

# Performance of Freshmen Students in Mathematics in the Modern World

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**Abstract:** *This study used a descriptive method of study. The researcher used a quantitative method to determine the academic performance of freshmen in Mathematics in the Modern World subject. Moreover, the level of learning in the course and the level of practice of the concepts learned as perceived by the students were also determined. 281 purposively selected students were the respondents employed by the researchers. Based on the findings, 38% of freshmen belong to Technology, Vocational, and Livelihood strand and the topics discussed are mathematics in our world, problem-solving and reasoning, and logic. Moreover, 185 or 68.84 students garnered very good performance in the said subject. The level of learning in the course and the level of the concepts learned as perceived by the students were much learned and much practiced. Most problems encountered by are topics discussed were not taken during senior high school, the assignments/homework given is too difficult to accomplish and the examinations/tests given are not consistent with the lessons discussed.*

**Keywords:** Level of Learning and Level of the concept learned

## 1. Introduction

Republic Act No. 10533 is an act enhancing Philippine Basic Education by strengthening its curriculum and increasing the number of years for basic education. As mentioned in this law that in terms of curriculum development, the Department of Education (DepEd) shall formulate the design and details of the enhanced basic education curriculum. It shall work with the Commission of Higher Education (CHED) to craft harmonized basic and tertiary curricula for the global competitiveness of Filipino graduates. To ensure college readiness and to avoid remedial and duplication of basic education subjects, the DepEd shall coordinate with the CHED and the Technical Education and Skills Development Authority (TESDA).

With its full implementation last school year in which the first batch of senior high school graduates are now in its first year in college. The Sorsogon State College is one of the higher education institutes which catered these students who are now taking the new courses in the General Education Curriculum (GEC) which was patterned after the enhanced basic education curriculum. One of the courses in the GEC is the Mathematics in the Modern World which is designed to give a background in the nature of mathematics and mathematics as a tool taught in all programs in college level.

The CMO 20, Series of 2013 of the Commission of Higher Education prescribed that Mathematics in the Modern World includes key concepts of mathematics in our world, mathematical language and symbols, problem solving and reasoning, data management, geometric design, linear programming, the mathematics of finance, apportionment and voting, logic, the mathematics of graphs, and mathematical system.

The researcher is the assigned teacher to handle the course in the initial offering this school year. With the experience of teaching this, it was observed that there is a need to conduct this study in order to find out the performance of the

students with the constraints encountered specifically in the preparation and the limited training hours given to the teachers in handling the course. Similarly, it was observed that the students came from various senior high schools in which the offering of the strands/tracks were limited. So, it was assumed that the needed requisite in taking the course is compromised. It is hoped that with this research the school administrators will identify the needed adjustments in the next offering of this course and hence, address whatever problem will come out based on the results.

Sorsogon State University is mandated to convey quality and accessible education to meet the culture of excellence to develop globally competitive leaders and professionals. Evidently, the institution is now in a midst of changing and molding individuals to conform to the burden of the world. Thus, producing quality graduates is one of the objectives of the College the researchers give considerable awareness to the academic performance of the students most specifically in ICT and BME.

The field of computing and management is very dynamic; its advancement and development had been rapid and its involvement is a continuous process (O'Brien, 2008). To face the challenges of advancement, HEIs recognize the need to be responsive to the current needs of the country. It is essential and important that the country's computing and management capability be continually developed and strengthen to be par globally (CHED Memo Order No. 25, 2015).

## 2. Objectives of the Study

This study aims to determine the performance of the freshmen students in Mathematics in the Modern World (GE 14) at Sorsogon State College – Bulan Campus during the school year 2018-2019. Specifically, it aims to:

- 1) Identify the strand/track taken by the students during Senior High School.
- 2) Identify the topics discussed in the course.

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- 3) Determine the academic performance of the students in the course.
- 4) Determine the level of learning in the course as perceived by the students.
- 5) Determine the level of practice of the concepts learned as perceived by the students.
- 6) Identify the problems encountered by the students.

### 3. Methodology

This portion presented the methods and procedures undertaken in the conduct of this study. It includes the research design, sample, research instrument, and data collection and analysis procedures.

#### Research Design

This study used the descriptive-survey method of research since a questionnaire is devised in gathering the primary data. A documentary analysis will also be utilized to determine the grades of the students in the course which will serve as secondary data. The students who are enrolled in the course will be involved in the study. A survey questionnaire was used as the instrument to gather data. In order to strengthen the study by having other useful data, interviews, and documentary analysis were also used. The data gathered were tabulated and analyzed using appropriate statistical tools namely: frequency count, rank, and mean percentage.

#### Respondents

Table 1 presents the respondents of the study. It includes the cluster and the number of schools where both the teacher and students' respondents belong.

**Table 1: The Respondents**

Course	f	%
BSIT	95	33.81%
BSIS	43	15.30%
BSED	37	13.17%
BSA	29	10.32%
BSACT	3	1.07%
BPA	21	7.47%
BSE	34	12.10%
BTVTEd	19	6.76%
Total	<b>281</b>	<b>100%</b>

The researcher used a sample size of 281 freshmen students from a population of 810 students which purposively selected from the different courses.

#### Research Instrument

There were two sets of research instruments used in this study. The research instrument for the respondents was a survey questionnaire to determine the level of learning in the course and the level of practice of the concepts learned as perceived by the students. A documentary analysis will also be utilized to determine the grades of the students in the course which will serve as secondary data.

#### Data Collection and Procedures

The researcher made a request letter to the registrar for the grades of the freshmen who took the subject which is mathematics and the modern world. The dry-run was used to

revise and validate the survey questionnaire and examined the way how students rated and checked the survey for the students. An interview was also made to know the problems and concerns of the respondents along the data gathering. As the survey questionnaire was finalized, the researchers prepared a letter to the registrar of the school for permission to gather the grades and perceptions of the students in the subject Mathematics and the Modern World.

The researchers personally distributed the final copies of the questionnaire. The data collection was conducted 2<sup>nd</sup> Semester School Year 2018-2019. The checklist was retrieved one to two weeks after they were answered by the respondents. Overall, the retrieval rate of data was hundred percent.

#### Statistical Treatment of Data

The data gathered were analyzed and interpreted using appropriate statistical tools. Frequency count and rank were used to determine the strand, grades, and problems encountered by the respondents. Weighted Mean was also used to determine the level of learning in the course and the level of practice of the concepts learned as perceived by the students.

To determine the level of learning in the course and the level of practice of the concepts learned as perceived by the students. The following scales were used.

#### Level of learning in the course

1.00	-	1.49	- Not Learned
1.50	-	2.49	- Less Learned
2.50	-	3.49	- Learned
3.50	-	4.49	- Much learned
4.5	-	5.00	- Very much learned

#### Level of the practice of the concepts learned

1.00	-	1.49	- Not Practiced
1.50	-	2.49	-Less Practiced
2.50	-	3.49	- Practiced
3.50	-	4.49	- Much Practiced
4.5	-	5.00	-Very Much Practiced

### 4. Results and Discussions

This section present analyzes and interprets the gathered data of the respondents and discussions of results and research problems were also presented. These are also presented by the use of the tables which are sequentially arranged to answer the main problem of the study.

#### 1) The strand/track taken by the students during Senior High School

Table 1 presents the Strand/Tracks taken by the student during Senior High School which technology and vocational have a higher frequency of 107 with 35 percent out of 281. Second, General Academic Strand with 77 frequency and 27 percent. Third, Accountancy Business and Management with a frequency of 59 with a total percentage of 21.

**Table 1:** Strand/Track taken by the students

Strand	f	%
Accountancy, Business and Management (ABM)	59	21%
Science, Technology Engineering and Mathematics (STEM)	12	4%
Humanities and Social Science (HUMMS)	6	2%
Technology, Vocational and Livelihood (TVL)	107	38%
General Academic Strand	77	27%
None	20	7%
Total	281	100%

The results showed that almost half of freshmen belong to Technology, Vocational and Livelihood (TVL), GAS and ABM strands which means Sorsogon State University offered courses appropriate to the students. Sorsogon State University Bulan campus offers a bachelor of information technology, computer science, information system, accountancy, entrepreneurship, and public administration. These courses were selected by the students who found it very hard to focus and maintain higher grades.

These results were supported by the K to 12 curriculum which focuses on information, media and technology skills; learning and innovation skills; effective communications skills; and like and career-saving skills. Senior High School is two years of specialized upper secondary education; students may choose a specialization based on aptitude, interests, and school capacity. The choice of career track will define the content of the subjects a student will take in Grades 11 and 12. Each student in Senior High School can choose among three tracks: Academic; Technical-Vocational-Livelihood; and Sports and Arts. The Academic track includes three strands: Business, Accountancy, and Management (BAM); Humanities, Education, Social Sciences (HESS); and Science, Technology, Engineering, and Mathematics (STEM).

**2) The topics discussed in the course.**

It can be gleaned from the table about the topics being discussed in the entire semester in Mathematics in the Modern World. Mathematics in our World and Problem Solving and Reasoning got the first and second ranks. While Logic and mathematical language and symbols got third and fourth ranks. Meanwhile, the Mathematics of Graphs and Apportionment and Voting got the fifth and sixth ranks.

**Table 2:** Topics discussed in the Course

Topics	f	Rank
Mathematics in our world	279	1
Problem Solving and Reasoning	266	2
Geometric Design	133	8
Linear Programming	94	10
Apportionment and Voting	192	6
Mathematics of Graphs	203	5
Mathematical language and Symbols	228	4
Data Management/ Statistics	170	7
Codes	42	11
Mathematics of Finance	113	9
Logic	244	3

This means that ICT and BME departments focus on Mathematics in our World; Problem Solving and Reasoning; Logic; and Mathematical language and Symbols. Since Information Technology and Business Management are the

courses offered by the school some instructors and professors discussed topics that the students need to focus on. Logic and mathematical language are the primary topics to be taught in ICT and math of investment as well is the focus of the BME.

Mathematics in our World and Problem Solving and Reasoning are in the highest rank because these topics are the introduction of the subjects. It means that all instructors are oblique to discuss all of these. Meaning, they focus on discussing it because it is already fresh from the mind of the instructors and it is very interesting to the part of the students. Relating mathematics to the real world is the best connection that teachers could offer to avoid boredom in class. Mathematics in our

World is a topic that students may travel around the world and argue about the nature of mathematics.

This result was supported by Calpa (2020) that mathematics in our World and Problem solving and Reasoning including mathematical language and symbols were topics that students will go beyond the typical understanding of mathematics as purely a bunch of memorized formulas and complicated mathematical computations but as a powerful tool used to understand better the world around us. Moreover, discussing and arguing about the nature of mathematics, what it is, and how it is expressed, represented, and used. We will study mathematics as a language in order to read and write mathematical texts and communicate ideas with precision and conciseness. We will also justify statements and arguments made about mathematics and mathematical concepts using different methods of reasoning.

**3) The academic performance of the students in the course**

**Table 3:** Academic Performance

Grade Interval	F	%	Interpretation
95-100	42	14.95%	Excellent
86-94	185	65.84%	Very good.
76-85	37	13.17%	Satisfactory
75	8	2.85%	Passed
73-74	4	1.42%	Conditional
72-below	5	1.78%	Failed
Total	281	100%	

It was depicted in table 3 about the academic performance of freshmen students taking Mathematics in the Modern World. 65.84 percent of the freshmen students garnered an academic performance from the bracket 86-94 and was interpreted as very good. Luckily, 42 or 14.95 percent got an excellent performance ranging from 95-100. Moreover, 37 or 13.17 percent had a performance of satisfactory. Sadly, 5, or 1.78 percent got failed the subject because of being caught cheating.

It was also gleaned from the results that students may understand the topics being discussed with them because of the very good performance. But suddenly more challenges were met like some of the teachers discussed it very fast which the students cannot cope with the lessons thoroughly. It implies that students are good enough and excellently

understood the topics since the teacher also focuses on the primary topics that the course is needed.

It was supported by Remo (2019) that the students performed well in Mathematics during high school. However, they are not doing well in college, specifically in Mathematics. The pre-enrolment requirements, such as high school GPA and admission test results do not significantly predict mathematics performance in college. It has a weak positive relationship with a 3% shared variance with MMW’s performance. It is, though, contributed to the difficulty experienced by the students in the said subject.

**4) The level of learning in the course as perceived by the students**

Table 4 presented the level of learning in the course as perceived by the students of which the first indicator was identifying patterns in nature and regularities in the world garnered 3.88 also interpreted as much learned, articulating the importance of mathematics in one’s life, arguing about nature of Mathematics, what is, how it is expressed represented, and used, and expressing appreciation of Mathematics as a human endeavor with a weighted mean of 4.18, 3.79 and 3.78 respectively. Discussing the language, symbols, and conventions of Mathematics with 3.90, explaining the nature of mathematics as a language with 3.77. Meanwhile, performing operations on mathematical expressions correctly with 3.72, acknowledged that mathematics is a useful language with 3.88, wrote a clear and logical proof with 3.74, and solved problems involving patterns and recreational problems following Polya’s four steps with 3.54. Likewise, contributed to the enrichment of Filipino culture and arts using concepts in geometry with 3.53, and supported the use of Mathematics in various aspects and endeavors in life with 3.77. All indicators are interpreted as much learned.

**Table 4:** Level of Learning in the course as perceived by the students

Indicators	WM	Interpretation
Identify patterns in nature and regularities in the world.	3.88	Much Learned
Articulate the importance of mathematics in one’s life	4.18	Much Learned
Argue about nature of Mathematics, what is, how it is expressed represented, and used.	3.79	Much Learned
Expressed appreciation of Mathematics as a human endeavor.	3.78	Much Learned
Discuss the language, symbols, and conventions of Mathematics.	3.90	Much Learned
Explain the nature of mathematics as a language.	3.77	Much Learned
Perform operations on mathematical expressions correctly.	3.72	Much Learned
Acknowledge that mathematics is a useful language.	3.88	Much Learned
Write clear and logical proof.	3.74	Much Learned
Solve problems involving patterns and recreational problems following Polya’s four steps.	3.54	Much Learned
Contribute to the enrichment of Filipino culture and arts using concepts in geometry.	3.53	Much Learned
Support the use of Mathematics in	3.77	Much Learned

various aspects and endeavors in life.		
<b>Total Weighted Average</b>	<b>3.79</b>	<b>Much Learned</b>

It can be gleaned from the table that the total weighted average in the level of learning in the course as perceived by the students is 3.79 and interpreted as much learned. It means that students learned the topics discussed by the teachers it is because some teachers use contextualized teaching strategies for them to understand the local discussions of the teachers. Although using the strategy can be overly simplistic and cause problems, many students are taught it as a base heuristic, or, more often, they learn it on their own. Orosco (2014) taught this strategy to English language learners (ELL) and poor readers who struggled in math, finding it a successful base strategy. He updated the name, calling it dynamic strategic math (DSM), or vocabulary modification.

**5) The level of practice of the concepts learned as perceived by the students.**

Table 5 shows the level of practice of the concepts learned as perceived by the students and the indicators presented with the corresponding computed weighted mean. Use different types of reasoning to justify statements and arguments made about mathematics and mathematical concepts with a WM of 3.89, Organize one’s methods and approaches for proving and solving problems with 3.86, and advocate the use of statistical data in making important decisions with 3.72, Use a variety of statistical tools to process and manage numerical data with 3.63, and use the methods of linear regression and correlation to predict the value of a variable given certain conditions with 3.53. These indicators are interpreted as much practiced.

Meanwhile, apply geometric concepts, especially isometries in describing and creating designs, and use coding schemes to encode and decode different types of information for identification, privacy, and security purposes with WM of 3.49 and 3.37 respectively. Furthermore, use mathematical concepts and tools in other areas such as in finance, voting, logic, business, networks, and systems and Exemplify honesty and integrity when using codes for security purposes with WM of 3.62 and 3.58 interpreted as much practiced.

**Table 5:** Level of the Concepts learned as Perceived by the Students

Indicators	WM	Interpretation
Use different types of reasoning to justify statements and arguments made about mathematics and mathematical concepts.	3.89	Much Practiced
Organize one’s methods and approaches for proving and solving problems.	3.86	Much Practiced
Advocate the use of statistical data in making important decisions.	3.72	Much Practiced
Use a variety of statistical tools to process and manage numerical data.	3.63	Much Practiced
Use the methods of linear regression and correlation to predict the value of a variable given certain conditions.	3.53	Much Practiced
Apply geometric concepts, especially isometries in describing and creating designs.	3.49	Practiced
Use coding schemes to encode and decode different types of information for identification, privacy, and security	3.37	Practiced



purposes.		
Use mathematical concepts and tools in other areas such as in finance, voting, logic, business, networks, and systems.	3.62	Much Practiced
Exemplify honesty and integrity when using codes for security purposes.	3.58	Much Practiced
<b>Total Weighted Average</b>	<b>3.63</b>	Much Practiced

It can be depicted in the table that the level of the concepts learned as perceived by the students is much practiced. It means that the teachers provide a tool for understanding and dealing with various aspects of present-day living, such as personal finances, making social choices, appreciating geometric designs, understanding codes used in data transmission and security, and dividing limited resources fairly. This aspect will provide opportunities for actual doing mathematics in a broad range of exercises that bring out the various dimensions of mathematics as a way of knowing, and test's students understanding and capacity. (CMO NO. 20 series of 2013).

**6. Problems encountered by the students**

**Table 6:** Problems encountered by the Students

Problems	f	Rank
The teacher is fast in discussing the lessons.	1,989	5
There is a limited number of examples given by the teacher.	2,072	4
There is no available textbook/workbook to support the discussion of the concepts.	1,772	10
The topics discussed are too difficult to understand.	1,859	9
The examinations/tests given are not consistent with the lessons discussed	2,173	3
The topics discussed were not taken during Senior High School.	2,238	1
Lack of preparedness in dealing with the subject matter.	1,878	6
The assignment/homework given are too difficult to accomplish.	2,175	2
There is an insufficient time spent in discussing the lessons	1,874	7
Lack of time devoted in studying/reviewing the lessons.	1,861	8

Table 6 presented the problems encountered by the students during the discussion of mathematics in the modern world topics and students experienced dilemmas and some challenges. The first problem encountered by the students was the topics discussed were not taken during senior high school. Second, the assignments/homework given is too difficult to accomplish. Third, the examinations/tests given are not consistent with the lessons discussed. Fourth, there is a limited number of examples given by the teacher and fifth is the teacher is fast in discussing the lessons.

This means that students encountered topics in mathematics in the modern world that they did not meet during senior high school time. Since the K to 12 curricula in senior high school focused on basic math and probability and statistics which are only math subjects for all strands and tracks except STEM and ABM because they are Calculus and some mathematics subjects.

This was supported by K to 12 that the mathematics curriculum provides a framework of instruction for exceptional child education in grades K-12. Content areas include numeration, whole numbers, rational numbers, real/complex numbers, calculator literacy, measurement, geometry, statistics, functions/relations, computer literacy, and pre-algebra. It means that mathematics in the modern world is not included in the offered subject.

**5. Conclusions and Recommendation**

This study used a descriptive method of study. The researcher used a quantitative method to determine the academic performance of freshmen in Mathematics in the Modern World subject. Moreover, the level of learning in the course and the level of practice of the concepts learned as perceived by the students were also determined. 281 purposively selected students were the respondents employed by the researchers.

The researchers will recommend developing instructional material specific to mathematics in the modern world and will suit the need of the freshmen students and the courses offered by the school. Conduct intensive training for the teachers who taught MMW and connect to real-world scenarios.

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