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Quantitative Techniques in Business: A Course Evaluation

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Abstract: This study aimed to assess the business mathematics course, Quantitative Techniques in Business which constitutes as basis for proposed intervention program. Descriptiveresearch design was used to assess the teaching and learning process of the course as to the extent of the attainment of the course objectives, coverage of the course content, use of teaching and assessment strategies and resources and facilities. The participants of the study were students and teachers of Cagayan State University offering programs like business, entrepreneurship and accountancy particularly on programs having Quantitative Techniques in Business course. Findings revealed that teachersas well as the students assessed to have a great extent in the teaching and learning the course on the different competencies like attainment of the course objectives, coverage of the course content, use of teaching and assessment strategies and learning resources and facilities. Nevertheless, there are problems and difficulties experienced by both participants and need to improve in order to enhance the teaching and learning process like unavailability of software needed in the course, lack of trainings and seminars related to the course, lack of course textbooks and poor foundation in mathematics. Student-participants revealed that there are many mathematical formulas to be memorized in the course and to address the issue, math software should be utilized in order to enhance the teaching and learning process.

Keywords: Quantitative Techniques in Business, teaching and learning process, intervention program, trainings and seminars, teacher, student

INTRODUCTION

Quantitative Techniques in Business is one of the Business Mathematics courses offered by most universities and colleges under the degree programs like Business and Management even in Accountancy programs. Quantitative Techniques in Business is almost similar to Management Science or Operations Management and it is one of the General Business Education courses under the Bachelor of Science in Business Administration (BSBA) as prescribed by the Commission on Higher Education (CHED) under CHED Memorandum Order (CMO) No. 39 series of 2006. Quantitative Techniques in Business is not only offered under the said program but also to programs like Bachelor of Science in Accountancy, Bachelor of Science in Accounting Technology and Bachelor of Science in Entrepreneurship under the said CHED Memorandum Order.

It is strongly believed that most students entering the business program lack the skills, techniques and methods that the degree requires to cope with the quantitative methods content in their chosen program and this problem affects a wide range of disciplines in many schools. This so-called "Mathematics problem" has been reported for many years, numerous learned societies, professional bodies and research reports, but it still a major problem and have been disregarded for a long time (Mac an Bhaird&Lawson, 2012; Pell and Croft, 2008; Vordermanet al., 2011).

Although the problems that many undergraduates experience with the quantitative content of their chosen degree programs are frequently attributed to school Mathematics curriculum that does not appear to prepare students adequately (Advisory Committee on Mathematics Education, 2011; Mac an Bhairdand Lawson, 2012). The causes of the The "Mathematics problem's" root causes are unclear, and they are probably complicated and multi-faceted (Croft, 2001).

Requiring undergraduate students to take a single course in mathematics curriculum does not make them develop the level of skills required as well. Many recent literature on quantitative literacy recommend the integration of quantitative skills in the curriculum and even mathematics technology that could enahnce teaching and

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learning process. Such practice cannot be learned or retained without a continuing practice to reinforce them. Schools or universities should play a vital role in leading their students in developing quantitative literacy and should, at least, conduct quantitative training standards to all business students as well as integrating quantitative skills in the curriculum throughout their program.

For a school offering the course, the Commission on Higher Education (CHED) and the business sectors should have a dialogue about the requirements of quantitative skills needed in the programs and to foster greater understanding between these three sectors about the skills needed by these students to be able to develop and apply them in the business world. The capacity to find employment, achieve job satisfaction, level of compensation, community involvement, and well-being are all impacted by one's numeracy skills, according to the government and companies (Capellari, et al., 2009). Furthermore, according to a number of studies (Bishop 1989, Murnane 1998, Ma 2001), having quantitative literacy increases general productivity in addition to work performance. This is because most jobs require a variety of computing tasks to be completed.

However, many proponents of educational reform, particularly those connected to the standards movement, insist that enhancing schools is the key to raising student achievement.Student performance will enhance if academic standards are high, curricula and assessments are in line with them, and teachers are qualified to instruct at the level that the standards need.However, this viewpoint conflicts to some extent with one that has arisen from the argument around school development, which holds that students, not schools, make the difference (Wenglinsky, 2011).

In addition, the school should look into the possible link between student's academic achievement, teacher classroom practices and other aspects of teaching such as professional development of teachers that they received like seminars, trainings and other professional development in support of their classroom practices and more teacher educational background qualification, referred to as "teacher inputs". Teacher inputs are very important in the teaching-learning process since they are the ones teaching the course. Hence, they should be more knowledgeable on the course and educational qualification is more important.

By their very nature, quantitative techniques in business involve complicated formulas and iterated procedures in order to solve a problem.Due to the drawn-out and time-consuming nature of the many quantitative methodologies, students often struggle to solve a given problem.For instance, utilizing the simplex approach to solve linear programming problems with more than two variables demands multiple iterations in order to identify the best solution.As a result, finding the best answer to the problem requires sufficient time and investigation.Students would eventually come to the conclusion that the complexity of the course makes it exceedingly challenging to understand, and that students generally despise the subject.

Although, problems on difficulties experienced by the students on Quantitative Methods are not a new issue to most universities and colleges, this topics has not been explored extensively yet. According to a study, problems students run into in quantitative research courses can lead to poor learning and bad course grades, but they can also have more significant effects.The methods utilized in their course work may be constrained by their difficulties, and students with difficulties may find it challenging to finish their degrees. Students with difficulties may not be as enthusiastic to enroll in optional quantitative methods courses (Meyer, et al., 2005; Kiley &Mullins, 2005). The difficulties may even be reflected in students' views on their future work and selecting a job (Onwuegbuzie, 2000). It's also feasible that the challenges faced while pursuing a degree have an effect on a person's readiness to handle particular jobs while employed as well as the caliber of the work produced.

Because of these problems and difficulties encountered by the students in the course, the course needs to be assessed and this motivated the researcher to conduct the study. Thus, the researcher look into the course objectives, course content, teaching and assessment strategies, andavailable learning resources and facilities in teaching the course to come up with a proposed intervention program.

This study evaluated the teaching and learning of Quantitative Techniques in Business as basis for a Proposed Intervention Program.

Statement of the Problem

Generally, this study aimed to evaluate Quantitative Techniques in Business course, basis for a proposed intervention program.

Specifically, it aimed to answer the following questions:

1. What is the profile of the teacher - participants in terms of:

1.1 highest educational attainment;
1.2 length of teaching experience in the course; and
1.3 trainings attended related to the course?

2. What is the profile of the student - participants in terms of:

2.1 degree program; and
2.2 year level?

3. What is the assessment of the two groups of participants as to the extent of:

3.1 attainment of the course objectives;
3.2 coverage of the course content;
3.3 use of teaching strategies;
3.4. use of assessment strategies; and,
3.5 use of learning resources and facilities?

4. What are the difficulties/problems encountered by the two groups of participants?
5. What intervention program can be proposed to enhance the academic program of Quantitative Techniques in Business?

Scope and Limitation

The study sought to evaluate Quantitative Techniques in Business course as basis for a Proposed Intervention Program. The results of the study serve as bases in the formulation of an intervention program of the course to improve students' learning and their performance in the said course. The study further determined the extent of attainment of the course objectives, coverage of the course content, use of teaching strategies, use of assessment strategies and the use of learning resources and facilities.

The study involved third or fourth year students who finished Quantitative Techniques in Business (Bus Math 13) course, since it is being offered in the third year level and usually during the first semester depending on the curriculum of the school offering it. The schools involved in this study are offeringbusiness courses, accountancy or entrepreneurship or degree programs that have Quantitative Techniques in Business integrated in their curriculum or prospectus. In addition, the selected schools assessed how Quantitative Techniques in Business is being taught. The tool used under course objectives was based on the CSU syllabus since the course objectives of the syllabus used by the said institution is aligned to the course content found in the CMO. Furthermore, most schools in this study followed the entire course content of the CMO.

The selected participating schools were the four (4) campuses of CSU namely, Andrews, Aparri, Gonzaga and Sanchez Mira Campus.

METHODOLOGY

Research Design

This study made use of the descriptive research design to evaluate the course Quantitative Techniques in Business, the results of which were used as basis for the development a proposed intervention program. The survey method was used to gather information from the participants using a designed survey questionnaire. Descriptive design was seen to be the most appropriate design utilized in this study since it is the most expansive and encompassing compared to other methods of investigation. In the context of this study, the researcher aimed to describe the extent of implementation of the implementation of the course along the five (5) elements, namely, attainment of the course objectives, coverage of the course content, use of teaching strategies, use of assessment strategies and use of learning resources and facilities.

Participants of the Study

The participants of this study were teachers and students Cagayan State University offering programs like business, entrepreneurship and accountancy particularly those having Quantitative Techniques in Business as a course. Students of this study are those enrolled in BS in Entrepreneurship (BSE), BS in Accountancy (BSA), BS in Business Administration/Management (BSBA), BS Accounting Technology (BSAT) and other Business programs where the course is being integrated in their curriculum. These students had already finished the course.

Meanwhile, the teacher-participants were those teaching or have taught Quantitative Techniques in Business course in the selected campuses of the Cagayan State University.

Random sampling was used to select the participants of the study. The sample size (n) was computed using the Slovin's formula. Total Enumeration was used to degree programs where the population size is minimal.

Table 1. Summary of Student-Participants Per Program per school using Random Sampling

No.	School	Program	Population size (N)	Samples size (n)
1.	CSU – Andrews	BSA BSAT BSE	38 178 65	38 123 56
	CSU – Aparri	BSAT	304	172
	CSU – Gonzaga	BSAT	119	92
	CSU – Sanchez Mira	BSAT	113	89
		TOTAL	817	570

Table 2. Summary of the Number of Teacher-Participants

No.	Campus	Number of Sample (s)
1.	Andrews	3
2.	Aparri	1
3.	Gonzaga	1
4.	Sanchez Mira	1
	TOTAL	6

Instrumentation

The research instrument utilized in this study is a survey questionnaire designed by the researcher. Part I of the survey questionnaire includes the profile of the participants, both students and teachers including the school profile. Part II of the instrument includes the assessment of the participants in terms of the attainment of the course objectives, coverage of the course content, use of teaching strategies, use of assessment and the use of learning resources and facilities. Problems and difficulties encountered by both participants were identified in this study including the best practices among HEIs as to the teaching and learning of the course.

The researcher sought the approval of the use of the tool from the panel of oral examiners prior to data collection. Hence, the panel members checked and content validated the tool before it was distributed to the participants. The basis for the validation of the content of the instrument are CMO No. 39 series of 2006, CMO No.3 series of 2005 and CMO No. 50 series of 2008.

Both participants were given a survey questionnaire to assess the course as to the extent of attainment of the course objectives, coverage of the course content, use of assessment and teaching strategies and learning resources and facilities.

Data Gathering Procedure

First, the researcher sought the approval from the office of the Graduate School through the Office of the Ethics Review Committee for the conduct of the data collection. Second, before the conduct of the study to the target participants, the researcher sought approval from the Office of the President or Head of the HEIs. Then, the researcher sought informed consent; once the participants approved or agreed, the researcher administered the survey questionnaire to the target participants from the different schools. The survey questionnaires were floated to the participants during the 2nd semester SY 2017-2018. For teacher-participants, the researcher conducted an informal interview to ensure the consistency and completeness of data needed for the study especially in listing the difficulties and problems they encountered by participants in the course.

Finally, the researcher looked at the course syllabus utilized by the different schools to determine the extent of compliance to the CMO.

It must be noted that the researcher obtained approval of the use of the data gathering tool from the panel members prior to data collection. Hence, the panel members checked and validated the tool before it was distributed to the participants.

DATA ANALYSIS

Descriptive statistics was used to analyze the data using the frequency count, percentages and weighted mean.

To evaluate the Quantitative Techniques in Business course, the following mean range was used and interpreted as follows:

Mean Range	Descriptive Interpretation
4.20 - 5.00	Very great extent
3.40 - 4.19	Great extent
2.60 - 3.39	Moderate extent
1.80 - 2.59	Little extent
1.00 - 1.79	Very little extent

Ranking was also used to identify the problems and difficulties encountered by the participants in the course.

RESULTS AND DISCUSSIONS

This chapter presents the results, analysis and discussion of data gathered from the participants and presented based on the study's problem statement.

Table 3. Frequency and Percentage Distribution of Teacher-Participants' Highest Educational Attainment

	Frequency	Percentage
Master's Degree Graduate	4	66.67
Doctoral Degree Graduate	2	33.33

Table 3 shows the frequency and percentage distribution of the teacher-participants' highest educational attainment. Based on Table, there were 4 or 66.67% are masters graduates while 2 or 33.33% are doctoral graduates. This implies that majority of the teacher-participants are master's degree graduates since it is the minimum requirement set by the Commission of Higher Education (CHED) for teaching in the tertiary level (CMO No.40, s.2008, Section 35, Article VIII).

Table 4. Mean, Frequency and Percentage Distribution of Teacher-Participants' Length of Experience in Teaching the Course

Length of Teaching Experience	Frequency	Percentage
less than 2 years	1	16.67
2-4 years	2	33.33
5-7 years	1	16.67
greater than 7 years	2	33.33
Total	6	100.00

With regard to the participants' length of teaching experience in the course, out of 6 teacher-participants, 1 or 16.67% has been teaching the course for less than 2 years and 5 to 7 years respectively while 2 or 33.33% for 2 to 4 years and greater than 7 years respectively. The teacher-participants' mean length of teaching experience is 4.9 years. This implies that teacher-participants in this study have been teaching the course for almost 5 years and are expected to have acquired mastery in the teaching of the course.

Table 5. Frequency and Percentage Distribution of Teacher-Participants' Number of Trainings/Seminars Attended related to the Course

Number of trainings/seminars attended	Frequency	Percentage
None	4	66.66
1	1	16.67
2	1	16.67
Total	6	100.00

On the number of trainings and seminars attended by the teacher-participants related to the course, it can be noted that majority did not attend any training in the said course.

Based on the interview conducted by the researcher, there are no trainings and seminars that are related to the course but are rather related to mathematics and statistics. However, these trainings in Mathematics and Statistics are also much needed in teaching the course.

Table 6. Frequency and Percentage Distribution of Student-Participants' Program Enrolled

Program Enrolled	Frequency	Percentage
BS in Accountancy	38	6.67
BS in Accounting Technology	476	83.51
BS in Entrepreneurship	56	9.82
Total	570	100.0

Table 6 shows the frequency and percentage distribution of the student-participants' program. It can be viewed on the table that out of 570 student-participants 38 or 6.67% are BS in Accountancy, 476 or 83.51% for BS in Accounting Technology while 56 or 9.82% are BS in Entrepreneurship students. This implies that majority of the student-participants are enrolled in the BS in Accounting Technology.

Table 7. Frequency and Percentage Distribution of Student-Participants' Year Level Per School

Year Level	Frequency	Percentage
3rd year	565	99.12
4th year	5	0.88
Total	570	100.0

Table 7 shows the frequency and percentage of student-participants' year level, 565 or 99.12% are 3rd year while 5 or 0.88% are 4th year. This implies that majority of the student-participants belong to the 3rd year level.

Table 8. Mean Assessment of Participants as to the Extent of Attainment of the Course Objectives

Topics	Course Objectives	SP	DI	TP	DI	OM	DI
1. Review of Basic Statistical Principles	1. provides a basic understanding of the value and use of quantitative methods in business and operational problem solving and decision-making.	4.20	VGE	4.50	VGE	4.35	VGE
	2. applies variety of statistical and quantitative techniques to a wide range of business situations.	4.02	GE	4.33	VGE	4.18	GE
	3. recognizes particular techniques and their applications so as to be able to apply these techniques in problem solving for management decision making.	4.10	GE	3.83	GE	3.97	GE
	4. analyzes the basic foundations of probability analysis.	4.11	GE	4.00	GE	4.06	GE
	5. describes statistically dependent and independent events.	4.01	GE	4.33	VGE	4.17	GE
	6. uses Bayes' theorem to establish posterior probabilities.	3.48	GE	3.17	GE	3.33	ME
	7. describes and provide	4.00	GE	4.00	GE	4.00	GE

	examples of both discrete and continuous random variables.						
	8. explains the difference between discrete and continuous probability distributions.	3.91	GE	3.83	GE	3.87	GE
	9. calculates expected values and variances and use the normal table.	4.07	GE	4.00	GE	4.04	GE
	Category Mean	3.99	GE	4.00	GE	4.00	GE
2. Mathematical decision models to represent the relationship among elements relevant to a given situation and to determine the effects in external and internal conditions.	10. lists the steps of the decision-making process.	4.20	VGE	4.67	VGE	4.44	VGE
	11. describes the types of decision-making environments.	4.09	GE	4.67	VGE	4.38	VGE
	12. makes decisions under uncertainty.	3.92	GE	4.33	VGE	4.13	GE
	13. uses probability values to make decisions under risk.	4.02	GE	4.33	VGE	4.18	GE
	14. constructs accurate and useful decision trees.	4.08	GE	4.00	GE	4.04	GE
	15. revises probabilities using Bayesian analysis.	3.44	GE	3.00	ME	3.22	ME
	16. uses computers to solve basic decision-making problems.	3.51	GE	3.17	ME	3.34	ME
	17. recognizes the importance and use of utility theory in decision making.	3.86	GE	3.67	GE	3.77	GE
	Category Mean	3.89	GE	3.98	GE	3.94	GE
3. Matrices and Linear Programming	18. formulates Linear Programming (LP) models, including an objective function and constraints.	4.09	GE	4.17	GE	4.13	GE
	19. graphically solve an LP problem with the ISO-Profit Line Method.	3.81	GE	4.00	GE	3.91	GE
	20. graphically solve an LP problem with the Corner-Point Method.	3.78	GE	3.83	GE	3.81	GE
	21. interprets sensitivity analysis and shadow prices.	3.78	GE	4.00	GE	3.89	GE
	22. constructs and solve a minimization problem.	4.05	GE	4.17	GE	4.11	GE
	23. formulates production-mix, diet, and labor scheduling problems.	3.75	GE	3.83	GE	3.79	GE
	24. illustrates Quantitative Methods (QM)for Windows in LP Problems	3.74	GE	4.17	GE	3.96	GE
	Category Mean	3.86	GE	4.02	GE	3.94	GE

4. Time Series Analysis	25. performs the different time-series forecasting models: moving averages, exponential smoothing, the linear trend, the quadratic trend, the exponential trend, the autoregressive, and the least-squares models for seasonal data.	3.96	GE	4.17	GE	4.07	GE
	26. chooses the most appropriate time-series forecasting model.	3.97	GE	3.83	GE	3.90	GE
	27. recognizes the importance of index numbers as applied to business.	3.88	GE	3.00	ME	3.44	GE
	28. constructs relative indexes	3.71	GE	3.00	ME	3.36	ME
	Category Mean	3.88	GE	3.50	GE	3.69	GE
5. Aggregate Indexes	29. distinguishes the different Aggregate indexes .	3.64	GE	3.33	ME	3.49	GE
	30. differentiates the different weighted indexes	3.63	GE	3.33	ME	3.48	GE
	31. determines price indexes and the difference between aggregated and simple indexes.	3.68	GE	2.83	ME	3.26	ME
	32. applies the consumer price index as: a) Deflator b) Inflator	3.77	GE	2.50	LE	3.14	ME
	Category Mean	3.68	GE	3.00	ME	3.34	ME
	Over-all Mean	3.86	GE	3.71	GE	3.78	GE

Table 8 illustrates the individual mean, category mean and overall mean responses of participants as to the extent of attainment of the course objectives. The course objectives under the content Review of Basic Statistical Principles namely, "provides a basic understanding of the value and use of quantitative methods in business and operational problem solving and decision making" was assessed as "very great extent" while uses Bayes' Theorem to establish posterior probabilities was assessed as "moderate extent". Likewise, other course objectives such as "applies variety of statistical and quantitative techniques", "recognizes particular techniques and their applications", "analyzes the basic foundations probability analysis", "describes statistically dependent and independent events", "describes and provide examples of both discrete and continuous random variables", "explains the difference between discrete and continuous probability distributions" and "calculated expected values and variances" were assessed as "great extent". It can also be viewed on the table that both student and teachers-participants assessed course objective under Review of Basic Statistical Principles as "great extent" with category means of 3.99 and 4.00 respectively. The overall assessment of the participants on the course objectives under the content Review of Basic Statistical Principles is "great extent" with an overall mean of 4.00. This shows that participants thought that the course competencies under the said course content had been attained greatly in teaching and learning the course.

Under the course content Mathematical Decision Models, the course objectives such as "lists the steps of the decision-making process" and "describes the types of decision-making environments" were assessed as "very great

extent" while "revises probabilities suing Bayesian Analysis and uses computers to solve basic decision-making problems" were assessed as "moderate extent". In addition, the other course objectives under the said content such as "makes decision under uncertainty", "uses probability values to make decisions under risk", "constructs accurate and useful decision trees" and "recognizes the importance and use of utility theory in decision-making" were assessed as "great extent". Both student and teacher-participants assessed the course objectives under Mathematical decision models as "great extent" with category means of 3.89 and 3.98 respectively. The overall assessment of participants on the course objectives under Mathematical Decision Models is "great extent" with overall mean of 3.94. This shows that the participants thought that these course competencies under the said course content had been attained greatly in teaching and learning the course.

All the course objectives under the course content Matrices and Linear Programming such as "formulates Linear Programming (LP) models", "graphically solve an LP problem with ISO-Profit and Corner-Point Method", "interprets sensitivity analysis and shadow prices", "constructs and solve a minimization problem", "formulates production-mix, diet and labor scheduling problems" and "illustrates QM for Windows in LP problems" were assessed as "great extent". Similarly, both student and teacher-participants assessed the course objective under Matrices and Linear Programming as "great extent" with category means of 3.86 and 4.02 respectively. The overall participants' assessment on the course objectives under Matrices and Linear Programming is "great extent" with a mean of 3.94. This implies that the participants believed that the competencies under the said course content have been attained greatly in the course.

The course objectives under Time Series Analysis like "performs the different time-series forecasting models", "chooses the most appropriate time-series forecasting model" and "recognizes the importance of index numbers" were assessed as "great extent" while constructs relative indexes was assessed as "moderate extent". Meanwhile, both student and teacher-participants assessed the course objectives under Time Series Analysis as "great extent" with category means of 3.88 and 3.50 respectively. The overall assessment of participants on the course objectives under the course content Time Series Analysis is "great extent" with an overall mean of 3.69. This means that the participants thought that the course competencies under the said content had been achieved greatly in teaching and learning the course.

Furthermore, the course objectives under the content Aggregate Indexes such as "distinguishes the different aggregate indexes and differentiates the different weighted indexes" were assessed as "great extent" while "determines price indexes and applies the consumer price index as deflator and inflator" were assessed as "moderate extent". In addition, student-participants assessed the course objective under Aggregate Indexes as "great extent" with a category mean of 3.68 while the teacher-participants is "moderate extent" with a category mean of 3.00. This means that student-participants' assessment under this course objective is higher than the teacher-participants.

The overall assessment of both student and teacher-participants as to the extent of attainment of the course objectives is "great extent" with overall means of 3.86 and 3.71 respectively. This implies that both participants believed that the course competencies from the course syllabus have been attained greatly. Generally, the overall assessment of participants as to the extent of attainment of the course objectives is "great extent" with an overall mean of 3.78. This implies that, generally, the participants had assessed the course objectives to a "great extent". This further implies that the participants had achieved greatly the different competencies as indicated in the course syllabus.

Table 9. Mean Assessment of Participants as to the Extent of Coverage of the Course Content based from CHED Memorandum Order No.3, s. 2007

Course Content	Mean Students' Participants	DI	Mean Teachers' Participants	DI	Overall Mean	DI
1. Review of basic statistical principles						

1.1 Probability concepts, addition and multiplication laws, and tree diagrams	4.35	VGE	4.67	VGE	4.51	VGE
1.2 Normal distribution concepts	4.22	VGE	4.33	VGE	4.28	VGE
1.3 Variance with expected values	4.20	VGE	4.17	GE	4.19	
1.4 Expectation concepts and their application to decision problems	4.12	GE	4.33	VGE	4.23	VGE
1.5 Populations and samples	4.31	VGE	4.00	GE	4.16	GE
1.6 Frequency distributions	4.33	VGE	4.17	GE	4.25	VGE
1.7 Measures of central location	4.06	GE	4.67	VGE	4.37	VGE
1.8 Measure of dispersion/variability	4.05	GE	4.50	VGE	4.28	VGE
Category Mean	4.20	VGE	4.35	VGE	4.28	VGE
2. Statistical decision theory						
2.1 Probability rules and Bayes' rules	3.68	GE	3.50	GE	3.59	GE
2.2 Probability decision trees	4.05	GE	4.17	GE	4.11	GE
Category Mean	3.86	GE	3.83	GE	3.85	GE
3. Mathematical decision models to represent the relationship among elements relevant to a given situation and to determine the effects in external and internal conditions.	3.99	GE	4.00	GE	4.00	GE
4. Matrices and linear programming						
4.1 Matrices	3.90	GE	4.00	GE	3.95	GE
4.2 Graphic linear inequalities	4.10	GE	4.17	GE	4.14	GE
4.3 The linear programming model	4.24	VGE	4.33	VGE	4.29	VGE
4.4 Graphical sensitivity analysis	3.92	GE	4.00	GE	3.96	GE
4.5 Use of the computer for linear, non-linear and integer programming	3.61	GE	3.83	GE	3.72	GE
Category Mean	3.95	GE	4.07	GE	4.01	GE
5. Time Series Analysis						
5.1. Method of estimating trend						
5.1.1 Free hand method	3.61	GE	3.67	GE	3.64	GE
5.1.2 Moving average	3.79	GE	3.50	GE	3.65	GE

method						
5.1.3 Semi-average method	3.73	GE	4.00	GE	3.87	GE
5.1.4 Least square regression method	3.81	GE	4.00	GE	3.91	GE
Category Mean	3.74	GE	3.79	GE	3.77	GE
5.2 Cyclical variation	3.60	GE	3.00	ME	3.30	ME
5.3 Single relation index number						
5.3.1 Definition: index number	3.57	GE	2.83	ME	3.20	ME
5.3.2. Importance of index numbers	3.59	GE	2.83	ME	3.21	ME
Category Mean	3.58	GE	2.83	ME	3.21	ME
5.4 Construction of:						
5.4.1 Price relative index	3.67	GE	2.83	ME	3.25	ME
5.4.2 Quantity relative index	3.67	GE	2.67	ME	3.17	ME
5.4.3 Value relative index	3.65	GE	2.83	ME	3.24	ME
Category Mean	3.66	GE	2.78	ME	3.22	ME
Overall category Mean for Time Series Analysis	3.65	GE	3.10	ME	3.30	ME
6 Aggregate indexes						
6.1 Unweighted	3.62	GE	2.83	ME	3.23	ME
6.2 Weighted						
6.2.1 Laspeyres index numbers	3.42	GE	2.67	ME	3.05	ME
6.2.2 Paasche index numbers	3.38	GE	2.67	ME	3.03	ME
6.2.3 Fixed weight index numbers	3.42	GE	2.50	LE	2.96	ME
Category Mean	3.41	GE	2.61	ME	3.01	ME
6.3 Shifting the base period						
6.3.1 Percent Change	3.64	GE	2.33	LE	2.99	ME
6.3.2 Rebasing	3.42	GE	2.50	LE	2.96	ME
Category Mean	3.53	GE	2.42	LE	2.98	ME
6.4 Applications						
6.4.1 Consumer price index (CPI)	3.88	GE	3.00	ME	3.44	GE
6.4.2 CPI as deflator	3.80	GE	2.83	ME	3.32	ME
6.4.3 CPI as inflator	3.77	GE	3.17	ME	3.47	GE
Category Mean	3.82	GE	3.00	ME	3.41	GE
Overall category mean for Aggregate Indexes	3.60	GE	2.72	ME	3.16	ME
Overall Mean	3.88	GE	3.68	GE	3.77	GE

Table 9 shows the individual means, category means and overall mean of the participants' assessment as to the extent of coverage of the Course Content based on the topics covered from CMO No.3, s. 2007. The table reveals that the topics under Review of Basic Statistical Principles such as probability concepts, normal distribution concepts, expectation concepts and their application to decision problems, frequency distributions, measures of central location and dispersion were assessed as attained to a "very great extent" while the topics population and samples and variance with expected values were assessed as attained to a "great extent". Also, both student and teacher-participants assessed the course content Review on Basic Statistical Principles as "very great extent" with category means of 4.20 and 4.35 respectively. The overall assessment of the participants under the content Review of Basic Statistical Principles is "very great extent" with an overall mean of 4.28. This implies that this content from the course syllabus had been discussed very greatly.

Moreover, the topics under the content Statistical Decision Theory such as probability and Bayes' Rule and probability decision trees were assessed as attained to a "great extent". The assessment of both student and teacher-participants of the course content Statistical Decision theory is "great extent" with category means of 3.86 and 3.83 respectively. The overall participants' assessment on the topics under the content Statistical Decision Theory is "great extent" with an overall mean of 3.85. This shows that the participants thought that this course content from the course syllabus have been discussed greatly.

Also, both student and teacher-participants assessed the course content Mathematical decision models as "great extent" with category means of 3.99 and 4.00 respectively. The overall assessment of the participants under the content Mathematical Decision Theory is "great extent" with an overall mean of 4.00. This implies that the participants believed that this course content was discussed greatly.

Also, the topics under the Matrices and Linear and Programming such as matrices, graphic linear inequalities, graphical sensitivity analysis and use of computer were assessed as attained to a "great extent" while the linear programming model was assessed as "very great extent". Likewise, the assessment of both student and teacher-participants of the extent of coverage of the course content Matrices and Linear Programming is "great extent" with category means of 3.95 and 4.07 respectively. The overall participants' assessment under the content Matrices and Linear Programming is "great extent" with an overall mean of 4.01. This shows that the participants believed that the said content was covered and discussed greatly.

Under the content Time Series Analysis, the topic method of estimating trend was assessed as "great extent" while topics such as cyclical variation and construction of price, quantity and value relative index were assessed by the participants as attained to a "moderate extent". Also, student-participants assessed the course content Time Series Analysis as "great extent" with a category mean of 3.65 while for teacher-participants is "moderate extent" with a category mean of 3.10. This shows that the student-participants' assessment of this course content is higher than the teacher-participants. Meanwhile, the overall assessment of the participants under the content Time Series Analysis is "moderate extent" with an overall mean of 3.30. This shows that this content was moderately discussed in the course.

Lastly, under the course content Aggregate Indexes, the topics such as unweighted and weighted index numbers and shifting the base period were assessed as attained to a "moderate extent" while the applications on Consumer Price Index (CPI) as deflator and inflator is "great extent". Also, the assessment of student-participants of the course content Aggregate Indexes is "great extent" with a category mean of 3.60 while for teacher-participants is "moderate extent" with a category mean of 2.72. This means that the assessment of student-participants of the extent of coverage of this course content is higher than the teacher-participants. The overall assessment of the participants under the content Aggregate Indexes is "moderate extent" with an overall mean of 3.16. This means that this course content that was covered from the course syllabus was moderately discussed. This implies that these topics were not given enough weight or emphasis in teaching and learning the course.

Hence, on the basis of the overall mean of 3.77 as "great extent", both student and teacher-participants assessed the extent of coverage of the

course content as "great extent" with means of 3.68 and 3.88 respectively. This means that both participants believed that the topics from the course syllabus were discussed greatly.

Table 10. Mean Assessment of Participants as to the Extent of the Use of Teaching Strategies

Teaching Strategies	Mean Students' Participants	DI	Mean Teacher Participants	DI	Overall Mean	DI
1. Problem-based Learning Approach	4.22	VGE	4.00	GE	4.11	GE
2. Lecture-Discussion Method	4.33	VGE	4.00	GE	4.17	GE
3. Reinforcing Math Skills through Games	3.66	GE	3.60	GE	3.63	GE
4. Structured Peer Tutoring	3.63	GE	3.40	GE	3.52	GE
5. Research Based Instruction	3.76	GE	3.80	GE	3.78	GE
6. Cooperative and Collaborative learning/Group Dynamics	3.85	GE	3.80	GE	3.83	GE
7. Think-Pair-Share Strategy	3.74	GE	3.80	GE	3.77	GE
8. Jigsaw Method	3.39	GE	2.80	ME	3.10	ME
9. Peer-Teaching Collaboration	3.77	GE	3.80	GE	3.79	GE
10. Discovery/Inquiry based learning	3.76	GE	3.80	GE	3.78	GE
11. Scaffolding Instruction	3.51	GE	3.80	GE	3.66	GE
12. Project-based Learning	3.64	GE	3.60	GE	3.62	GE
Category Mean	3.77	GE	3.68	GE	3.73	GE

Table 10 shows participants' assessment as to the extent of the use of teaching strategies. It can be viewed from the table that all teaching strategies were assessed as utilized to a "great extent" by both student and teacher-participants apart from Jigsaw Method which was assessed as "moderate extent" with a mean of 3.10. Although the assessment of the said teaching method is moderately used, nonetheless, some of the importance of the method were mentioned by some authors. According to Aronson (2018), Jigsaw is a research-based cooperative learning strategy that enhances student motivation and performance, decreases absenteeism, and increases enjoyment of the learning process while also reducing racial tension among schoolchildren.This technique works because each student must contribute, and that is exactly what makes it work.

The assessment of both student and teacher-participants as to the extent of the use of learning strategies is "great extent" with category means of 3.77 and 3.68 respectively. This shows that both participants' have the same descriptive interpretation on the use of teaching strategies. This implies that student-participants believed that teaching strategies were greatly used by their teacher in teaching the course. Generally, the assessment of participants as to the extent of the use of teaching strategies is "great extent" with an overall mean of 3.73. This implies that teaching strategies are greatly used in teaching and learning the course.

Table 11. Mean Assessment of Participants as to the Extent of the Use of Assessment Strategies

Assessment Strategies	Mean Students' Participants	DI	Mean Teachers Participants	DI	Overall Mean	DI
1. Quizzes or Long Examinations	4.42	VGE	3.83	GE	4.13	GE
2. Assignments	4.34	VGE	3.67	GE	4.01	GE
3. Problem sets	4.32	VGE	3.83	GE	4.08	GE
4. Seatwork/Boardwork	4.34	VGE	4.67	VGE	4.51	VGE
5. Graded Recitations	3.98	GE	4.17	GE	4.08	GE
6. Major Examinations (e.g. Prelim, Midterm, Finals)	4.58	VGE	4.17	GE	4.38	VGE
Category Mean	4.33	VGE	4.06	GE	4.20	VGE

Table 11 shows participants' assessment as to the extent of the use of assessment strategies. It can be viewed from the table that both participants assessed as "very great extent" the use of Seatwork/Boardwork and Major Examinations with means of 4.51 and 4.38 respectively. On the other hand, assessment strategies like quizzes or long examinations, assignments, problem sets and graded recitations were assessed as "great extent". Major examinations are assessments usually given to the students at the end of each grading period like Prelims, Midterms and Finals. Also, the study of Stenberg (2010) mentions that aside from assignments, performances of the students were also assessed using, mid-semester test and final exam averages.

Meanwhile, the assessment of student-participants as to the extent of the use of assessment strategies is "very great extent" with a category mean of 4.33 while for teacher-participants is "great extent" with a corresponding category mean of 4.06. This shows that student-participants' assessment on assessment strategies is higher than the teacher-participants' assessment. This implies that student-participants were confident that the assessment strategies were very greatly utilized as assessment by their teacher in teaching the course. Generally, the assessment of participants as to the extent of the use of assessment strategies is "very great extent" with an overall mean of 4.20. This implies that the assessment strategies mentioned above were very greatly utilized as assessment strategies in the teaching and learning the course.

Table 12. Mean Assessment of Participants as to the Extent of the Use of Learning Resources and Facilities

Learning Resources and Facilities	Mean Students' Participants	DI	Mean Teachers' Participants	DI	Overall Mean	DI
1. Computers or laptops	3.78	GE	4.50	VGE	4.14	GE
2. LCDs and projectors or Powerpoint Presentations	3.72	GE	4.17	GE	3.95	GE
3. Hand-outs	4.06	GE	4.00	GE	4.03	GE
4. Textbooks	3.81	GE	3.83	GE	3.82	GE
5. Math software	3.05	ME	4.33	GE	3.69	GE
6.Calculators	4.50	VGE	4.83	VGE	4.67	VGE
7. Worksheets	3.88	GE	4.33	VGE	4.11	GE
8. Course syllabus	4.44	VGE	4.33	VGE	4.39	VGE
Category Mean	3.90	GE	4.29	VGE	4.10	GE

Table 12 illustrates participants' assessment as to the extent of the use of learning resources and facilities. It can be seen from the table that using calculators and course syllabus were marked as "very great extent" with corresponding means of 4.67 and 4.39 respectively. Basically, in Quantitative Techniques in Business or in any mathematics courses, calculator is much

needed to compute basic mathematical problems and statistics. On the other hand, the rest of the learning resources and facilities were assessed as "great extent".

In addition, student-participants assessed the use of learning resources and facilities as "great extent" with a corresponding category mean of 3.90 while for teacher-participants is "very great extent" with a corresponding category mean of 4.29. This shows that teacher-participants' assessment on the use of learning resources and facilities is higher than the student-participants' assessment. This implies that teacher-participants is certain that the learning resources and facilities that were mentioned were very greatly utilized in teaching the course. Generally, the assessment of participants as to the extent of the use of learning resources and facilities is "great extent" with a mean of 4.10. This implies that the learning resources and facilities mentioned were greatly utilized as learning resources in teaching and learning the course.

According to Busljeta (2013), the goal and function of teaching and learning resources go beyond just enhancing the appeal and interest of the educational process. They also support active learning, the growth of various abilities, and the adoption of students' desired values and attitudes.Clarifying the conditions and procedures for using teaching and learning resources in the teaching and learning process is crucial to achieving the aforementioned goals.

Table 13. Rank Distribution of the Problems and Difficulties Encountered by Student-Participants in Quantitative Techniques in Business

Problems and Difficulties	Frequency	Rank
1. Unavailability of software related to the course	278	1st
2. Lack of facilities.	276	2nd
3. Lack of course textbooks	254	3rd
4. Lot of formulas are to be memorized	230	4th
5. Lack of trainings and seminars related to the course	214	5th
6. Lack of instructional aids	179	6th
7. Examination pressure due to problems not related to real life situation	170	7th
8. Classroom environment is not conducive for learning	164	8th
9. Large classes or overcrowded classrooms	137	9th
10. Overloaded curriculum (too much content to be covered)	134	10th
11. The teacher sometimes gets absent	131	11th
12. Lack of support from the school	106	12th
13. The teacher does not teach regularly	95	13th
14. Poor teaching methods and practices	89	14th
15. The teacher is not aligned or not fit to teach the course	52	15th

Table 13 presents the listing of problems and difficulties encountered student-participants. It can be noted that "unavailability of software related to the course" ranked 1st among the problems experienced by the students in the course, followed by "lack of facilities", and 3rd is "lack of course textbooks**".** With regard to software in business education particularly in Quantitative Techniques in Business, students make use of math software in solving Linear Programming (LP) problems. According to Kilicman and Husain (2010) in their study titled, "Teaching and Learning using Math Software: The New Challenge", although teaching and learning in mathematics curriculum in universities by using math software is difficult and demanding task, it provides conceptual and meaningful understanding for the student.

Afework&Asfaw (2014) mentioned regarding school facilities and instructional materials like textbooks. Research result showed that the unavailability of school facilities and instructional materials created a great challenge on teaching and learning activities that, in turn, had a negative impact on the improvement of the quality of education.According to Khan and Iqbal's (2012) research, having adequate and high-quality school facilities is essential to providing students with a high-quality education and enabling schools to carry out their stated objectives. Their emphasis on the fact that learning is a complex activity requiring the motivation of both students and teachers, adequate school facilities like standardized buildings and classrooms with their facilities, instructional materials, and equipment for children's development strengthens the concept.

Meanwhile, "lot of formulas are to be memorized" and "lack of seminars and trainings related to the course" also ranked 4th and 5th, respectively in the list of problems and difficulties encountered by students.

Table 13. Rank Distribution of the Problems and Difficulties Encountered by Teacher-Participants in Quantitative Techniques in Business

Problems and Difficulties	Frequency	Rank
1. Lack of facilities in teaching the subject.	6	1.5
2. Lack of trainings and seminars related to the course	6	1.5
3. Unavailability of software related to the course	5	3rd
4. Students have poor foundations in mathematics	4	4.5
5. Much workload for lecturers	4	4.5
6. Lack of support from the school	3	7.5
7. Classroom environment in not conducive for learning	3	7.5
8. Large classes or overcrowded classrooms	3	7.5
9. Negative attitude towards course among students	3	7.5
10. Lack of textbooks.	2	10.5
11. Overloaded curriculum (too much content to be covered)	2	10.5
12. Lack of instructional aids	1	12th
13. Habitual absences of students	1	13th

Table 13 illustrates the listing of problems and difficulties encountered by teacher-participants. It can be seen from the table that "lack of facilities in teaching the subject" and "lack of trainings and seminars related to the course" ranked 1st among the problems experienced by the teacher-participants followed by "unavailability of software related to the course". According to Earthman (2002), school facility conditions affect student academic achievement. This contradicts the study of Hedges and Theoreson (2000) that adequacies of school facilities do not guarantee student's academic performance but the proper utilization of the facilities has a great value.Therefore, it is important to pay attention to the availability of school facilities and the efficient use of these resources in order to enhance the quality of education. Thus, raising the quality of education has emerged as the current hot topic. At the school and classroom levels, a number of interrelated components must work together to produce high-quality education.Most people agree that the quality of educational resources is the most crucial of these variables.

Programs for teachers' professional development and training, whether they are for primary, middle, high, or even collegiate levels of education, are of utmost importance in any educational institution. If teachers at all levels are to alter their teaching beliefs, attitudes, and daily living practices in the classrooms, they must

regularly receive training in their associated fields and subject matter. These programs will support teachers in honing their instructional techniques as well as in-depth and improved subject-matter knowledge, which will enhance student learning and school education. The curriculum and teachers' actual teaching experiences need to be in harmony for positive and effective transformation to occur. Another crucial factor relates to the effectiveness of the time teachers spend on professional development. Professional development programs that place a heavy emphasis on high-quality subject matter content will be more beneficial to teachers (Bourdersa, 2016).

In relation to educational software related to the course, Colado, et al., (2017) mentioned regarding the use of Mathematics educational software to support the learning of the first-year primary students in Mexico. Overall, the study suggests, based on the survey conducted, the use of mathematics educational software has a positive impact on the learning of the students.

Proposed Intervention Program in the Teaching and Learning of Quantitative Techniques in Business**

Rationale

Teachers play a vital role in making the teaching and learning process become meaningful and worthwhile. This Intervention Program was developed to address the needs of students and teachers in the teaching and learning of Quantitative Techniques in Business.

The primary goal of the intervention program is to enhance the skills and competencies of the students and teachers by providing them the opportunities to expand their knowledge and develop their potentials and interests in the course. It assumes the idea that the faculty would feel their worth and receive their affirmations if administrators would listen to their recommendations and suggestions.

As a result of the study, generally, students and teachers assessed the different learning competencies to a great extent such as attainment of the course objectives, coverage of the course content, use of teaching and assessment strategies and learning resources and facilities. Nonetheless, there is a need to improve in some areas in the course.

It was also found out that teachers lack trainings and seminars that are related to the course. Trainings and seminars are needed to improve teachers' knowledge and skills in teaching the course.

It was observed that many schools are not utilizing mathematical software in the teaching and learning of the course. To improve instruction math software is needed to enhance the teaching and learning process.

On the other hand, it was also found out in this study that lack of textbooks in teaching and learning the course is also a problem. Textbooks are the most important feature of teaching mathematics in the classroom which were designed to help teachers to organize their teaching.

Program Objectives

Based on the aforementioned problems of students and teachers in the teaching and learning of the course, this proposed intervention program was conceptualized with the following objectives:

1. to enhance teachers' knowledge and skills in teaching the course;
2. to facilitate the teaching and learning of the course;
3. to improve instruction; and
4. to conduct skills assessment on the use of math software

The Intervention Programs prepared by the researcher is based on the problems and difficulties encountered by both participants in the course. The role of the researcher in the intervention program is to address and recommend the prepared intervention program to the different schools in this study for its implementation.

Note: ** see the appendix page for the intervention program

CONCLUSION AND RECOMMENDATIONS

Based on the results of the study, Quantitative Techniques in Business course has been taught and learned properly. The different schools are compliant regarding the minimum requirement on the course content under CMO No. 3, s. 2007 as prescribed by the Commission on Higher Education in teaching and learning the course. The teaching practices of the teachers play a significant role in the teaching and learning of

the course since these could employ high quality of instruction for the improvement of mathematics education, especially Quantitative Methods in Business. Moreover, the trainings and seminars can also improve teachers' knowledge and skills in teaching the course. Likewise, the learning facilities needed in the course of instruction can enhance and facilitate the teaching and learning of the course.

The administrators may allot funds for the purchase of math software as one of the priority projects in improving instructions, may provide facilities to enhance the teaching and learning of the course, may provide more course textbooks in Quantitative Techniques in Business and provide trainings/seminars workshop to improve teachers' knowledge and skills in teaching the course.

Moreover, the administrators may allot funds for the purchase of math software as one of the priority projects in improving instructions. The course competencies should be given more emphasis and importance when teaching and learning the course since the assessment is low. Also, the teachers may take a careful evaluation on the topics covered in the CMO on what topics to be added or retained in the course syllabus based from CMO.

The teacher may integrate quantitative research in the course syllabus as part of the output or requirement in the course with the purpose of sustaining the life of quality and excellence in the course. In addition to these, math teachers should be urged to engage in action research activities and make research as part of their teaching scheme in research-based instruction. The teachers may find enough time in identifying the weaknesses, problems and difficulties of the students in learning the course as these will serve as bases in enhancing the program. The researcher shall present the enhanced program of the course to the administrators in all business schools and seek further support for implementation.

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Appendices

Table 14-A. PROPOSED INTERVENTION PROGRAM FOR TEACHER-PARTICIPANTSIN THE TEACHING AND LEARNING OF QUANTITATIVE TECHNIQUES IN BUSINESS

OBJECTIVES	ACTIVITITY / STRATEGY	TIME FRAME	PERSON INVOLVED	MATERIALS NEEDED	VENUE
✚ To enhance teachers' knowledge and skills in teaching the course ✚ To facilitate the teaching and learning of the course ✚ To improve instructions	✚ Design a training program for teachers regarding math software. Steps to an effective training program: 1. Define purpose of training and target audience 2. Perform a Training Needs Assessment 3. Develop Learning Objectives 4. Design Training Materials 5. Develop Training Materials 6. Implement the Training 7. Evaluate the Training	✚ Year round	✚ Teachers ✚ Students ✚ Administrators ✚ Training Coordinators ✚ Trainer/ Speaker ✚ Facilitators ✚ Graphic Designer ✚ Implementer	✚ Assessment tool ✚ Evaluation tool ✚ Overhead Projector ✚ Computer/ laptop ✚ Printer ✚ Participant worksheets ✚ Handouts/ module ✚ Pencil / ballpen ✚ Envelops ✚ Bond paper	✚ Faculty room ✚ Training office ✚ Computer lab/ function hall

	✦ attend seminars and trainings conducted by CHED accredited organizations	✦ Year round	✦ Teachers ✦ Students ✦ Coordinators ✦ Administrators ✦ Researcher	✦ training forms ✦ invitations ✦ special order ✦ itinerary form	
	✦ coordinate with the different stake holders for the source of the math software	✦ August 2018-December 2018	✦ Administrators ✦ Stake holders ✦ Teachers		
	✦ request from the administration to purchase, install and enhanced math software needed for teaching and learning the course	✦ January 2019-August 2019	✦ Computer technician ✦ Administrators ✦ Stake holders ✦ Teachers	✦ Software installer ✦ computer	✦ computer lab.
	✦ request a computer laboratory for the math software				
✦ to increase students' knowledge regarding the course ✦ to facilitate teaching and learning the course	✦ suggest available textbooks from the different bookstore ✦ request from the administration to purchase textbooks needed in the course ✦ request online journals/ textbooks/ periodicals	✦ August 2018-September 2018	✦ School librarian ✦ administrators ✦ Stakeholders ✦ Teachers	✦ textbook list ✦ requisition slip	✦ library ✦ book store
✦ to	✦ desig	✦ Aug	✦ Teachers	✦ Lapto	✦ facul

enhance teaching and learning the course	n and create interactive instructional aids for the course	ust 2018-December 2018		p/ computer Bond paper printe r	ty room

Table 14-B. PROPOSED INTERVENTION PROGRAM FOR STUDENT-PARTICIPANTS IN THE TEACHING AND LEARNING OF QUANTITATIVE TECHNIQUES IN BUSINESS

OBJECTIVES	ACTIVITITY/ STRATEGY	TIME FRAME	PERSON INVOLVED	MATERIALS NEEDED	VENUE
To enhance students' knowledge and skills in the course To facilitate students' learning in the course To improve instructions	Design a training program for students regarding math software. Steps to an effective training program: 1. Define purpose of training and target audience 2. Perform a Training Needs Assessment 3. Develop Learning Objectives 4. Design Training Materials 5. Develop Training Materials 6. Impleme nt the Training 7. Evaluate the Training	Year round	Stude nts Teach ers Admi nistrators Train ing Coordinators Train er/ Speaker Facili tators Grap hic Designer Imple menter	Assess ment tool Evaluat ion tool Overhe ad Projector Compu ter/ laptop Printer Particip ant worksheets Hando uts/ module Pencil/ ballpen Envelo ps Bond paper	Clas sroom Trai ning office Com puter lab/ function hall
	attend seminars and trainings conducted by CHED accredited organizations	Year round	Stude nts Coor dinators Admi nistrators Resea rcher	training forms invitati ons special order itinerar y form	
	ask the help from the teachers regarding the use of math software in the course	Aug ust 2018-December 2018	Admi nistrators Stake holders Teach ers		
to	suggest	Aug	Schoo	textboo	libra

increase students' knowledge regarding the course ➢ to facilitate teaching and learning the course	course textbooks from the teacher to be used in the course ➢ download online journals/ textbooks/ periodicals	ust 2018-September 2018	l librarian ➢ administrators ➢ Teachers	k list ➢ requisition slip	ry ➢ book store