant in the new Common Core standard, up to this point, little has been thought about how to quantify such abilities. Such examination is significant towards seeing how to precisely quantify ingenuity since ingenuity is needed by understudies on the off chance that they are to be school and profession prepared (Common Core Initiative, 2010) and research in the field (US Department of Education, 2013), has shown the significance in understudies to make them 'school and profession prepared.'

The last component is procedures and strategies utilized during the errand. The US Department of Education (2013) found that understudies are bound to drive forward inside an assignment if they can explicitly draw on a specific procedure/strategy during the errand to help them self-manage all through the assignment. These methodologies can be explicitly attached to the substance (i.e., realistic coordinator for composing tasks, utilization of manipulative to urge understudies to play with mathematical ideas, etc.) or wider to deal with the errand (plan for dealing with the undertaking, accomplice work, etc.). It ought to be noticed that each of the three of the components noted

by the US Department of Education (2013) could be educated/created by educators in the plan/execution of exercises consistently.

Math Confidence students in the 18-22-year-old reach were less positive about addressing mathematical questions than others. Understudies who had retaken a mathematical course were less certain than the individuals who had not. Chemistry students were less positive about taking care of mathematical questions than those in physical science courses. Chemistry II understudies were less certain than those in Mathematics I and Administrators of Mathematics. Understudies were least positive about addressing logarithms and the most positive about taking care of polynomial math issues. In general, understudies felt that their mathematical courses didn't set them up for the numerical questions experienced in science courses. There was no huge contrast in certainty between understudies who had finished their numerical schoolwork on the web and the individuals who had completed their schoolwork on paper.

The researchers suggest that science instructors discover consolidating more science in their courses, particularly logarithms and slant. Moreover, math teachers should consolidate more science-related applications to math class. Results of speculations testing, ends, conversations and suggestions for future examination are incorporated (Quinn, 2013)

According to Khun-Inkeeree 2017, the outcome tracked down that helpful learning by STAD procedure working on students' self-confidence in mathematic class. The student's investigations in a little gathering need to communicate with one another in the gathering. Every part has their task to carry out in the gathering to work on their social cooperation.

Shaikh (2013) affirmed that students' mathematic certainty presumably gained from their folks or primary teachers who likewise felt clumsy when working with numbers. This is concurred by Das, Das, and Kashyap (2016) referenced that guardians and schools are dealing with the issue as far as the presentation of students in mathematics as it thought-about low.

On the off chance that the student's self-confidence towards mathematics is low, it makes it hard for the student; they will think that it's exhausting and not fascinating that may influence their mathematic execution. In this way, the uplifting outlooks among understudies towards math will further develop understudies' results that affirmed by Akinbobola (2009); Brookstein, Hegedus, Dalton, Moniz, and Tapper(2014); Mata, Monteiro, and Peixoto (2012); Tran (2014) have been directed on the connection between mentality, accomplishments, and execution of understudies in mathematic., the connection between these factors is critical.

Understand math concept Reisa (2010) tracked down that the accomplishment of instructing with GeoGebra is higher contrasted and that of customary educating. Normally, another justification tends to be credited to Gardner's theory of Multiple Intelligence. There are 8 different types of intelligence in the theory of multiple intelligences, and Gardner expresses that a person was brought into the world with this load of kinds of insights, yet some are prevailing. Beginning this investigation, with the utilization of GeoGebra, more insights of understudies are expected to be reached; in this manner, the achievement is to be higher.

Additionally, as per Edgar Dale's Cone of Experience, we recall 30% of what we hear yet recollect 80% of what we see, hear and utter. The

consequences of our application for sure show precisely this. With GeoGebra, students are more associated with the interaction, and more receptors are spoken to; in this way, the higher achievement was accomplished. Along these lines, we can say, Making more utilization of GeoGebra in Math educating will be a significant factor in a successful mathematical education and perpetual learning." In this manner, we help understudies learn, not to remember that is the genuine point of instruction (Reisa, 2010). By embedding photographs into GeoGebra and afterward "crunching the numbers," understudies truly learn by utilizing more detects.

Students have regularly seen mathematics as a troublesome subject (Brown et al., 2008). Math is conceptual and coherent, and numerous concepts in mathematics can't be clarified effectively as far as actual portrayals or identified with consistent life. It is conceivable that arithmetic can add to the overall advancement of every understudy by offering understanding which will empower them to develop socially in the feeling of being capable add to society all the more viably and having the option to sort out organization all the more adequately. Be that as it may, math is regularly depicted as being theoretical and unrelated to life.

Word Problem (WP) Mathematical problem solving includes various psychological cycles that require understudies to grasp and incorporate the issue data, create and keep up with mental pictures of the issue, foster a practical arrangement way, just as compute an answer (Krawec, Huang, Montague, Kressler, and Melia de Alba, 2013; Montague, Enders, and Dietz, 2011)

Wan, J., Wang, D., Hoi, S. C. H., Wu, P., Zhu, J., Zhang, Y., & Li, J. (2014) study uncovered that rudimentary understudies with MD followed the conventional model of the numerical word critical thinking stages, yet had lacked in the capacity to utilize viable systems to work with numerical word critical thinking.

According to Zhu 2015, showed that students at all capacity levels (aside from successful students) in the treatment bunch outflanked their partners in the correlation bunch altogether; the mediation impact was more grounded for students with math inabilities just than for those with both arithmetic and understanding inabilities. The current investigation shows that CSI is a logically and educationally fitting model that can develop numerical word critical thinking further.

Non-prescription math (NPM) Chinese instructors have been scrutinized as not giving a learning climate that is helpful for "acceptable learning" and utilizing a showing technique which is only "aloof transmission" and "repetition boring" (Gu, Huang, and Marton, 2004). One viewpoint of the analysis is that repetition learning prompts helpless learning results. The proof recommends, nonetheless, that Chinese understudies reliably beat their Western partners in numerous global relative investigations of arithmetic accomplishment like TIMSS (Mullis, Martin, and Foy, 2008) and PISA (OECD, 2010).

Marton, Wen, and Wong (2005) make the undeniable point that the probability of having the option to review something is higher if the students hear or see something a few times than if they don't.

Lo and Marton (2012) bring up that to see or experience an idea with a specific goal in mind requires the student to know about specific highlights, which are basic to the proposed method of seeing this idea. There will be various basic highlights with random subjects that should be recognized if the idea is observed. Similarly, Leung (2003) brings up that insight comes about when highlights of the idea are being engaged and briefly outlined from the entirety. Accordingly, the focal thought of educating with variety is to feature the fundamental highlights of the ideas through fluctuating the insignificant highlights (Gu, Huang, and Marton, 2004).

CHAPTER 3

METHOD

This chapter discussed the method of research used, locale of the study, the respondents of the study, the instrument used, validation of the instrument, the administration of the device, and the statistical treatment for the data that had been collected.

Research Design

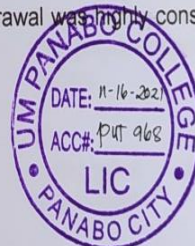
The research design used quantitative non-experimental correlation techniques to investigate the relationship between teacher's pedagogical approach and learning comprehension in mathematics. This was allied with a checklist questionnaire designed to focus on the answers where the researchers lead to the results they are looking for.

Quantitative research gives significance to the data it collects by revealing objectivity. Quantitative analysis uses inquiry tactics like experiments and surveys to collect data on preset instruments that provide statistical data. Quantitative research findings can be predictive, explanatory, and confirming (Creswell, 2003).

It is non-experimental correlation research because this research design does not involve manipulating the participants' situations, circumstances, or experiences. The correlation method is intended to investigate between variables. Investigators use it to describe and measure the degree of relationship between two or more variables or sets of scores (Creswell, J.W. (2008)

Research Subjects

In the selection of our key respondents, the researchers used a random sampling technique. The respondents were the grade 12 senior high school students of UM Panabo College 2020-2021. The population is too large to cater, and it shows the total population of Grade 12 Senior High School students of UM Panabo College were 196 grade 12 students, which has the sample size of 143 grade 12 students, to which 37 were male 106 were female. The respondents were students with enough learning experiences and have gone through various transitions and adjustments in learning. Thus, the respondents have experienced being apprehensive, uneasy, worried, and anxious. They answered the checklist that the researchers send to them. The answers of the respondents were the first step for the solution of this study. Respondent's withdrawal was highly considered if feel uncomfortable with the study conducted.



Research Instrument

The research instrument used in gathering the data was a standardized questionnaire that consists of 20 items for teacher's pedagogical approach by Hilt (2004), eleven items for the first indicator: students' perception of learning from online discussion, and eight items for online discussion motivation and Enjoyment, one item for instructor role. The dependent variable, learning comprehension in mathematics by Kloosterman and Stage (1992), has 25 articles: seven items for the indicator effortful math, six items for the hand of a practical math, two items for the indicator math persistence, three items for the indicator math confidence, three items for the indicator understand a math

concept, two items for the word problem and two items for the indicator nonprescription math. The panel members validate questionnaires. It was used to have validity, reliability, and objectivity.

This scale was used to determine the teacher's pedagogical approach level among grade 12 senior high school students.

Range of Means	Description	Interpretation
4.21 – 5.00	Very High	The teacher's pedagogical approach is most evident.
3.41 – 4.20	High	The teacher's pedagogical approach is more evident.
2.61 – 3.40	Moderate	The teacher's pedagogical approach is evident.
1.81 – 2.60	Low	The teacher's pedagogical approach less evident.
1.00 – 1.80	Very Low	The teacher's pedagogical approach not evident.

This scale was used to determine the level of students' learning comprehension in Mathematics among grade 12 senior high school students.

Range of Means	Description	Interpretation
4.21 – 5.00	Very High	When the student's learning comprehension in mathematics is most evident.
3.41 – 4.20	High	When the student's learning comprehension in mathematics is more evident

2.61 – 3.40	Moderate	When the student's learning comprehension in mathematics evident.
1.81 – 2.60	Low	When the student's learning comprehension in mathematics is less evident.
1.00 – 1.80	Very Low	When the student's learning comprehension in mathematics is not evident.

Data Gathering Processes

The following were the steps in gathering the data of this study:

Permission to conduct. The researchers had sent a letter to the SHS principal asking authorization and approval to complete the survey and administer the survey questionnaire to the grade 12 students.

Administration of questionnaire. Amidst the pandemic situation, the researchers used the Google form format in conducting the study since this platform is one of the safest ways to conduct the research.

Retrieval of the questionnaire. All the questionnaires were retrieved through Google form when the respondents finish answering the survey questionnaire.

Analyzed the data. The researchers had examined, analyzed, and reviewed the data to form findings or conclusions.

Statistical Treatment of Data

The gathered data were analyzed and interpreted using appropriate statistical treatments as follows:

Mean. This was used to measure the teacher's pedagogical approach and learning comprehension in mathematics among grade 12 senior high school students in UM Panabo College.

Pearson-r. This was used to determine the relationship between the teacher's pedagogical approach and learning comprehension in mathematics among grade 12 senior high school students in UM Panabo College.

CHAPTER 4

PRESENTATION, ANALYSIS AND INTERPRETATION OF FINDINGS

This chapter presents the analysis according to the questions in the statement of the problem. They are presented in tabular and as well as textual form with a description of the result.

Level of Teacher's Pedagogical Approach of Grade 12 SHS in UM Panabo

Table 1 presents the results of the level of teacher's pedagogical approach attaining the grand mean of 3.82 with the descriptive equivalent of more evident. Instructors role got the highest overall mean of 4.17, students' perception of learning from online discussion got overall mean of 3.80, online discussion motivation and enjoyment got overall mean of 3.50 all the three indicators were interpreted that the teacher's pedagogical approach is more evident.

Shown in Table 1 is the result on the level of teacher's pedagogical approach which is the students' perception of learning from online discussion. It was supported by the item no. 3 *improve generalization skills* which has the highest mean of 4.18 with a descriptive level of high, which means the teachers' pedagogical approach is more evident. This was followed by item no. 1 *learn great deal from peers* where it has a mean of 4.17 with descriptive equivalent of high, which means the teacher's pedagogical approach is more evident. While item no. 10 *most peers' comments are not very valuable* got

TABLE 1: Teacher's Pedagogical Approach

Students' Perception of Learning from Online Discussion	Mean	Descriptive Equivalent
1. Learn great deal from peers	4.17	High
2. Improve integration skills	4.16	High
3. Improve generalization skills	4.18	High
4. Learning quality is improved by online discussion	3.67	High
5. Improve communication skills	3.78	High
6. Online discussion provides useful social interaction	3.68	High
7. A great chance to share opinions among peers and instructor.	3.78	High
8. Broaden my knowledge	3.79	High
9. Online discussion is useful to my learning	3.69	High
10. Most peers' comments are not very valuable	3.36	Moderate
11. Online discussion decreases my learning quality	3.52	High
OVERALL	3.80	High
Online Discussion Motivation and Enjoyment		
1. Motivated to learn more	3.82	High
2. More interested in the subject	3.55	High
3. Motivated to do best work	3.82	High
4. Learning interest is improved by online discussion	3.48	High
5. Enjoyed online discussion more	3.45	High
6. Enjoyed sharing knowledge with peers	3.69	High
7. Liked online discussion	3.34	High
8. Online discussion wastes my time	2.87	Moderate
OVERALL	3.50	High
Instructors Role		
1. Instructor plays a critical role to motivate effective online discussion	4.17	High
GRAND MEAN	3.82	High

Legend:

Scale	Descriptive Equivalent
4.21-5.00	Very High
3.41-4.20	High
2.61-3.40	Moderate
1.81-2.60	Low
1-1.80	Very Low

the lowest mean of 3.36 with a descriptive level of moderate, which means teacher's pedagogical approach is evident. The remaining item no. 2 got the mean of 4.16, item no. 8 got the mean of 3.79, items no. 5 and item no. 7 both got the mean of 3.78, item no. 9 got the mean of 3.69, item no. 6 got the mean of 3.68, item no. got the mean of 3.67, item no. 11 got the mean of 3.52, which all has a descriptive level of high. This implies that teacher's pedagogical approach is more evident.

The second indicator in which is of online discussion motivation and enjoyment got the overall mean of 3.50 with descriptive equivalent of high. Item no. 1 *motivated to learn more* and item no. 3 *motivated to do best work* both got the highest mean of 3.82 with a descriptive level of high, which means teacher's pedagogical approach is more evident. it was followed by the item no. 6 *enjoyed sharing knowledge with peers* got the mean of 3.69 with a descriptive level of high, which means teacher's pedagogical approach is more evident. While for the item no. 8 *online discussion wastes my time* got the lowest mean of 2.87 with descriptive level of moderate, which interpreted that the teacher's pedagogical approach is evident. the remaining item no. 2 got the mean of 3.55, item no. 4 got the mean of 3.48, items no. 5 got the mean of 3.45, item no. 7 got the mean of 3.34, which all has a descriptive level of high. This implies that teacher's pedagogical approach is more evident.

The third indicator in which is of instructor role got the overall mean of 4.17 with descriptive equivalent of high. The Item no. 1 *instructor plays a critical role to motivate effective online discussion* got the mean of 4.17 with a descriptive level of high. This implies that teacher's pedagogical approach is more evident.

Level of Learning Comprehension in Mathematics of Grade 12 SHS in UM Panabo

Table 2 presents the results of the level of learning comprehension in mathematics attaining the grand mean of 3.93 with the descriptive equivalent of high. The first indicator in which is effortful math got the overall mean of 4.05 with descriptive equivalent of high. Item no. 5 *try hard can get smarter in math* and item no. 6 *hardwork can increase ability to do math* both got the highest mean of 4.17 with a descriptive level of high, which means that learning comprehension in mathematics is more evident. It was followed by the item no. 3 *getting smarter in math* got the mean of 4.16 with a descriptive level of high, which means learning comprehension in mathematics is more evident. However, item no. 7 *can do hard math problem, just hang in there* got the lowest mean of 3.68 with a descriptive level of high, which means learning comprehension in mathematics is more evident. The remaining item no. 2 got the mean of 4.09, item no. 4 got the mean of 4.08, item no. 1 got the mean of 4.01, which all has a descriptive level of high. This implies that learning comprehension in mathematics is more evident.

The second indicator in which is useful math got the overall mean of 4.02 with descriptive equivalent of high. Item no. 1 *mathematics is a worthwhile and necessary subject* got the highest mean of 4.15 with a descriptive level of high, which means learning comprehension in mathematics is more evident. This was followed by the item no. 3 *studying mathematics is not waste of time* got the mean of 4.03 with a descriptive level

TABLE 2: Learning Comprehension in Mathematics

Effortful Math	Mean	Descriptive Equivalent
	4.01	High
1. Ability in math increases when studies hard.		
2. By trying hard, one can become smarter in math.	4.09	High
3. Getting Smarter in math	4.16	High
4. Working can improve ability in mathematics.	4.08	High
5. Try hard can get smarter in math.	4.17	High
6. Hard work can increase ability to do math.	4.17	High
7. Can do hard math problem, just hang in there.	3.68	High
Over-all Result	4.05	High
Useful Math		
1. Mathematics is a worthwhile and necessary subject.	4.15	High
2. Studied mathematics because I know how useful it is.	3.99	High
3. Studying mathematics is not waste of time.	4.03	High
4. Mathematics has relevance to life.	3.99	High
5. Mathematics is important in my life's woks	3.94	High
6. Knowing mathematics will help me earn a living.	4.02	High
Over-all Result	4.02	High
Math Persistence		
1. Can do math problem in a few minutes, I can do it all	3.51	High
2. Can solve a math problem quickly, just keep on trying.	3.73	High
Over-all Result	3.62	High
Math Confidence		
1. Can do math problems that take long time to complete.	3.28	High
2. Math problems that take long time don't bother.	3.76	High
3. Good at solving math problems	3.42	High
Over-all Result	3.59	High
Understand Math Concept		
1. It's important to understand why a mathematical procedure works as long as it gives a correct answer.	4.01	High
2. Understanding why the answer works is more important than getting the right answer	4.08	High

3. Understand math problems, then it matters most to get the right answer	4.06	High
Over-all Result	4.05	High
Word Problem		
1. Word problems are important part of mathematics.	4.08	High
2. Emphasize word problems.	3.87	High
Over-all Result	3.98	High
Non-prescription Math		
1. Word problem can be solved if you know the right steps to follow.	4.21	Very High
2. Word problem can be solved by using the correct step-by-step procedure.	4.24	Very High
Over-all Result	4.23	Very High
Grand Mean	3.93	High

Legend:

Scale	Descriptive Equivalent
4.21-5.00	Very High
3.41-4.20	High
2.61-3.40	Moderate
1.81-2.60	Low
1-1.80	Very Low

of high, which means learning comprehension in mathematics is more evident. While item no. 5 *mathematics is important in my life's work* got the lowest mean of 3.94 with a descriptive level of high, which means learning comprehension in mathematics is more evident. All the remaining item no. 6 got the mean of 4.02, item no. 2 and item no. 4 got the mean of 3.99, which all has a descriptive level of high. This implies that learning comprehension in mathematics is more evident.

The third indicator in which is math persistence got the overall mean of 3.62 with descriptive equivalent of high. Item no. 2 *can solve math problem quickly, just keep on trying* got the highest mean of 3.73 with a descriptive level of high, which means learning comprehension mathematics is more evident. While, item no. 1 *can do math problem in a few minutes, can do it* got the lowest mean of 3.51 with a descriptive level of high, which means learning comprehension in mathematics is more evident.

The fourth indicator in which is math confidence got the overall mean of 3.59 with descriptive equivalent of high. Item no. 2 *math problems that take long time don't bother* got the highest mean of 3.76 with a descriptive level of high, which means learning comprehension in mathematics is more evident. This was followed by item no. 3 *good at solving math problems* got the mean of 3.42 with a descriptive level of high, which means learning comprehension in mathematics is more evident. While, item no. 1 *can do math problem that take long time to complete* got the lowest mean of 3.28 with a descriptive level of high, which means learning comprehension in mathematics is more evident.

The fifth indicator in which is understand math concept got the overall mean of 4.05 with descriptive equivalent of high. Item no. 2 *understanding why*

the answer works is more important than getting the right answer got the highest mean of 4.08 with a descriptive level of high, which means learning comprehension in mathematics is more evident. This was followed by item no. 3 *understand math problems, then it matters most to get the right answer* got the mean of 4.06 with a descriptive level of high, which means learning comprehension in mathematics is more evident. While, item no. 1 *it's important to understand why a mathematical procedure works as long as it gives correct answer* got the lowest mean of 4.05 with a descriptive level of high, which means learning comprehension in mathematics is more evident.

The sixth indicator in which is word problem got the overall mean of 3.98 with descriptive equivalent of high. Item no. 1 *word problems are important part of mathematics* got the mean of 4.08 with a descriptive level of high, which means learning comprehension in mathematics is more evident. While, item no. 2 *emphasize word problem* got the lowest mean of 3.98 with a descriptive level of high, which means learning comprehension in mathematics is more evident.

The seventh indicator in which is non-prescription math got the overall mean of 4.23 with descriptive equivalent of very high. Item no. 2 *word problem can be solved by using the correct step-by-step procedure* got the highest mean of 4.24 with a descriptive level of high, which means learning comprehension in mathematics is more evident. While, item no. 1 *word problem can be solved if you know the right steps to follow* got the lowest mean of 4.21 with a descriptive level of high, which means learning comprehension in mathematics is more evident

Significant Relationship between Teacher's Pedagogical Approach and Academic Learning in Mathematics

Table 3 shows the significant relationship between the teacher's pedagogical approach and learning comprehension in Mathematics. The computed r-value is 0.624**, and the p-value is 0.000, which is less than 0.05; thus, the null hypothesis is rejected. This implies a significant relationship between the teacher's pedagogical approach and learning comprehension in Mathematics among grade 12 students in UM Panabo. It stated that the teacher's pedagogical approach does affect the learning comprehension in Mathematics. Therefore, teacher's pedagogical approach and learning comprehension in mathematics has a significant relationship.

This study was anchored in the study of Yuanita, P., Zulnaldi, H., & Zakaria, E. (2018) that using effective teaching strategies can increase learning comprehension in mathematics. Teachers must be encouraged to use pedagogical approaches that complement the mathematical problem solving skills of students. The teaching and learning procedure inside the classroom will determine the effective teaching approach. The efforts of teachers using effective teaching strategies should be doubled in order to increase the learning comprehension in mathematics of students.

Table 3**Significant Relationship between Teacher's Pedagogical Approach and Learning Comprehension in Mathematics****Correlation Coefficient**

	Learning Comprehension in Mathematics
Teacher's Pedagogical Approach	0.624**

P-value (0.000) < 0.05

In addition, having or adding a learning comprehension strategy to a particular math class can help to learn, and the strategy can help students understand more about the topic in mathematics (Walkington, 2018).

CHAPTER 5

SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATION

Presented in this chapter is the summary of findings, conclusion, and recommendation of the study.

Summary of findings

Based on the result formulated from the data collected, the researchers found out the following:

1. The teacher's pedagogical approach among Grade 12 students of UM Panabo College has a grand mean of 3.82, interpreted as teacher's pedagogical approach is more evident.
2. The learning comprehension in Mathematics among Grade 12 students of UM Panabo College has a grand mean of 3.93 interpreted as learning comprehension in mathematics is more evident.
3. The computed r-value of teacher's pedagogical approach and learning comprehension in Mathematics is 0.624 and with a p-value of 0.000, which is less than 0.05. It implies that the null hypothesis is rejected.

Conclusion

The following conclusions are drawn based on the findings of the study:

1. Teacher's pedagogical approach level among Grade 12 Senior High School students of UM Panabo College is high.
2. Learning comprehension in Mathematics among Grade 12 Senior High School students of UM Panabo College is high.

3. There is a significant relationship between teacher's pedagogical approach and learning comprehension in Mathematics among Grade 12 Senior High School students.

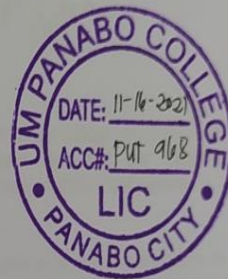
Recommendation

Based on the findings and conclusions of the study, the following recommendations are drawn:

1. The teacher is the primary key to develop the student's love of learning mathematics, helping them to motivate and encourage with positive attitudes. That's why teachers must make learning productive in a way that most of the time must create a connection towards the student, to another student, to teachers, and to the lesson, which is the most valuable.
2. The Mathematics teacher is the catalyst in the active participation of students in math by giving raw problems and employing various activities for a deeper understanding of a certain topic in mathematics. However, the students must appreciate how the teachers try to deliver the topic. The student's job is to perceive Mathematics as a primary component to become successful and constantly aware of how Mathematics plays a critical role in this world.
3. In these moments that many of us suffer in the situations, and connectedness to every individual is necessary, especially in learning. The Mathematics teacher must be considerate to every factor that hinders the developments and approach the students wisely to build ties

ties that, according to the result of this research, will be a big aspect to guide the students upon learning in Mathematics.

4. Future researchers may conduct another study by using another variable that could influence learning comprehension in Mathematics.



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Appendix A

Letter of Permission to Conduct the Study

March 22, 2021

Prof. Joyce B. Hernando
SHS Principal
UM Panabo College

*Approved
3/22/2021*

Dear Ma'am,

The undersigned are third year BSED-MATH students of UM Panabo College who are currently conducting a research entitled "**Teacher's Pedagogical Approach and Learning Comprehension in Mathematics using Asynchronous Learning of SHS in UM Panabo**" as a final requirement of the course.

To this matter, we are humbly asking for your permission to allow us to conduct our study to the Grade 12 SHS students of this institution. We assure you that the data that will be gathered shall be treated with outmost confidentiality.

We highly appreciate your positive response to this matter.

Thank you and God bless.

Respectfully yours,

[Signature]
James S. Galagala

[Signature]
Delfiero G. Ibanez

[Signature]
Fritz Nigao P. Mendoza
Researchers

Noted by:
[Signature]
Celso Tagadiad, Ph.D
Adviser

*HUMSS 1 - Tatimio
HUMSS 2 - Moya
HUMSS 3 - Rapote
ABM 1 - Talaboc
ABM 2 - Centillas*

Appendix B-1 Validation Letter

March 16, 2021

DR. MARIESEL A. LAUREL
UM Panabo College
Panabo City


Dear Ma'am:

We are pleased to inform you that you are chosen as one of our validators on the questionnaire modified and prepared by the undersigned. This will be used for the conduct of our study entitled: **Teacher's Pedagogical Approach and Learning Comprehension in Mathematics using Asynchronous Learning of SHS in UM Panabo: A Quantitative Inquiry.**


To this matter, we would like to request your expertise by way of rating its content, your suggestions and comments will be a great help for the improvement of our research instrument.

We are highly anticipating your kind approval regarding this matter.

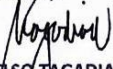
Respectfully yours,


Galang, James S.


Ibañez, Delfiero G.


Mendoza, Fritz Niger P.
Researchers

Noted by:


CELSC TAGADIAD, Ph.D
Adviser

Appendix B-2

Validation Letter

March 16, 2021

DR. AMELIE L. CHICO
Research Coordinator
UM Panabo College
Panabo City

Dear Ma'am:

We are pleased to inform you that you are chosen as one of our validators on the questionnaire duty modified and prepared by the undersigned. This will be used in the conduct of our study entitled: **Teacher's Pedagogical Approach and Learning Comprehension in Mathematics using Asynchronous Learning of SHS in UM Panabo: A Quantitative Inquiry**

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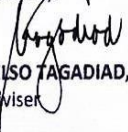
Respectfully yours,


Galang James S.


Ibanez Delviero G.




Mendoza Kritz Niger P.
Researchers

Noted by:


CELISO TAGADIAD, Ph.D
Adviser


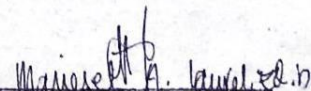
Appendix C-1

Questionnaire Validation Sheet

 UM <small>The University of Mindanao</small>	RESEARCH AND PUBLICATION CENTER <input type="checkbox"/> Main <input type="checkbox"/> Branch _____ QUESTIONNAIRE VALIDATION SHEET																																																
<p>Title of Research: <u>Teacher's Pedagogical Approach and Learning Comprehension</u> Proponents : <u>James Galagala, Delfino Ibanez and Fritz Nigir Mendoza</u></p> <p>To the Evaluator: Please check the appropriate box for your ratings.</p> <p style="text-align: center;">Point Equivalent: 5 – Excellent 2 – Fair 4 – Very Good 1 – Poor 3 – Good</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 70%;"></th> <th style="width: 5%;">5</th> <th style="width: 5%;">4</th> <th style="width: 5%;">3</th> <th style="width: 5%;">2</th> <th style="width: 5%;">1</th> </tr> </thead> <tbody> <tr> <td> 1. CLARITY OF DIRECTION AND ITEMS The vocabulary level, language structure and conceptual level of the questions suit the level of respondents. The test directions and items are written in clear and understandable manner. </td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> 2. PRESENTATION/ORGANIZATION OF ITEMS The items are presented and organized in logical manner. </td> <td style="text-align: center;">✓</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> 3. SUITABILITY OF ITEMS The items appropriately represent the substance of the research. The questions are designed to determine the conditions, knowledge, perceptions and attitude that are supposed to be measured. </td> <td></td> <td style="text-align: center;">✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td> 4. ADEQUATENESS OF ITEMS PER CATEGORY The items represent the coverage of the research adequately. The number of questions per area category is representative enough of all the questions needed for the research. </td> <td style="text-align: center;">✓</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> 5. ATTAINMENT OF PURPOSE The instrument as a whole fulfills the objectives for which it was constructed. </td> <td></td> <td style="text-align: center;">✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td> 6. OBJECTIVITY Each item questions require only one specific answer or measures only one behavior and no aspect of the questionnaire suggest bias on the part of the researcher. </td> <td style="text-align: center;">✓</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> 7. SCALE AND EVALUATION RATINGS SYSTEM The scale adapted is appropriate for the items. </td> <td style="text-align: center;">✓</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <div style="text-align: right; margin-top: 10px;">  AMELIE L. CHICO, DM, FRM _____ Signature Above Printed Name </div>			5	4	3	2	1	1. CLARITY OF DIRECTION AND ITEMS The vocabulary level, language structure and conceptual level of the questions suit the level of respondents. The test directions and items are written in clear and understandable manner.						2. PRESENTATION/ORGANIZATION OF ITEMS The items are presented and organized in logical manner.	✓					3. SUITABILITY OF ITEMS The items appropriately represent the substance of the research. The questions are designed to determine the conditions, knowledge, perceptions and attitude that are supposed to be measured.		✓				4. ADEQUATENESS OF ITEMS PER CATEGORY The items represent the coverage of the research adequately. The number of questions per area category is representative enough of all the questions needed for the research.	✓					5. ATTAINMENT OF PURPOSE The instrument as a whole fulfills the objectives for which it was constructed.		✓				6. OBJECTIVITY Each item questions require only one specific answer or measures only one behavior and no aspect of the questionnaire suggest bias on the part of the researcher.	✓					7. SCALE AND EVALUATION RATINGS SYSTEM The scale adapted is appropriate for the items.	✓				
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Appendix C-2

Questionnaire Validation Sheet

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Appendix D

Questionnaire on Teacher's Pedagogical Approach and Learning Comprehension in Mathematics

A Survey Questionnaire:

Research-Adopted Questionnaire from the study of Hilt (2004) and Kloosterman and Stage (1992) on Teacher's Pedagogical Approach and Learning Comprehension in Mathematics.

NAME: _____ Strand: _____ Gender: _____

(Optional)

I. Teacher's Pedagogical Approach

Direction: Please Check (✓) and rate yourself honestly based on what you actually do, given the statements using the following scale:

(5) Strongly Agree (4) Agree (3) Moderately Agree

(2) Disagree (1) Strongly Disagree

Item No.	Item	5	4	3	2	1
	Students' Perception of Learning from Online Discussion					
1	Learn great deal from peers					
2	Improve integration skills					
3	Improve generalization skills					
4	Learning quality is improved by online discussion					
5	Improve communication skills					
6	Online discussion provides useful social interaction					

7	A great chance to share opinions among peers and instructor.					
8	Broaden my knowledge					
9	Online discussion is useful to my learning					
10	Most peers' comments are not very valuable					
11	Online discussion decreases my learning quality					
	Online Discussion Motivation and Enjoyment					
1	It motivation me to learn more					
2	More interested in the subject					
3	It motivate me to do best work					
4	My learning interest is improved by online discussion					
5	I enjoy online discussion more					
6	I enjoy sharing knowledge with peers					
7	I like online discussion					
8	Online discussion wastes my time					
	Instructor Role					
1	Instructor plays a critical role to motivate effective online discussion					

II. Learning Comprehension in Mathematics

	Questionnaire Item	5	4	3	2	1
	Effortful math (EM)					
1	Ability in math increases when one studies hard.					
2	By trying hard, one can become smarter in math.					
3	I can get smarter in math if I try hard					
4	Working can improve one's ability in mathematics.					
5	I can get smarter in math if I try hard.					
6	Hard work can increase one's ability to do math.					
7	I find I can do hard math problem if I just hang in there.					
	Useful math (UM)					
1	Mathematics is a worthwhile and necessary subject.					
2	I study mathematics because I know how useful it is.					
3	Studying mathematics is not a waste of time.					
4	Mathematics has relevance to my life.					
5	Mathematics will be important to me in my life's woks.					
6	Knowing mathematics will help me earn a living.					
	Math persistence (MP)					
1	If I can do math problem in a few minutes, I can't do it all.					
2	If I can solve a math problem quickly, I quit trying.					
	Math confidence (MC)					

1	I feel I can do math problems that take long time to complete.					
2	Math problems that take long time don't bother me.					
3	I'm very good at solving math problems that take a while to figure out.					
Understand math concept (UMC)						
1	It's important to understand why a mathematical procedure works as long as it gives a correct answer.					
2	Understanding why the answer works is more important than getting the right answer.					
3	If you understand math problems, then it matters most to get the right answer.					
Word problem (WP)						
1	Word problems are important part of mathematics.					
2	Math classes should emphasize word problems.					
Non-prescription math (NPM)						
1	Any word problem can be solved if you know the right steps to follow.					
2	Any word problem can be solved by using the correct step-by-step procedure.					

Appendix E

Grammarly Certification

The screenshot shows a Grammarly performance report for a document titled "GALAGALA". The report is displayed in a white box over a blurred background of the document. The report includes the following information:

- Performance:** Text score: 99 out of 100. This score represents the quality of writing in this document. You can increase it by addressing Grammarly's suggestions. (99)
- Word Count:**

Characters	56,346	Reading time	33 min 31 sec
Words	8,381	Speaking time	1 hr 4 min
Sentences	602		
- Readability:** Metrics compared to other Grammarly users. Word length: 5.3 (Above average).

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Appendix F

Grammarly Certificate



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Certificate

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CELSO B. TAGADIAD, Ph.D
Name and Signature of Editor

Plagiarism Result

feedback studio Teachers Pedagogical Approach and Learning Comprehension in Mathematics 18 35 of 57

CHAPTER 1

THE PROBLEM AND ITS SETTINGS

Background of the Study

As what has observed in the past decade there was problems that noticed in the learning of the students. Specifically, the learning in Mathematics, for some place like Thailand in Bangkok, (Phonapichat P., Wongwanich S. & Sujiva S. (2014), based on the result of the national test, most of the students were lacking of skill in understanding and comprehending a mathematical problem solving. It implied that the overall

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