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Addressing Academic Deficiencies And Difficulties Of Graduate Students In The Ma Mathematics Program Of Dlsu- Dasmariñas

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Abstract

This study was conducted to address the academic deficiencies and difficulties of graduatestudents and to determine their readiness to meet the challenges of the MA Mathematics program . The students were chosen using the complete enumeration method. Their professional profile such as educational attainment and years of teaching experience either in high school or college level were analyzed.

The respondents took an 87- item validated teacher-made diagnostic test. The result of the study shows that only 12 (47.0%) out of the 26 students are mathematics majors; however, all of them are teaching mathematics subjects. Most of the respondents have taught mathematics for 6 to 10 years although about 53% of them lack higher mathematics subjects in their bachelor's degree. Others who took higher mathematics have very limited knowledge, or have already forgotten the topics. Based on the result of the diagnostic test, the students had difficulty on items related to slope, fractions and probability as evidenced by their low proficiency rating on these topics, but they got high proficiency rating on topics such as algebraic expressions, measures of dispersion, and functions. Only 50% of the students answered the items correctly in general mathematics. Overall, the graduate students are fairly proficient in the background subjects required in pursuing the MA Mathematics Program.

INTRODUCTION

Graduate programs at De La Sall UniversityDasmarinas were originally under the College of Education, Arts and Science Graduate Studies (CEASGS). It was then verticalized in the year 2006 so that each of the colleges namely the College of Education, College of Liberal Arts and College of Science started to have its own Graduate Studies Office. This gave birth to the College of Science and Computer Studies Graduate Studies Office, formerly the College of Science, which offers the MA Mathematics and MS Mathematics programs. Since then, it accepted enrollees who want to upgrade themselves in the field of

mathematics for the improvement of their professional services and for promotion purposes. Graduate mathematicscourses are far more rigorous than those that they took in theirundergraduate. Each year, some MA Math candidates do not meet the requirements of their graduate programs and asked to leave. Others choose to leave because they are burnt out, or their interests have changed or they leave with no degree at all. Readiness is important since the individual's success or failure to learn depends on it, (Thorndike,1997). In this respect, mastersdegrees can be unfulfilling, so they must pick their Masters degrees carefully. They should be prepared for these scenarios by making a backup plan. Everyone knows that math is a "hands on' field absolutely requiring practice to get it as stated by Salvatore (2012), early on, this means learning what basic operations 'do' and practicing them. Later on, they get more sophisticated and their problem solving repertoire hopefully increased so that they can solve a variety of math problems appropriately. Knowing when to use particular techniques is just as important as facility in applying those techniques themselves although these take time and practice,On the otherhand, they should be encouraged and inspired themto keep their enthusiasm and love for mathematics.

Owens (2006) emphasized that rarely is the teacher of mathematics actually trained in education. Proof motivation is never addressed. This is a critical fault of our educational system. But we cannot blame that lack of training for the other critical fault of our system.

Masters courses, in particular, are intended for graduates from many different universities, with different levels of experience. As such, they are forced to cram a lot of material into a short space of time, and often begin modules at a relatively introductory level and progress very quickly (http://www.thestudentroom.com).

So far, this is a pioneering study in the country inasmuch no study has ever been conducted to address the academic deficiencies and difficulties of graduate studies students in the MA Mathematics program of DLSU-Dasmariñas.

Hence, this study aimed to determine the level of proficiency of students in relation to the area they want to pursue and their readiness to meet the challenges of the graduate program.

Significance of the Study

Having identified the deficiencies and difficulties of the graduate students in mathematics, the proponents were able to prepare a program that will help them come up to the required standards. Students with the same area of difficulty were grouped together and have time or attention for the actual content. They were asked to read through their notes to try to understand the theorems and proofs taught in class. Attempting to problem sets given to them not resulted in more confusion. On the other hand, a memorandum related to the students' areas of deficiencies was utilized as basis for encouraging the administrators of the school of origin to look into their curriculum. In the long run, the graduate school will be of help to prospective graduate students.

Scope and Limitation of the Study

This study is limited to identifying the academic deficiencies and difficulties of 26 graduate students in the MA Mathematics program of the College of Science and Computer Studies. An 87-item validated teacher-made test questionnaire was used to identify the difficulties of respondents in the mathematics. The topics included in the test were basic math, algebra, geometry, trigonometry and statistics.

Objectives of the Study

The study attempted to address the academic deficiencies and difficulties of graduate studies students in the MA Mathematics program of DLSUDasmariñas, SY 2014-2015. Specifically, it aimed to:

1. identify the deficiencies and difficulties of the students,
2. describe the level of proficiency of the students,

3. determine the readiness to meet the challenges of the graduate programs, and
4. prepare an action program to address students' identified deficiencies and difficulties in mathematics

METHODOLOGY

This chapter presents the procedure used in conducting the study which includes the research design, selection of the respondents, the instrument for gathering data and the statistical techniques used in the analysis of the data.

Research Design

The study used descriptive method of research. According to Zulueta and Perez (2010), descriptive method of research is a fact-finding study that aims to determine the relationship or association of variables not necessarily in terms of cause and effect. Moreover, it helps us understand the nature, characteristics, components and aspect of the phenomenon under investigation. Specifically, it used documentary analysis which aims to analyze in the analysis of the academic deficiencies and difficulties of graduate studies students in the MA Mathematics program of the College of Science and Computer Studies Graduate Studies, DLSUDasmariñas.

Respondents of the study

The respondents of this study were all the MA Mathematics students in the College of Science and Computer Studies Graduate Studies of DLSU-Dasmariñas, during the 1st semester of school year 2014-2015. Complete enumeration method was used since there were only 26 students enrolled in the MA Math program when the study was conducted.

The Instrument

To identify the academic profile of the respondents, their credentials in the Registrar's Office were examined while an 87-item validated teacher-made test questionnaire was used to identify the difficulties of respondents in the mathematics. The topics included in the test were Basic Math, Algebra, Geometry, Trigonometry and Statistics.

Data- Gathering Procedure

The students were chosen using the complete enumeration method. Their professional profile such as educational attainment and years of teaching experience either in high school or college level were analyzed. Moreover, they took an 87item validated teacher-made diagnostic test. Topics included in basic mathematics are ratio and proportion, scientific notations, and fractions. In geometry, the topics are volume, measurement, circle, and angles. In algebra, the topics are algebraic expressions, domain and range, coordinates, special products and factoring, quadratic equations, inequalities, radicals, equations of lines, graphs, functions, linear equations, arithmetic sequence, properties of real numbers, rational expressions, slope. Likewise in statistics, the topics are measures of dispersion, correlation, and probability.

The correct and wrong responses of the graduate students were tallied according to each topic. Moreover, an interview was conducted with them in order to know their thoughts about their scores in the diagnostic test. Lastly, the proponents prepared an action program to address identified deficiencies and difficulties

Statistical Tool Used

This study used descriptive statistics such as frequency, percentage, mean and standard deviation. Frequency and percentage were used to describe the professional profile and other characteristics of the respondents. The mean and standard deviation were used to identify the difficulties of the graduate students.

To identify the proficiency level of the respondents, the following scale was used:

Score	Verbal Interpretation
14-28	Not Proficient

29-43	Fairly Proficient
44-59	Proficient
60 and above	Very Proficient

To identify the proficiency level of the respondents per area/topic, the following scale was used:

Percentage of Correct Answers	**Verbal Interpretation**
13 to 32	Not Proficient
33 to 52	Fairly Proficient
53 to 72	Proficient
73 and above	Very Proficient

RESULTS AND DISCUSSIONS

This chapter presents the results and discussion of the data gathered based on the major and specific problems of the study.

Professional profile of the respondents:

Table 1. Baccalaureate Degrees of the respondents

Baccalaureate

Degrees	**Frequency**	**Percentage**
BSE major in Math	10	38.46
BS Math	2	7.69
BSE major in Science	9	34.62
BS Computer Science	2	7.69
BS Biology	2	7.69
BS Nursing	1	3.85
Total	**26**	**100**

Table 1 shows the baccalaureate degrees of the respondents. It can be gleaned from the table that out of 26 respondents, only 12 (46.15%) are mathematics majors. However, all the respondents are teaching mathematics subjects. An interview with the respondents revealed that this is the main reason why they enrolled in the MA Mathematics program in DLSU-D. Aside from this, they want to enhance their mathematical knowledge for the good of the service and fulfil requirements for promotion.

According to Weidman et. al (2001), in Laursen et al (2012), the "professional socialization" of graduates is maximized when it is in line with their expertise. Graduate students have absorbed the necessary understanding in their field that honed them and become well-versed in their imminent tomorrow. Nevertheless, there are times where some students receive imprudent pieces of information regarding what jobs may lay ahead. This seems to drive graduates to put themselves in roles without considering their suitability to it. This predicament can lead from simple to serious mismatching in pursuit of graduate schools for those in the teaching field. In this study, there are graduate students who did not come in any STEM or Math Education field. Thus, various difficulties pop up whenever such types of students are already taking up major mathematics subjects.

Table 2. Number of Years of teaching experience of the respondents

No. of Years of Teaching Experience	**Frequency**	**Percentage**
1 to 5	5	19.23
6 to 10	12	46.15
11 to 15	9	34.62
Total	**26**	**100**

The length of teaching experience of the respondents is shown In Table 2. It shows that about 46.15% or 12 out of 26 of the respondents have already rendered service for about 6 to 10 years. This information does not directly imply that the respondents were teaching only mathematics subjects. Some of them were also teaching nonmathematics subjects. Furthermore, 5 or 19.23% of them

can be classified as beginning teachers since they have teachingexperience of 5 years or less as shown in the table. Clearly, these teachers need to enroll in the graduate school as emphasized by De Guzman (2000) who mentioned that beginning teachers need to have mastery of the core subjects of teaching by taking graduate courses.

Deficiencies and difficulties of graduate students.

Based on their records /credentials, the number of units of mathematics subjects taken by the nonmath majors when they were in college was very limited. They only have college algebra and statistics in their curriculum. As a result, their deficiencies must have been due to lack of understanding to other topics compared to expected subject offerings for prospective mathematics teachers. They have very limited knowledge that is why the results of their scores to some other topics in the
teacher made test examinations given to
them was very low. The science majors have confusion to other topics since they only have 4 math subjects in college.

According to the respondents, they have not experienced right mentoring in mathematics in college. They had no time or attention for the actual content back then. At present, since they enrolled MA Math program, they are forced to study to try to understand the topics taught in class. Attempting to perform homework only resulted in more confusion. In this regard, others have no choice but to drop out of the MA Math program. Table 3 shows the number of mathematics subjects taken by the respondents.

Table 3. Number of mathematics subjects taken by the respondents

Baccalaureate Degrees	**Number of Mathematics Subjects**
BSE major in Math	9
BS Math	23
BSE major in Science	4
BS Computer Science	4
BS Biology	3
BS Nursing	2

All courses except BS Math have limited number of mathematics subjects. This fact may also have accounted for the respondents' difficulties in understanding the subjects in the MA Math program and, therefore, the need for bridging courses.

The table below shows the distribution of the respondents' correct answers per topic in geometry with corresponding level of proficiency:

Table 4. Level of proficiency in Geometry

Geometry topics	**Percentage of correct answers**	**Proficiency Level**
Volume	69.23	Proficient
Measurement	65.38	Proficient
Circle	55.77	Proficient
Angles	45.73	Fairly Proficient
Mean Percentage	**59.03**	**Proficient**

Table 4 reveals that the lowest percentage of correct answers is on*angles with o*nly 45.73% of the respondents getting the correct answer, while the topic v*olume* has the highest percentage of correct answers. It follows that the respondents are fairly proficient in the topic *angles* while they are proficient in *volume*. Over-all, the respondents are proficient in geometry. This contradicts the study of Saritas, T., &Akdemir, O. (2009) which mentioned that a student is completely lost when faced with a set of exercises about *volume*. Some authors have different ways of improving their book to make it convenient for students and to address their difficulty and deficiencies in mathematics. For instance, Belmonte (2010) who wrote for college students without anybackground in the topics *volume* and *angles* and who made every effort to produce a clear, readable text from which students can learn and instructors can teach. Palisoc (2010) emphasized that in the study of angles and circles, the students will greatly rely upon the knowledge and skills of solving problems in geometry and trigonometry.

Table 5. Level of proficiency in Basic Mathematics

Basic Math topics	Percentage of Correct Answers	Proficiency Level
Ratio and Proportion	50.00	Fairly Proficient
Scientific Notation	42.31	Fairly Proficient
Fraction	32.69	Not Proficient
Mean Percentage	41.67	**Fairly Proficient**

In basic math subjects, *fraction* seems to be the most difficult topic. Table 5 shows that only 32.69% of the respondents were able to solve theproblemson fraction, and therefore they are not proficient in this particular topic. It was shown that the respondents are not proficient in all the topics under this area, leading to the over-all proficiency as "fairly proficient". This finding agrees with that of Barcelona (2009) which indicated that students find difficulty in fractions because they have difficult time in remembering mathematical facts. According to Kerslake (1986) as cited by Sadi (2007), students relied heavily on rote memory of previously learned techniques when working with fractions that do not form a normal part of a child's environment and operations. Fractions are abstractly defined and this might have caused the learner's misconception on the concept. Dinglasan (2013) had some interesting findings that will shed light on to the causal factors of the difficulty. The common difficulties of the students of her findings are found in fractions especially adding common fractions and applying the law of exponents. It is worth mentioning, however, that half of the respondents were able to get the correct answer on problems involving ratio and proportion.

Table 6. Level of Proficiency in Algebra

Algebra topics	Percentage of Correct Answers	Level of Proficiency
Algebraic Expressions		Proficient
Domain and Range	73.08	Very Proficient
Coordinates	67.31	Proficient
Special Products and Factoring	66.35	Proficient
Quadratic Equations	65.38	Proficient
Inequalities	61.53	Proficient
Radicals	61.53	Proficient
Equations of Lines	58.97	Proficient
Graphs	53.85	Proficient
Functions	49.92	Fairly Proficient
Linear Equations	47.6	Fairly Proficient
Arithmetic Sequence	46.15	Fairly Proficient
Properties of Real Numbers	42.31	Fairly Proficient
Rational Expressions	36.54	Fairly Proficient
Slope	26.92	Not Proficient
Mean percentage	**55.62**	**Proficient**

As reflected in Table 6, the most difficult topics in algebra are *slope* and *rational*

expressions where the respondents got only 26.92% and 36.54%, respectively, of the correct answers, which implies that they are ”not proficient” and “fairly proficient.

On the other hand, the respondents are “Very proficient” in the topics a*lgebraic expressions* and d*omain and range*, that corresponds to 76.92% and 73.08% correct responses, respectively. Their overall level of proficiency in algebra was also shown in the table, with a mean percentage of 55.62, which implies that the respondents are proficient. The importance of algebra was noted by Catibijan (2009) who emphasized the need for a thorough knowledge of topics which are not fully understood by the students especially slope and rational expressions.

Table 7. Level of proficiency in Statistics

Statistics' topics	Percentage of Correct Answers	Verbal Interpretation
Measures of Dispersion	88	Very Proficient
Correlation	46.15	Fairly Proficient
Probability	34.62	Fairly Proficient
Mean percentage	**42.25**	**Fairly Proficient**

Table 7 shows that 88% of the respondents know how to solve problems on m*easures of mispersion*. This means that the respondents are very proficient in this topic. Apparently, this is the easiest topic in statistics, while the most difficult is on *probability* since only 34.62% of the respondents were able to get the correct answer and they are considered fairly proficient. In general, the respondents are “fairly proficient” in statistics, with a mean percentage of only 42.25. This affirms the study of Tsung (2014)who observes that students encounter difficulties in understanding and interpreting probability–related questions. On the other hand, Linder (2011) mentions that students are not mere receivers or listeners of information given or discussed by teachers especially if the topic is probability Table 8. Mean and standard deviation of wrong and correct answers

	Correct (%)	Wrong(%)
Over-all Mean	**70.19**	**29.81**
Standard Deviation	**20.92**	**20.92**

In terms of the responses per item, the result (see Appendix C) reveals that item number 29 (linear equations) and item 40 (measures of dispersion) obtained the highest percentage of 92.31. The two items correspond to the topics. This result somehow is in accordance with the result in Table 4 that the easiest topic is measures of dispersion. However, the lowest correct responses are item numbers 38 and 52 with only 7.69% each, On the other hand, students have difficulty in analyzing the problems in linear equations. This couldbe attributed to the fact that they do not know how to translate statements into symbols.

Table 8reveals that item number 87 (laws of exponents) obtained the highest correct response percentage of 84. This implies that the respondents are “very proficient” in this particular topic in the problem solving part. This is followed by item number 69, with 80% correct response, which is also about the laws of exponents. Meanwhile, the lowest correct response rate is for item number 85 which is about non-linear equation. Nobody got the correct answer for this item. Over-all mean implies that the respondents are proficient in answering problem solving.

The over-all mean implies that, on the average, 72% of the total number of respondents was able to answer all the items correctly, with a standard deviation of 20.68. To remedy problem solving difficulties, Mamaril (2003) suggested an increased concentration on correct equation writing and rigorous mathematical proofs. For their deficiencies, the students interviewed mentioned that either they did not take up those topics in a regular class or they did not understand the lessons during class discussions when they were in college. According to the respondents, they did not like some topics of mathematics which were too complicated and confusing. Those who like them, however, were not prepared to learn them. They found it difficult to remember

concepts and others werevery confident to answer the test questions and they did not bother to check their answers. Carelessness was also considered as one source of error.

Table 9. Percentage of students' correct answers per item and level of proficiency in the problem solving part

Item Number	Percentage of correct answer	Verbal Interpretation
68	64.00	Proficient
69	80.00	Very Proficient
70	64.00	Proficient
71	56.00	Proficient
72	60.00	Proficient
73	68.00	Proficient
74	72.00	Proficient
75	52.00	Fairly Proficient

Continuation:

Item Number	Percentage of correct answe	Verbal Interpretatio
77	52.00	Fairly Proficient
78	72.00	Proficient
79	64.00	Proficient
80	68.00	Proficient
81	56.00	Proficient
82	7.69	Fairly Proficient
83	72.00	Proficient
84	68.00	Proficient
85	0.00	Fairly Proficient
86	60.00	Proficient
87	84.00	Very Proficient
Mean	**72.00**	**Proficient**
Standard Deviation	**20.68**	

Table 10. Distribution of Graduate Students in terms of Proficiency Level

Proficiency Level	Frequency	Percentage
Very Proficient	1	3.85
Proficient	2	7.69
Fairly Proficient	18	69.23
Not Proficient	5	19.23
Total	**26**	**100.00**

Table 10 shows the level of proficiency of graduate students. It can be gleaned from the table that about 69.23% of the total respondents are fairly proficient and only 1 student has a very high level of proficiency

Readiness of the students to meet the challenges of the graduate programs:

The readiness to meet the challenges of the graduate programs was analyzed based on the records of the students. Strictly speaking, enrolment in the Master's degree requires enrollees to have a BS or BSE degree in mathematics. However, even non mathematics majors were accepted inasmuch as one of the objectives of the graduate school is to help professionals who are interested to upgrade and update their knowledge in mathematics. It was a challenge for them to take this master's degree since they need to have 9 units of bridging courses in mathematics if their BS degree is not aligned to this program. It is very important that at this stage to develop and nurture the ability and the confidence of the students to perform basic mathematics courses required in the graduate program

In the college level, mathematics readiness is critically important for this will determine the student's mathematical disposition and achievement in the future (Lee, 2008). Students should understand and perform basic mathematics before they are promoted to the next level of learning. However, it is observed that many of the sampled students have insufficient mastery in the skill that they need on their current level such as slope, probability, fractions, and linear equations. This is a distressing reality – many students are

promoted to the next level of learning while they were in college. They graduated from high school, entered and graduated in college with such lingering problem when they enrolled in the
Master's Degree. They are apparently not prepared for new learning, specifically higher order mathematics. An Action Program (AP) was formulated by the researchers to address the identified difficulties of the respondents. It aims to provide the respondents opportunities to recognize specific areas where their knowledge is still limited. It would also help them obtain more knowledge on the topics that were identified. The table below shows the details of the action program.

Table 11. Action Program to address identified difficulties and deficiencies

Subject Area	**Identified difficulties**	**Students with identified difficulties**	**Group Tutorial Schedule**	**Guided Online Tutorial**	**Other Material**
Basic Math	Fractions	R1,R4,R5,R15, R25,R26	7:00-8:30/Saturday	Schoolbook Tutorial	Prepared Module
Algebra	Slope	R2,R6,R7,R8, R17,R23,R24	10:00-11:30/Saturday	Schoolbook Tutorial	Prepared Module
Geometry	Angles	R3,R9,R10,R11, R18,R22	2:30-4:00/ Saturday	Schoolbook Tutorial	Prepared Module
Statistics	Probability	R12, R13,R19,R20	6:00-7:30/Saturday	Schoolbook Tutorial	Prepared Module

Table 11 shows the summary of the subject area and the identified difficulties of the respondents for each. Also, the respondents were identified and labeled as R1, R2, and so on referring to respondent 1, respondent 2, until the last observation. The AP aims to address the identified difficulties by creating a face-to-face peer tutorial with the schedule, and online tutorials through the university's Schoolbook. A module will also be prepared to help the students in their difficulties.

The individual learns ideas, skills and values in different ways. As mentioned by Sumalinog (2004), teachers learn informally through experiences as they continually do their routine throughout the day. They learn formally when they are given time to join an organized group for the purpose. In this case, the teachers (respondents) will be given time to join a tutorial group where they will be given special attention to improve their performance.

Waldock (2011),also stressed the importance of support groups. According to him, Peer Assisted Learning (PAL), both individual and group will help Higher Education Students especially the first year
students. Many HEIs in United Kingdom are implementing this method in their mathematics classes. Most of the time, the intention of the program, among others, is to advance current skill level, cooperation, and communication between the freshmen. This idea of Waldock can be useful as well in graduate school. New graduate students, especially non-math majors may need to get acclimatized first in their new environment by either PAL or schoolbook assisted tutorials.

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter presents the summary, conclusions, and recommendations of the study.

Summary

The research was conducted to address the academic deficiencies and difficulties of MA mathematics students. To accomplish this, their credentials were analyzed to identify

their deficiencies in terms of the major and minor courses they have completed which are required of the program they are taking. Moreover, they were required to take an 87-item validated teacher-made diagnostic test to identify their difficulty in the mathematics topics needed.

The result of the study showed that 14 (53%) students out. of the 26 are non-mathematics majors. Only half of the total number of students were able to answer majority of the items in the test which covered topics in general mathematics. Apparently, the graduate students are fairly proficient in the required mathematics background for them to succeed in the MA Mathematics program. Only one student registered a very high level of proficiency in mathematics.

In as much as one of the objectives of the Graduate Studies Office is to help aspiring students to finish the masters' degree in their chosen fields of specialization, these students were all allowed to enroll in the MA Math program. Those who registered low proficiency in the diagnostic test are required to enroll in 9 units of bridging courses in mathematics, specifically those whose baccalaureate degree is not on mathematics education. Also, to upgrade the students' mathematical background, free tutorial sessions are organized for them to cope with the lessons on topics which they found difficult.

Conclusion

Based on the above findings, it was concluded that only 12 (47.0%) out of the 26 students are mathematics majors; however all of them are teaching mathematics subjects. Remarkably, 53% of the respondents lack higher mathematics subjects in their bachelor's degree. Others who took higher mathematics have very limited coverage, or have already forgotten the topics. Based on the diagnostic test, the students had difficulty on items related to slope, fractions and probability (low proficiency rating), while algebraic expressions, measures of dispersion, and functions have high proficiency rating. Only 50% of the students answered the items correctly in general mathematics. In conclusion, the graduate students are fairly proficient in the subjects of MA

Mathematics programand are not ready for the graduate program even if they are already employed as mathematics teachers in their respective workstations. In addition, it found out that they lack the necessary mathematics subjects to fully understand higher mathematics. Others who were mathematics majors indicated that they had very limited coverage when they took their undergraduate mathematics subjects, and some had forgotten the topics already having graduated 6 to 10 years ago. In this respect, the proponents were able to prepare an AP that will help them come up to the required standards to address the academic deficiencies and difficulties of MA Mathematics students.

Recommendation

Based on the findings and conclusions drawn, the researchers recommend that in general, mathematics teachers should be (1) updated and upgraded with the new trends of learning and (2) allot time to improve in teaching their field of expertise. This, in turn, will lessen the difficulties of their respective students in understanding the topics especially on probability, slope, fractions, and linear equations. Mathematics teachers in college must also do some extra reading to build strong mathematical foundations in their students to equip themselves latter in for advanced education. The Commission on Higher Education and the Teacher Education Institutes may be informed of the findings of this study so that appropriate modification or realignment may be done in the Bachelor of Science in Education, major in mathematics, curriculum.

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Appendices:
A. To determine the level of proficiency of graduate students

Respondent	Score	Proficiency Level
1	33	Fairly Proficient
2	30	Fairly Proficient
3	43	Fairly Proficient
4	38	Fairly Proficient
5	38	Fairly Proficient
6	36	Fairly Proficient
7	40	Fairly Proficient
8	25	Not Proficient
9	31	Fairly Proficient
10	30	Fairly Proficient
11	14	Not Proficient
12	38	Fairly Proficient
13	37	Fairly Proficient
14	68	Very Proficient
15	27	Not Proficient
16	48	Proficient
17	34	Fairly Proficient
18	34	Fairly Proficient
19	25	Not Proficient
20	19	Not Proficient
21	48	Proficient
22	38	Fairly Proficient
23	36	Fairly Proficient
24	34	Fairly Proficient
25	38	Fairly Proficient
26	36	Fairly Proficient

B. The Percentage of Correct and Wrong Response of the Graduate Students per Area/Topic

Area/Topic	Correct (%)	Wrong (%)	Item number
Equations of Lines	58.97	41.03	1, 23, 59
Algebraic Expressions	76.92	23.08	2
Functions	49.92	50.08	3, 47, 53, 63, 67
Domain and Range	73.08	26.92	4
Angles	45.73	54.27	5, 6, 7, 8, 9,24, 28, 39, 54
Quadratic	65.38	34.62	10, 18, 35

Equations			
Measurement	65.38	34.62	11
Fraction	32.69	67.31	12, 13
Inequalities	61.53	38.47	14
Coordinates	67.31	32.69	15, 31
Special Products and Factoring	66.35	33.65	16, 32, 37, 66
Arithmetic Sequence	46.15	53.85	17,33
Ratio and Proportion	50	50	19, 46
Circle	55.77	44.23	22,55
Graphs	53.85	46.15	25
Radicals	61.53	38.47	20
Measures of Dispersion	75	25	26, 40
Correlation	46.15	53.85	27
Linear Equations	47.6	52.4	29, 30, 38, 49, 51, 52, 7, 8
Rational Expressions	36.54	63.46	34, 62
Scientific Notation	42.31	57.69	36
Geometry	69.23	30.77	41
Probability	34.62	65.38	42, 58
Trigonometry	38.47	61.53	60
Volume	69.23	30.77	45
Properties of Real Numbers	42.31	42.31	48, 61
Slope	26.92	73.08	60
Over-all Mean	54.03	45.97	
Standard deviation	14.1	14.1	

C. Percentage of Students' Correct and Wrong Responses per Item

Item Number	Correct (%)	Wrong (%)	Item Number	Correct (%)	Correct (%)
1	53.85	46.15	35	65.38	34.62
2	76.92	23.08	36	42.31	57.69
3	69.23	30.77	37	76.92	23.08
4	73.08	26.92	38	7.69	92.31
5	76.92	23.08	39	69.23	30.77
6	80.77	19.23	40	92.31	7.69
7	50	50	41	69.23	30.77
8	19.23	80.77	42	34.62	65.38
9	38.46	61.54	43	53.85	46.15
10	69.23	30.77	44	42.31	57.69
11	65.38	34.62	45	69.23	30.77
12	15.38	84.62	46	46.15	53.85
13	50	50	47	69.23	30.77
14	80.76	19.24	48	65.38	34.62
15	80.76	19.24	49	73.08	26.92
16	76.92	23.08	50	26.92	73.08
17	15.38	84.62	51	73.08	26.92
18	61.54	38.46	52	7.69	92.31
19	53.85	46.15	53	30.77	69.23
20	61.53	38.47	54	19.23	80.77
21	42.31	57.69	55	38.46	61.54
22	73.08	26.92	56	42.31	57.69
23	76.92	23.08	57	50	50
24	50	50	58	34.62	65.38

25	53.85	46.15	59	46.15	53.85
26	57.69	42.31	60	34.62	65.38
27	46.15	53.85	61	19.23	80.77
28	7.69	92.31	62	11.54	88.46
29	92.31	7.69	63	34.62	65.38
30	69.23	30.77	64	26.92	73.08
31	53.85	46.15	65	30.77	69.23
32	76.92	23.08	66	34.62	65.38
33	76.92	23.08	67	30.77	69.23
34	61.54	38.46			