



# NEEDS ASSESSMENT IN MATHEMATICS COMPETENCIES OF GRADE 6 COMPLETERS

Marinette Pacong<sup>1</sup>, Van Kelly Vayson<sup>1</sup>, Hazel Garbo<sup>1</sup>, Jovenil Bacatan<sup>1\*</sup>

<sup>1</sup>UM Penaplata College, Island Garden City of Samal, Davao del Norte, Philippines

\*Corresponding Author, [jovenilbacatan@umindanao.edu.ph](mailto:jovenilbacatan@umindanao.edu.ph)

## KeyWords

needs assessment, Mathematics, completers, descriptive method, curriculum guide, competencies, Philippines

## ABSTRACT

This study used a quantitative research design employing descriptive survey research method. It sought to determine the needs of Grade 6 Completers in Mathematics competencies. The respondents of this study were the 384 Grade 6 completers who are officially enrolled in Nieves Villarica National High School. The statistical tools used in this study were the frequency and percentage. It was indicated in the study the five (5) most learned competencies; and the five (5) least learned competencies which are also the needs of the students. Based on the result, the researchers recommended that the teachers should give more emphasis on teaching the least learned competencies. This study offers pedagogical implications that can benefit especially the students and the Mathematics teachers of every school.

## INTRODUCTION

In Northern California, mathematics is considered to be a major factor in all aspects of modern society with the root of mathematical capability of students in doing classroom activities. But a great concern to an educator, parents and policy maker in the United States is that having an inadequate achievement of American students in terms of mathematics. The progress of students using the Accelerated Math Fluency intervention across grade levels and years at the experimental school was also investigated. These results showed considerable growth in math fact automaticity. Recommendations for further research were made such as using the particular intervention McLean (2015).

In the Philippines, the study of Magayon (2016) stated the phenomenological study of misconceptions of mathematics teachers on differentiated instruction. Since the students differ in many aspects, differentiated instruction has been found to be effective in aiding such differences and at the same time, it helps the students to build favorable attitudes towards the subject, develop their willingness to involve themselves in learning and improved achievement. The teacher's response to the student conception and ability to create challenging learning situations are limited due to misconception of this type of instruction. This case will result the students lack of engagement in the class considering of unclear instructions in the lesson and it must be assess by the teacher.

In Mindanao particularly in the Public High School Mathematics teachers of selected provinces of Lanaodel Sur, Maguindanao and Marawi City in ARMM to provide a comprehensive description of the factors affecting their teaching. The identified factors such as student-related factors, teachers-related factors, administrators-related factors, school support facilities, school curriculum, parent and community attitudes, and socio-cultural setting were used as the baseline information. This will help in identifying the reasons behind the students being incompetent in mathematic (Gumal (2016).

The common observation of some teachers in Island Garden City of Samal, the students have difficulties in understanding mathematics.

There are some students who were not able to meet the competencies in mathematics. This study focuses on the assessment at the beginning of the school year for the grade-7 students to test if they have enough learning to face the next level. It leads the teacher on what are the needs assessments in mathematics competencies of Grade-6 completers.

### Research Questions

The purpose of the study is to determine the needs of assessment for Grade 7 in Mathematics competencies in Grade 6 at Nieves Villarica National High School

1. What are the most learned competencies of Grade-7 students using Grade-6 Math competencies?
2. What are the least learned competencies of Grade 7 students using Grade-6 Math competencies?

### LITERATURE REVIEW

#### Needs Assessment

Mussawy (2009) defined assessment as a systematic process for gathering data. It is also an essential component of teaching. Examining student's perception of assessment approach stimulates students to develop authentic and realistic assessment approach the "rewards real effort and deepness of a learning rather than luck (Dhindsa, Omar and Waldrip, 2007, P 1261) why do we need to assess students and know their level of understanding in terms of Mathematics subject. It is because in assessing children's feelings and attitudes towards Mathematics is a challenging propositions of a methods that collects information from young students about their attitude towards Mathematics and it results to largely negative attitudes and emotions that these negative attitude are well formed by the end of the early years of schooling (Larkin and Jorgensen 2015)

Mathematics plays a big role compare to the other subject in every school level. Learning mathematics is expected that it will affect the performance of the learners in other subject. On the hand, learning mathematics is difficult among all subjects, it needs strong basic knowledge and real understanding for practical situations which can improves the cognitive domain of the learners. It is a common view that mathematics is a difficult subject among the other subject, due to this reasons, at the school level, students follow the right and wrong answer strategy without real understanding. The students are being satisfied without any complains and not even clarifying. Researchers view and prove that there is a strong relationship between present and previous knowledge in mathematics, previous knowledge provides a background understanding about the new topics while the present study was to find error in the present discussion which affects student's mathematics achievements. It was found that students' contribution during the classroom play an important role in the achievements and understanding of mathematical concepts. (Khan At.al, 2011)

Ketterlin-Geller and Yovanoff, 2009 states that diagnostic test will help how to assess some errors. It serves as a guide to assess students in terms of their capability. The results may determine the specific conditions of the students. If the students will be assess in that aspect. Diagnostic test results are increasingly used to design of remedial instruction and placement in supplemental interventional programs. It gives highlights to emerged and utilized of cognitive diagnostic assessments for making instructional programming decisions for students at-risk in failing the domains. The study gives valid diagnostic inferences about student's persistent misunderstandings and cognitive errors and still existing.

Herholdt, & Sapire, (2014) studied about an error analysis which is an error's in learners work with a view to looking for possible explanations or some errors. Correct and incorrect processes and that to leads to have a possible remedy and the fitted strategies those students will have an effective learning through analyzing errors. This paper reports on such an analysis of learner's test deals as a part of evaluation and imposed project that aimed to teach mathematical problem solving skills. Using a coding sheet for each grade, quantitative error analysis was carried out. A reliability coefficient was found for each test, as were items means and discrimination indicates for each item. The analysis provides some insights into common procedural in the learner script. This finding shows similar difficulties across intervention and control schools and highlighted particular areas of difficulty and in order to remediate strategies in mathematics problem.

Rahman, Ahmar (2016) the exploration of mathematics problem solving process is based on the thinking level of the students in junior high school. According to Slavin (2008) there are studies that most of the students are not in the same level of development. From the period that middle childhood spans the time and characterized by the development of logical thought, to the development of the ability to that about abstract concepts. Being delayed of some students experiences in the transition phase that lead in every student's difficulty in solving mathematics problems.

#### Mathematics Competencies

Graf (2009) the study focuses on early development and pilot efforts associated with the Cognitive Based Assessment of, for and as learning (CBAL) which motivated by the evidence-centered design (ECD) approach to assessment developed by Mislevy and colleagues. The study characterizes mathematical competency with respect to both content and process. It also state on how to model mathematical com-

petency at the middle school level, the kinds of evidence that reflect the level of student competency and support future learning, and how to design tasks that elicit the target evidence.

McNaught and Hoyne (2011) expressed that science courses depend on competency in mathematics. Competency in mathematics is inherently associated. The students who enter using "elective section pathway" could be off guard contrasted with the individuals who have contemplated mathematics all through secondary school. What's more, Cert IV and TEP graduates performed equivalently in the arithmetic test contrasted with ATAR those understudies who enter elective section pathway yet the general execution of all student bunches in the mathematics test was well beneath desire.

Hansen, Jordan, and Rodrigues (2017) the examination part improvement from third to review 6, they characterized diverse development classes for portion ideas and strategies, some gathering of the kids gained little ground among third and graded six dimensions. Subjective and math explicit measure anticipated development direction participation. A few students experience issues in learning part examination and equality issue. That is the reason some of evaluation six completer are not ready to meet the skills that should be achieved before they quicken to review seven levels. Schumacher, (2017) describes fraction-calculation errors among fourth grader students and to determine error patterns differed as a fraction of problem type. Addressing mathematics achievement status was related to student's tendency to operate with whole number bias. Core instruction that focused on part-whole understanding versus small group tutoring that focusing magnitude understanding. The study results to small-group tutoring have a higher effective way to teach every student. Students across the sample were more likely to operate with whole number bias on problem unlike to denominators, small group tutoring emphasize magnitude understanding and increases fraction understanding for all students in upper elementary grades. Also, Polozov et al. (2015) expressed that trouble in numerical word issue can be improved by customizing and associating their lives in the word issue. Through this, the students are intrigued by taking care of such word issue and think that it's reasonable by being engaged with the numerical exercises.

Mundia (2017) expressed that the inability to utilize the four math activity, not understanding the connection between units, hundreds, place esteem issues/wrong arrangement of numbers; poor eye-hand coordination when understudies are in the lower years prompts dysgraphia and memory slips. This issue suggested the discoveries incorporate causal components which included math tension. The appraisal of Mathematics learning in essential evaluations needs big help to address the powerless learning of a kid.

Burton et al. (2018) in their study uncovered that in the U.S, to improve the instructing and learning in mathematics in each classroom, they actualized developmental evaluation. Where in having formative assessment makes unequivocal association towards formative evaluation procedures and other instructional structures additionally devices in advancing improved learning in Mathematics. This study offers thoughts that ought to be valuable in mathematics teacher over the globe.

Shim, Shakawi, and Azizan (2017) expressed that to know the fundamental numerical expertise of a student was through an asymptomatic test. This test is a fundamental appraisal for the most part utilized by an instructor to recognize student's shortcoming and quality in learning mathematics. This evaluation allows each teacher to cook their showing styles and substance that fits each essential understudy learning. Thus, the analytic test demonstrates the significance and advantages in instructing and learning of students.

## METHODS

This study utilized the descriptive survey research method. In this study the researchers gathered necessary data to identify the "Needs Assessment for incoming Grade – 7 in Mathematics Competencies in Grade – 6. The study was done by gathering data from the respondents through the questionnaire comes from the division based on Grade – 6 Math curriculum guide of the Nieves Villarica National High School, that served as our main instrument in gathering and collecting the needed data for this study.

The researchers chose the Nieves Villarica National High School students in Grade – 7 as the respondents because it is one of the schools in Island Garden City of Samal that has large scales in terms of population of learners. The respondent consisted of all Grade-7 students with the total of 384 enrollees.

The data gathered from the respondents were the essential information needed in the study in order to come up with a valid and reasonable outcome. To make it possible, researchers carefully planned the research instrument which was used to gather the data from the respondents. The researchers used the adapted test questionnaire taken from the Division Office of the Island Garden City of Samal. This is used to test the students in Grade – 7 of what they've learned in previous level specifically in math and if they meet the learning competencies in Grade – 6. The researchers asked permission from the Principal of Nieves Villarica National High School to conduct the study. After the approval, the test was conducted and the results were tallied, collated, recorded, and analyzed accordingly.

## RESULTS AND DISCUSSION

### Least Learned Competencies

Based on the research conducted, it was found that the least learned competencies of Grade 6 completers are; *Creates problems (with reasonable answers) involving division without or with any of the other operations of decimals, mixed decimals and whole numbers including money.* , *Represents integers on the numbers line.* , *Makes listings and diagrams of outcomes and tells the number of favorable outcomes and chances using these listings and diagrams.* , *Creates problems involving experimental and theoretical probability* and *Creates problems (with reasonable answers) involving addition and/or subtraction of decimals and mixed decimals.* This shows that least learned competencies that were the least learned by the students.

**Table 1**  
*Least Learned Competencies of Grade 7 Students Examination*

Competencies	Item No.	Frequency (N=381)	Percentage
Creates problems (with reasonable answers) involving division without or with any of the other operations of decimals, mixed decimals and whole numbers including money.	40	380	99.74%
Represents integers on the numbers line.	28	376	99.73%
Makes listings and diagrams of outcomes and tells the number of favorable outcomes and chances using these listings and diagrams.	33	362	99.45%
Creates problems involving experimental and theoretical probability.	40	362	99.45%
Creates problems (with reasonable answers) involving addition and/or subtraction of decimals and mixed decimals.	38	377	98.95%

Table 1 shows the least learned competency corresponding to the item number with the highest frequency and percentage in descending order. The first least competency is *Creates problems (with reasonable answers) involving division without or with any of the other operations of decimals, mixed decimals, and whole numbers include money* among 381 students there were 380 students who got wrong that's 99.74% in the item number 40 in a first periodical exam. According to Lortie-Forgues, Tian, Siegler (2015) in hopes of stimulating greater amounts of research on what we believe to be a crucial aspect of numerical development, we devoted this review to analyzing why learning fraction and decimal arithmetic is so difficult. To address this question, we identified seven difficulties that are inherent to fraction arithmetic, decimal arithmetic or both -- their notation, inaccessibility of the magnitudes of operands and answers, opaqueness of procedures, complex relations between rational and whole number arithmetic procedures, complex relations of rational number arithmetic procedures to each other, direction of effects of multiplication and division of numbers from 0-1 being the opposite as with whole numbers, and the large number of distinct procedures involved in rational number arithmetic.

The next least competency is *Represents integers on the numbers line* among 381 students there were 376 students who got wrong that's 99.73% in the item number 28 in the second periodical exam. Lemmo and Maffia 2016 stated that students have difficulties in placing the rational number on the number line. The students are shows to commit mistakes are related both to the management of the rational numbers representations and to the manipulation of the graduate scale of the number line. This study proves that the errors are more frequent when the rational numbers are involved and have a misinterpretation on the number line as a list of ordered number.

The next least competency is *Makes listings and diagrams of outcomes and tells the number of favorable outcomes and chances using these listings and diagrams* among 381 students there were 362 students who got correct that's 99.45% in the item number 33 in fourth periodical exams. According to Diezmann (2005), there is need of instruction to be improved especially in the diagram that can be used to empower students and address their difficulties specifically in this aspect first the diagram-picture distinction, second the ambiguity of diagrams and lastly the dynamic feature of diagrams. This means that because of unclear instruction the students have difficulty in understanding diagrams.

The next least competency is *Creates problems involving experimental and theoretical probability* among 381 students there were 362 who got correct that's 99.45% in the item number 40 in the fourth periodical exam. Novriani and Surya 2017 mentioned that the students have difficulties in solving such problem difficulty in solving mathematical problem in reading questions in text, students are always misinterpretation the given problem, students are having difficulty in understanding the problem and they will just guessing the answer, the

students can't figure out the solution of the problem and can't interpret it in a symbol form. These difficulties are the common problems of the students in learning mathematics problem-solving. This means that students were experiencing difficulties in creating or solving a mathematical problem.

The last least competency is *Creates problems (with reasonable answers) involving addition and subtraction of decimals and mixed decimals* among 381 students there were 377 students who got correct that's 98.95% in the item number 38 in a first periodical exam. Adora (2017) stated that the result of the National Achievement Test in the Division of Northern Samar in Mathematics shows the least learned competencies are *Adding similar fractions in mixed decimal, Subtracting dissimilar fraction and Adding and subtracting of decimal including money* which rate as average mastery. Likewise the result of our study the students also have difficulties in this area where in the least learned competencies are more on problem-solving.

### Most Learned Competencies

Based on the research conducted, it was found that the most learned competencies of Grade 6 completers are; *Solves word problems involving the measurement of surface area. , Calculates speed, distance, and time. , Interprets data presented in a pie graph. , Solves routine and non-routine problems using data presented in a pie graph and identifies the nets of the following space figures: cube, prism, pyramid, cylinder, cone, and sphere using plane figures.* This shows that most learned competences that were achieved by the students.

Table 2 shows the most learned competency corresponding to the item number with the highest frequency and percentage in descending order. The first most learned competency is *Solves word problems involving measurement of surface area* among 369 students there were 361 who got correct that's 97.83% in the item number 40 in the third periodical exam. Wallit (2016) stated that the performance of grade-6 pupils in Buyagan Elementary School is enhanced and improved by the used of Arts in Math (AIM). The students have a better performance in applying this kind of method especially in solving problems in measuring surface area. The pupils find art in doing this mathematical activity by enjoying this kind of method and can stimulate, motivated and sustained pupils interest in math.

The second most learned competency is *Calculates speed, distance, and time* among 369 students there were 353 students who got correct that's 95.66% in the item number 25 in the third periodical exam. Yao et al. (2015) stated that calculating speed through the use of photo acoustic microscope (PAM) has a fast-functioning in terms of solving complex calculation. Trombley, Nave, Lavoie, Hockrein, and Mat-tern (2016) added that there is a way of improving in calculating distance. A system and method for calculating a distance from a horizontal camera. Using the controller of the camera, it is a better way to measure the distance from the target and have a good quality of the result. Wang, Deng, Song, and Tian (2016) stated that measuring time accessibility and spatial characteristics in Beijing the best method to be applied is the comprehensive method where the dual index is combined.

**Table 2**  
*Most Learned Competencies of Grade 7 Students Examination*

Competencies	Item No.	Frequency (N=369)	Percentage
Solves word problems involving measurement of surface area.	40	361	97.83%
Calculates speed, distance, and time.	25	353	95.66%
Interprets data presented in a pie graph.	22	328	90.11%
Solves routine and non-routine problems using data presented in a pie graph.	23	323	88.74%
Identifies the nets of the following space figures: cube, prism, pyramid, cylinder, cone, and sphere using plane figures.	12	288	78.05%

The third most learned competency is *Interprets data presented in a pie graph* among 369 students there were 323 students who got correct that's 88.74% in the item number 22 in fourth periodical exams. According to Adora (2017), the result of the National Achievement Test in the Division of Northern Samar in Mathematics shows that the most learned competencies are *Identifying congruent polygons and Interpreting data presented in a pie graph.* Likewise, the results of our study one of the most learned competency are *Interpret data presented in a pie graph* where the students are good in this area.

The fourth most learned competency is *Solves routine and non-routine problems using data presented in a pie graph* among 369 students there were 323 students who got correct that's 88.74% in the item number 23 in fourth periodical exams. Haydar & Zolkower (2015) stated that the teachers are being engaged in making the non-routine problem solving and a mathematics classroom routine was the activities are included: framing, solving and discussing non-routine mathematical problem and according to the results it is the teachers has no problem in conducting this lesson because the students are good in performing the activities they just need to be more engage and involve in this activity and have more patient to instruct especially in giving the direction.

The last most learned competency is *Identifies the nets of the following space figures: cube, prism, pyramid, cylinder, cone, and sphere using plane figures* among 369 students there were 288 who got correct that's 78.05% in the item number 12 in a third periodical exam. Dogruer (2018) concluded that the students have a good performance in finding definition and properties of prisms, finding the surface area of prisms, finding the surface area of the cylinder and finding the volume of the cylinder through argumentation approach. The students can understand the three-dimensional solids through the support of argumentation with the group and dynamic geometry software. The effective way to learn mathematics is to have collaboration as a whole class by exchanging their ideas and justifying their answers in a wider community.

## Conclusion and Recommendations

The study is entitled "Needs Assessment in Mathematics Competencies of Grade 6 completers". As manifested in the data analysis, it can be concluded that the least learned competencies are the needs of Grade-6 completers and should be addressed of the Grade-7 teachers and the most learned competencies are the easy competency of the Grade -6 completers in Nieves National High School.

Based on the aforementioned findings and conclusions of this study, the following recommendations are offered to the following individuals:

To the Grade 7 teachers as curriculum implementers, the results show that there are needs on the mathematics competencies of the students that should be addressed in order for the students to attain the required competencies as specified in the Curriculum Guide thus the researchers recommend that the teachers should have first a review of the previous topics specifically to the least learned competencies and give more activities before to proceed to the Grade 7 topics.

To the curriculum designers, the researchers recommend having a review competency of the Grade-6 competency before introducing the Grade-7 competencies.

To the test maker, the researchers recommend making not only one item per competencies but to have at least 2-3 items per competency to test if the competency is least or most learned competency and to make it conclusive proof of the result.

For the future researchers, the researchers recommend you to conduct a study to assess not only in mathematics subject but also in another subject of the elementary level. Also, the continuation of this study will provide a wider understanding of the students' needs in all subjects that will benefit the teachers as well as the Program Heads of Education.

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