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## THE EFFECTIVENESS OF THE USE OF EXPLORATORY APPROACH IN THE TEACHING OF MATHEMATICS OF INVESTMENT AMONG FRESHMEN BUSINESS ADMINISTRATION STUDENTS: A PILOT STUDY

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**Abstract:** *One of the principles of learning states that “The learner must be active not passive for maximum learning”. This principle is adroitly expressed in the Chinese adage: “I hear and I forget, I see and I remember, I do and I understand”. The process of learning is primarily controlled by the learner and not by the teacher. Learning is not only a function of what a teacher does, says, or provides a learner. More significantly, learning has to do with something happen in the unique world of the learner. Learning readily takes place when teaching serves as a facilitating process that helps the learner to explore and discover the world around him. Learning by doing is important. It is therefore important that teachers must apply the appropriate approach in teaching where students will be encourage to participate and do the activities voluntarily. One way to motivate the students to involve him in the activity is through the use of exploratory approach. Concepts are more develop and remembered if they do it by themselves. The study attempted to assess the effectiveness of the exploratory approach in teaching Mathematics of Investment, the true-experimental research design, which made used of pre-test and post-test to two-matched groups, was used.*

**Key Words:** *Exploratory Approach, Mathematics of Investment, Traditional Method, True-Experimental Research Design, Attitude Scale, Achievement Test, Match Group*

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## **INTRODUCTION**

Education is the core of the teaching-learning process. What the recipient's learn depends on the output of the agent of education. He must remember that he is the producer of knowledge and wisdom, the interpreter of the past, preserver of the present and the determiner of the future. He is at the helm of providing illumination of knowledge searchers and a voluble influence to heighten the spirit of love, concern and interest to the mathematics lexicon; thus, educators have a commitment and responsibility to himself and to his profession and the societal development in general.

The modern age of rapid technological development and the millennium era tintured the society with a vast changes of influencing the worldwide way of life economically, socially, politically, etc. and an introduction of alienation to the instruction to a more wholesome, comprehension and highly technical approach involving less human instruction.

Society that group uncomplainingly to the modern technological innovations and advancement achieve fame and destruction of development by not overlooking the observant of educational foundation of learning while bewilderment is facing for countries who are squabble for such new innovations. In complacency to universal reaction, the field of all development is the basis of all sciences particularly in modern science and technology.

Mathematics underwent a vital role in such a way that other sciences cannot work independently by not utilizing operationally the concept of math. In the recourse of everyday life, mathematics is somewhat subtle for such purpose indeed, the lexicon is a science of all sources that even an ages old problems of the world met solution and encumbrances for progress and prosperity was taken into nullification and void. It is one frequency, which is a pre-requisite to mastering scientific and technological pursuit. Hence, contribute directly or indirectly to all phases of modern civilization.

Among all other fundamental subject areas in the field of education, mathematics is one of the most essential tools in the development of our country. Mathematics needs to be given importance and full attention particularly its teaching methods and strategies in order to meet the needs of the learners. It is therefore essential for teachers to explore and upgrade their strategies in teaching the said subject to make learning meaningful, enjoyable and become permanent.

The teacher is as important as the student in the teaching learning process. He will stimulate, guide, and direct the students in all broad phases of their growth and



development, both personal and scholastic. Learning mathematics as a field of discipline is greatly dependent on mathematics teaching. Whatever techniques, styles or methods the teacher employs in his teaching would greatly affect the learning retention and understanding of the students. It is believed that the use of the lecture method is the real source of difficulty experienced and negative impressions by the students. This is one drawback of the teacher where teaching methods is dependent on a monotony and traditional approach.

Mathematics education is faced with challenges and demands, which Philippines are constantly left behind on this area. Educators fall the responsibility and challenge of gathering essential information and conducting continuous research to improve and enhance the methods of transforming and forming individual to make them progress and make them competent and excel in the field of mathematics.

In the end view to ensure efficient and effective teaching particularly mathematics, educators' motive should be right and noble, his ideas must be high, his standard must be correct and his spirit must be worthy. His professional growth must be continuous and must never cease. His face should always be the rising sun. To ensure quality education in mathematics, educators tried varied approaches in the teaching of mathematics, one of which is the exploratory approach. It can be said that no one has proved one method to be superior to another in every situation. In other words, there is no best method of teaching for all teaching-learning situations. Likewise, there is no way to teach a particular process effectively, but there are certain fundamental teaching methods and approaches adversely. Exploratory approach is no exemption if not properly planned and executed.

Hence, this study attempts to investigate the effectiveness of this approach as a tool in the teaching of mathematics of investment among freshmen business administration students of Cagayan colleges Tuguegarao with an end goal of improving the quality of classroom instruction in terms of better academic performance, the interest and attitude of students towards the subject.

## **CONCEPTUAL FRAMEWORK**

Educators are re-appraising not only "what" mathematics should be taught, but also "how" it should be taught. His ability to create effective teaching and learning situations should grow with every single day he spends in the classroom.

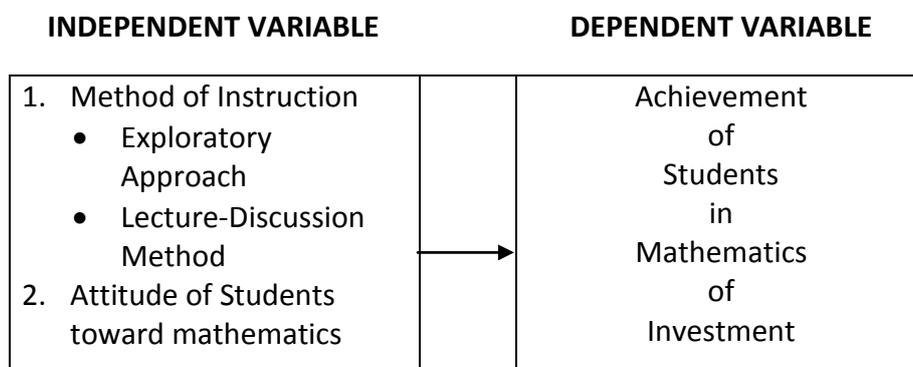


Teaching is a profession. According to Lardizabal (1991, p 11) one of the responsibilities of the teacher to his students should earnestly make learning experiences of the students enjoyable, fruitful and meaningful.

Likewise, educator agree that appropriate approach play a vital role in the effectiveness and enhancement of classroom instruction with the end view of improving academic achievement of students and motivate to love mathematics. It is an exact science, which entails concepts development. This can be a subject everyone can love and enjoy when one is taught to understand every detail of it. Snader (1960, pp.1-5) claims that mathematics literacy is a must for living in today's world, and these is a sharp division between the traditional and modern mathematics. There is however no discontinuity in the growth out of the old and that will be new tomorrow is already taking root in the mathematics of today.

Gorospe (1987, p.8) in his article "How to Make Teaching Interesting?" stresses that mathematics is fundamental to the study and understanding of all sciences. It enters every walk of life. With this knowledge, mathematics becomes an expression of the human mind for it reflects active will, the contemplative reason, and the sincere desire for aesthetic perception. He further emphasized the primary purpose of teaching mathematics. That teaching this field of discipline should develop those habits of thoughts and actions which will make these powers effective in the daily living of the learner. Favorable attitude toward this subject maximize the possibility that the student will willingly learn to perform a better, remember and use what he has learned efficiently.

The conceptual paradigm is shown as follows:



**Figure 1 Conceptual Paradigm Showing the Relationship of the Variables of the Study**



The independent variables in the paradigm are the exploratory approach, the lecture-discussion methods and attitude of students toward mathematics. The two methods that were used in this study was compared. The exploratory approach in the teaching of mathematics of investment is expected to enhance achievement of the students and to develop their interest and love for the subject. The dependent variable, which is the achievement in the subject, is the focus of the investigation, which is influence by the independent variable shown by the attitude and the two approaches in teaching mathematics. Achievement in mathematics therefore is dependent upon the effectiveness in teaching the subject with the use of exploratory approach.

### **STATEMENT OF THE PROBLEM**

The study assessed the effectiveness of exploratory approach in the teaching of Mathematics of Investment to the Freshmen Business Administration Students in comparison to the lecture-discussion method.

Specifically, it sought to answer the following problems:

1. Is there a significant difference in the mean achievement of the students being taught with the use of exploratory approach in Mathematics of Investment in comparison to those students taught with the use of traditional method?
2. What is the attitude of the students toward Mathematics of Investment?
3. Is there a significant relationship between the mean achievement in Mathematics of Investment and their attitude towards the subject?

### **HYPOTHESES**

This study was guided by the following hypotheses:

1. There is no significant difference in the mean achievement of the students taught with the use of exploratory approach in Mathematics of Investment in comparison to those students taught with the use of traditional method.
2. There is no significant relationship between the mean achievement of students in Mathematics of Investment and their attitude towards the subject.

### **METHODS**

#### **Research Design**

Since this study attempted to assess the effectiveness of the exploratory approach in teaching Mathematics of Investment, the true-experimental research design, which made



used of pre-test and post-test to two-matched groups, was used. The design involved the comparison of the mean achievement of students that were exposed to the exploratory approach and those that were exposed to the traditional method of teaching.

### Respondents of the Study

The respondents of the study were composed of 60 freshmen Business Administration students of Cagayan Colleges Tuguegarao from which two matched groups were formed for the purpose of the study: the experimental group and the control group. The sixty (60) students were equated to the two (2) groups through the following variables: age, sex and I.Q.

The researcher made use of random sampling in determining which group is assigned to the experimental and the control group.

The distribution of respondents according to age, sex and IQ is shown in table 1a, table 1b and table 1c, respectively.

**Table 1a. Frequency and Percentage Distribution of Respondents According to Age**

Age	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
20-21	8	10.00	8	10.00
18-19	3	27.00	3	27.00
16-17	19	63.00	19	63.00
Total	30	100.00	30	100.00

**Table 1b. Frequency and Percentage Distribution of Respondents According to Sex**

Female	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
Male	7	23.00	7	23.00
Female	23	77.00	23	77.00
Total	30	100.00	30	100.00

**Table 1c. Frequency and Percentage Distribution of Respondents According to IQ**

I.Q.	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
AA	1	4.00	1	4.00
A	25	84.00	25	84.00
BA	4	13.00	4	13.00
L	-	-	-	-
Total	30	100.00	30	100.00



Legend:

AA = Above Average

A = Average

BA = Below Average

L = Low

### **Measuring Instrument**

This study utilized three measuring instruments in gathering pertinent data for the study. These are Mathematics of Investment Achievement Test, Mathematics Attitude Scale Inventory and Lennon Mental Ability Test.

The construction and validation of the mathematical attitude scale inventory was adopted from the research tool done by Dr. Milagros Ibe of the University of the Philippines, Diliman, Quezon City. The inventory is composed of 30 items for which 16 are positive (1, 2, 3, 6, 10, 11, 13, 15, 17, 18, 20, 21, 23, 24, 25 and 27) and 14 are negative (4, 5, 7, 8, 9, 12, 14, 16, 19, 22, 26, 28, 29 and 30). The respondents will choose how truly the statements are applied to them. It utilizes the following codes.

5 - very true to me

4 - generally true to me

3 - neutral

2 - slightly true to me

1 - not at all true to me

Due to the scarcity of standardized test in Mathematics of Investment, the researcher constructed an achievement test based on the topics for the second grading period and third grading period. Originally, the test consisted of eighty items multiple choice type. The items for the achievement test were submitted to the dissertation panel for comments and suggestions. Every item in the test was analyzed and items that were below 25% difficult and above 75% easy were deleted. After revision was made from the results of the item analysis, the achievement test was finally reduced to sixty items.

To ensure accuracy and validity of the achievement test that was used, the researcher pre-tested it with the fourth year BSBA students of Cagayan Colleges Tuguegarao. Table 1-d shows the table of specification of the Mathematics of Investment Achievement Test.



**Table 1d. The Table of Specification of the Topics**

Topics	Knowledge	Comprehension	Application	Total
1.Simple Interest				30
1.1 Interest	1		1	
1.1.1 Principal	1		1	
1.1.2 Rate of Interest	1			
1.1.3 Time/Term	1		1	
1.2 Ordinary Interest	1		2	
1.3 Exact Interest	1		1	
1.4 Interest Between Dates	1	2	2	
1.5 Amount and Present Value at Simple Interest	1	1	3	
1.6 Simple Discount	1	1	2	
1.7 Promissory Notes	2		2	
2. Compound Interest				30
2.1 Compound Amount			3	
2.2 Compound interest	1	1	2	
2.3 Present Value	1	1	2	
2.4 Compound Discount	2	1	1	
2.5 Finding the time	1	2	1	
2.6 Finding the rate	1	1	2	
2.7 Equation of values	4	1	1	
TOTAL	22	11	27	60

### Data Gathering Procedures

Before the conduct of the study, the proponent invited a Psychometrician, Dr. Hortencia Calvan, to administer the IQ test. The test was administered based exactly on the test manual of administration to ensure validity and reliability of results. The test was given to control group and experimental group on different days yet on the same time in the morning.

Originally, the two groups were composed of eighty students. However, after the conduct of the IQ test, the results was interpreted by the psychometrician according to percentile rank and were given verbal descriptions ranging from Superior (none), Above Average (AA), Average (A), Below Average (BA) and low. After matching the results based on their age, sex and IQ, there were only 7 males and 23 females left in each group.

The sixty students left were equated to the two groups; namely; the experimental and the control groups. The experimental group was given pre-test in the teaching of Mathematics



of Investment. After the topics were presented the students were given a post-test. In the second group topics were presented through the use of lecture/discussion method.

Similarly, both groups were given post-test and the Attitude Inventory which was developed by Dr. Milagros Ibe of University of the Philippines. In order to take good care of the time variable, the schedule of both classes was set at 7-8:30 in the morning Monday to Thursdays for the experimental and control group. The researcher herself took care of both groups.

### Statistical Tools

This study made use of the following statistical tools, which were needed in the analysis of the data.

Frequency counts and percentage was used to categorize the respondents.

For the Mathematical Attitude Inventory, a modified Likert Scale value was assigned to score the five categories for positive and negative statement as follows:

#### Positive Statements

Scale Value	Categories
5 points	Very true to me
4 points	Generally true to me
3 points	Neutral
2 points	Slightly true to me
1 point	Not at all true to me

#### Negative Statements

Scale Value	Categories
5 points	Not at all true to me
4 points	Slightly true to me
3 points	Neutral
2 points	Generally true to me
1 point	Very true to me

To analyze the attitude of students towards mathematics, the weighted mean was used.

A criterion scale was used by the researcher for the assessment of results as follows:

Arbitrary Level (Negative Statement)	Mean Range	Arbitrary Level (Positive Statement)
Not at all true to me	4.20-5.00	Very true to me
Slightly true to me	3.40-4.19	Generally true to me
Neutral	2.60-3.39	Neutral
Generally true to me	1.80-2.59	Slightly true to me
Very true to me	1.00-1.79	Not at all true to me

To assess if the two groups differ significantly in the achievement pre-test and post-test, t-test for dependent or correlated means was utilized.



Likewise, the mean result of the performance between the two groups was tested using the t-test.

To find out the existence of a significant relationship on the performance of the students in the achievement test and their level of interest, the Pearson Product Moment Correlation and t for r were utilized.

## RESULT AND DISCUSSIONS

Based on the statistical analysis, this study yielded the following findings:

**Table 2b. Test of Difference in the Mean Achievement of the students Being Taught with the Use of Exploratory Approach in Mathematics of Investment in Comparison to those Students Taught with the Use of Traditional Method in the Post-test**

Groups	Mean	Standard Deviation	t-ratio
Exploratory	36.77	5.90	3.833
Lecture/Discussion	30.77	6.22	

$t_t = 1.671$        $df=58$        $LS= 0.05$       Decision: Reject  $H_0$

Table 2b shows the test of difference in the mean achievement of the students being taught with the use of exploratory approach in Mathematics of Investment in comparison to those students taught with the use of lecture/discussion method in the Post-test. The result of the performance of the respondents in the achievement Post-test which was given at the end of the experimental period shows that the mean score of 36.77 of the experimental group is higher than the mean score of 30.77 with a mean difference of 6. The findings further show a significant difference between the group measures. This is further explained by the t-value of 4.60 which is greater than the critical t-value of 1.70 at 0.05 level of significance. This implies that the exploratory approach enhanced the achievements level of students. This implies further that exploratory approach is more effective than lecture/discussion method in teaching Mathematics of Investment.

**Table 2c. Test of Difference Between Pretest and Posttest of the Experimental and Control Groups**

	Experimental Group	Control Group	Mean Difference	t-ratio
Pretest Mean	29.5	27.9	1.60	1.25
Posttest Mean	36.77	30.77	6.77	4.60
Mean Gain	7.27	2.87	4.40	
t-ratio	7.44	2.27	5.17	



As gleaned in table 2c, the experimental group performed better than the control group as indicated by the mean gain of 7.27 and t-ratio of 7.44 while the control group performed lower as indicated by the mean gain of 2.87 with a t-ratio of 2.27. Both groups have a significant difference in the Pre-test and Posttest. This means that lecture/discussion method enhanced a little in the achievement of the students in Math of Investment while exploratory method has enhanced adequately the achievements of students in the Posttest. This implies that the respondents in the experimental group have better learning than students in the control group for this is now the effect of the use of exploratory approach in the teaching of Mathematics of Investment. Hence, this subject is more effective than the traditional method as shown in their difference between the pre-test and post-test of both groups in their achievements.

**Table 3a. Item Mean Distribution on the Attitude of Respondents Toward Exploratory Approach when used in the Teaching of Mathematics of Investment**

Items	Item Mean	Descriptive Scale
When I work with math problem, I find that my thinking and reasoning power are sharpened.	4.83	Very true to me
Mathematics is a subject which I have always enjoyed studying.	4.33	Very true to me
The people I enjoy going with are those who are good in mathematics.	4.10	Generally true to me
I would be happy if mathematics were to be taken out of the curriculum.	4.00	Generally true to me
If I had my way out, I would avoid taking mathematics subject.	3.90	Generally true to me
Mathematics makes me more inquisitive about things which are not clear to me.	3.70	Generally true to me
I always need someone to help me with mathematics because it confuses me.	3.70	Generally true to me
I would willingly to exchange my math subject for an easier subject in school.	3.60	Generally true to me
I think I have more chances of becoming successful if I am good in mathematics.	3.60	Generally true to me
Mathematics gives me much satisfaction.	3.57	Generally true to me
Mathematics problem often scare me.	3.47	Neutral
I think I will stand a better chance to succeed in my course if it does not require mathematics.	3.44	Neutral
I am too nervous to think of my mathematics class.	3.27	Neutral
I enjoy going beyond he assigned work in mathematics and I try solving more than is	3.23	Neutral



expected of me.		
Mathematics makes me feel as though I am lost in a jungle of numbers and I can no find my way out.	3.17	Neutral
I feel uncomfortable with numbers and symbols.	3.07	Neutral
I think my mind works well when doing with mathematics problem.	2.97	Neutral
I feel happier in my mathematics class than in any other class.	2.97	Neutral
I easily give up when I cannot solve mathematics problem.	2.97	Neutral
My favorite subject is mathematics.	2.90	Neutral
My parents love and enjoy math.	2.87	Neutral
I find mathematics useful for problems of everyday life.	2.87	Neutral
In school I thoroughly enjoy my math class.	2.83	Neutral
My poorest mark is mathematics.	2.70	Neutral
I consider mathematics my most difficult subject.	2.70	Neutral
Of all my teachers, it is my math teacher that I like the least.	2.47	Slightly true to me
In mathematics I am not satisfied with just a passing grade, I want something really high.	2.37	Slightly true to me
I am unable to think clearly when working with math.	2.10	Slightly true to me
I feel I have a good grade if I have a strong foundation in mathematics.	2.00	Slightly true to me
I am interested to acquire further knowledge in mathematics.	1.70	Not at all true to me
Over-all Mean	3.18	Generally true to me

The item mean distribution of the attitude of respondents toward exploratory approach when used in the teaching of mathematics of investment is shown in table 3a.

As gleaned from the table, the item on “When I work with math problems, I find that my thinking and reasoning power are sharpened” got the highest mean of 4.83 with a descriptive scale of very true to me. This implies the respondents have expressed their desire and willingness to widen their horizon in the field of mathematics. Next in rank is the item on “Mathematics is a subject which I have enjoyed studying” with an item mean of 4.33 or very true to me. Although mathematics is loved by very few people because of the nature of the subject, still the respondents have expressed their joy and love of studying this subject because of the benefits they will derived from it, as part of their living. Next item with an item mean of 4.10 with a descriptive scale of generally true to me is “the people I



enjoy going with are those who are good in mathematics.” This implies that homogenous group can work rapidly and harmoniously for all of them have the same level of interest towards mathematics. However, it contradicts the item on “I would be very happy if mathematics were to be taken out of the curriculum” with an item mean of 4.00 or generally true to me. This reveals that the respondents expressed their positive attitude towards this subject, they also had their second thought that if it is not a part of the curriculum, they would not probably show interest. Their second thought was again expressed in the next item which is “If I had my way out, I would avoid taking my math subjects” with an item mean of 3.90 or generally true to me. The respondents would possibly shift to non-mathematics related course because what they have chosen when they enrolled is BSBA in which this course entails a lot of mathematics subjects. The next item on “I always need someone to help me with mathematics because it confuses me” with an item mean of 3.70 or generally true to me. This implies that the respondents humbly expressed their need to be helped which would guide them in understanding mathematics. The eighth item with a mean of 3.6 or generally true to me is “I would willingly exchange my math subject for an easier subject in school.” The item reveals that respondents would go for a non-challenging endeavor in life. The next item is “I think I have more chances of becoming successful if I am good in mathematics.” This item reveals that if only they were gifted with numbers, they should have enrolled in Engineering courses and the greater would be their level of interest towards mathematics. The item on “Mathematics gives me much satisfaction” has an item mean of 3.57 or generally true to me. The result of their achievement test reveals their satisfaction of learning and advancing their knowledge and skills in mathematics.

There are fifteen items that were rated neutral. These are: mathematics problem often scare the respondents. They should have a better chance to succeed in their course if it does not require mathematics. They are too nervous to think of their math class. They enjoy going beyond the assigned work to them and they try solving more than what are expected of them. Mathematics makes them feel as though they are lost in the jungle of numbers and symbols. Their minds work well when doing with mathematics problems. They feel happier in their math class than in any other class. They easily give up when they could not solve mathematics problem. Their favorite subject is mathematics. Their parents love and enjoy



mathematics. They find math very useful for problems in everyday life. In school they thoroughly enjoy their mathematics class. Their poorest mark is mathematics. They consider mathematics their most difficult subject.

The over-all mean is 3.18 or generally true. This means that the respondents in the experimental group have a positive or favorable attitude towards their subject Mathematics of Investment when exploratory approach is being used in the teaching of this subject. That the students have enjoyed and helped them discover their skills and their gift of numbers from Almighty God because they were given a great deal of freedom to try out solving mathematics problem without any help from the researcher. They have learned from their mistakes as they gain practical experience with the materials they study.

**Table 3b. Item Mean Descriptive Interpretation and Rank Distribution on the Attitude of Respondents Toward Lecture Discussion Method when used in the Teaching of Mathematics of Investment**

Items	Item Mean	Descriptive Scale
When I work with math problem, I find that my thinking and reasoning power are sharpened.	4.47	Very true to me
Mathematics is a subject which I have always enjoyed studying.	4.30	Very true to me
In school I thoroughly enjoy my math class.	3.80	Generally true to me
If I had my way out, I would avoid taking mathematics subject.	3.77	Generally true to me
Mathematics gives me much satisfaction.	3.73	Generally true to me
Mathematics makes me more inquisitive about things which are not clear to me.	3.53	Generally true to me
I would be happy if mathematics were to be taken out of the curriculum.	3.53	Generally true to me
I think I will stand a better chance to succeed in my course if it does not require mathematics.	3.50	Generally true to me
I would willingly exchange my math subject for an easier subject in school.	3.47	Generally true to me
I easily give up when I cannot solve mathematics problem.	3.47	Generally true to me
Mathematics makes me feel as though I am lost in a jungle of numbers and I can no find my way out.	3.33	Generally true to me
I find mathematics useful for problems of everyday life.	3.33	Generally true to me
I enjoy going beyond the assigned work in mathematics and I try solving more than is expected of me.	3.33	Generally true to me
I think my mind works well when doing with	3.07	Neutral



mathematics problem.		
I am too nervous to think of my mathematics class.	3.07	Neutral
The people I enjoy going with are those who are good in mathematics.	3.03	Neutral
I feel uncomfortable with numbers and symbols.	2.93	Neutral
I feel happier in my mathematics class than in any other class.	2.93	Neutral
My parents love and enjoy math.	2.90	Neutral
Mathematics problem often scare me.	2.90	Neutral
Of all my teachers, it is my math teacher that I like the least.	2.87	Neutral
I am interested to acquire further knowledge in mathematics.	2.73	Neutral
I am unable to think clearly when working with math.	2.70	Neutral
My poorest mark is mathematics.	2.67	Neutral
I think I have more chances of becoming successful if I am good in mathematics.	2.67	Neutral
I consider mathematics my most difficult subject.	2.67	Neutral
In mathematics I am not satisfied with just a passing grade, I want something really high.	2.63	Neutral
My favorite subject is mathematics.	2.50	Slightly true to me
I always need someone to help me with mathematics because it confuses me.	2.50	Slightly true to me
I feel I have a good grade if I have a strong foundation in mathematics.	2.47	Slightly true to me
<b>Over-all Mean</b>	<b>3.16</b>	<b>Generally true to me</b>

The item mean distribution on the attitude of respondents toward lecture/discussion method when used in the teaching of Mathematics of Investment is shown in table 3b.

The items on “When I work with math problems, I find that my thinking and reasoning power are sharpened” and “Mathematics is a subject which I have always enjoyed studying” were given an item mean of 4.47 and 4.30 respectively with a descriptive scale of very true to me. The respondents expressed their interest and love for mathematics. That learning mathematics would really sharpened and enhanced their learning ability and mathematical skills in which they truly believed that mathematics is needed in their daily undertakings.

The eleven items that obtained a descriptive scale of generally true to me with their item means of 3.80, 3.77, 3.73, 3.53, 3.53, 3.50, 3.47, 3.33, 3.33 and 3.33 respectively are as follows: “In school, I thoroughly enjoy my math class, If I had my way out, I would avoid taking mathematics subjects, mathematics gives me much satisfaction, mathematics makes me more inquisitive about things which are not clear to me, I would be happy if



mathematics were to be taken out of the curriculum, I think I will stand a better chance to succeed in my course if it does not require mathematics, I would willingly exchange my math subjects for an easier one in school, I easily give up when I cannot solve mathematics problem, mathematics makes me feel as though I am lost in a jungle of numbers and I cannot find my way out, I find mathematics useful for problems if everyday life and I enjoy going beyond the assigned work in mathematics and I try solving more than is expected of me." Based on the items enumerated, there are six positive statements against five negative statements. Generally, the respondents have a positive attitude towards the use of lecture/discussion method in the teaching of mathematics of investment. However, they also have a second thought, that the respondents in the control group would be more happy if this would not be included in the curriculum and sometimes they lost their interest and patience to understand math because of the great influence of the method being used in their class.

There are fourteen items that obtained a descriptive scale of "Neutral" with an item mean of 3.07, 3.07, 3.03, 2.93, 2.93, 2.90, 2.87, 2.73, 2.70, 2.67, 2.67, 2.67 and 2.63. They are as follows: " I think my mind works well when doing with math problems, I am too nervous to think in my class, the people I enjoy going out with are those who are good in mathematics, I feel uncomfortable with numbers and symbols, I feel happier in my mathematics class, my parents love and enjoy math, Mathematics problem often scare me, of all my teachers it is my math teacher that I like the least, I am interested to acquire further knowledge in mathematics, I am unable to think clearly when working with mathematics, I consider mathematics my most difficult subject, In mathematics I am not satisfied with just a passing grade, I want something really high." The items enumerated were described "Neutral" to the respondents. This means that the students find some disagreement on the different items, but despite of this disagreement, they expressed neutral feelings on the use of lecture/discussion method towards their subject mathematics of investment.

There are only three items were rated slightly true to them, the item on they always need someone to be help with mathematics because learning mathematics confuses them, that they have a good grade if they have a strong foundation in mathematics were described slightly true to them. This means that the respondents slightly believed that they should have a good grade if they have a strong foundation in mathematics. This means that the



respondents in the control group have a favorable attitude on the use of lecture/discussion method towards mathematics of investment.

**Table 4. Test of Relationships between the Mean Achievement of the Control and Experimental Group in Math of Investment and their Attitude towards the Subject**

Groups	Correlation Indices	
	r-value	t-value
Experimental	0.76	6.76
Control	0.41	2.37
$t_t = 1.70$ $df = 28$ $LS = 0.05$		

Table 4 shows the test of relationship between the mean achievement of the control and experimental group in mathematics of investment and their attitude towards the subject.

The correlation coefficient of the experimental group is 0.76 while the control group is 0.41. The data obtained in the experimental group showed a high or strong positive correlation because the r-computed value is within the range of 0.5 to 1. This means that this group showed a high relationship between the students' achievement and their attitude towards Mathematics of Investment. This is also supported by the t-computed value of 6.16 which is greater than the t-tabular value of 1.70 at five percent level of significance with 28 degrees of freedom. The null hypothesis stated earlier is rejected, hence we accept the alternative hypothesis, that is there is a significant relationships between the mean achievement of the experimental group in mathematics of investment and their attitude towards the subject. The data further imply that the more favorable the attitude of the students towards their subject, the higher is their academic achievements.

The computed r-value of the control group is 0.41. This means that there is a small or weak positive correlation that exists between the attitude and the achievements of the students because the computed r-value is within the range of 0 to 0.5. This finding is also supported by the t-computed value of 2.37 which is greater than the t-tabular value of 1.70 at 5 percent level of significance. Therefore, the null hypothesis is also rejected which means that there is a significant correlation between attitude and achievement. This implies that the favorable attitude of the students had influenced their achievements in Mathematics of Investment.

### SUMMARY OF FINDINGS

Based on the statistical analysis, this study yielded the following findings:



A. Significant Difference in the Mean Achievement of Students in Exploratory and Control Group.

1. The two groups showed non-significance in the pretest. This implies that the two methods did not influence the result in their pre-test and as indicated by their groupings of students which made them identical and the same prior to the study.
2. The result of the performance of the respondents in the achievement post test which was given at the end of the experimental period shows a significant difference between the two groups. This means that the exploratory approach enhanced the achievement level of students. This further implies that exploratory approach is more effective than lecture/discussion method in teaching Mathematics of Investment.

B. Test of Difference Between Pre-test and Post-test of the Experimental and Control Group.

When pretest of both groups were subjected to t-test and mean gain, the findings showed that the experimental group performed better than the control group as indicated by the mean gain of 7.27 and t-ratio of 7.44 as compared to the control group with a mean gain of 2.87 and t-ratio of 2.27. However based on the computed t-ratio of pretest and post test 1.25 and 4.6 respectively in comparison to the t-tabular value of 1.671. The computed value is greater than the t-tabular value, hence both groups have a significant difference in the pre-test and post test. This means that exploratory approach is better more effective than the lecture/discussion method in the teaching of mathematics of Investment.

C. Level of Interest of Students in Mathematics of Investment

1. The level of interest of respondents in the experimental group had an over-all mean of 3.86 with a descriptive scale of generally true to me. This means that the respondents in the experimental group have a positive or favorable attitude towards their subject Mathematics of Investment when exploratory approach is being used in the teaching of their subject. This implies further that their interest level was influenced by the use of the exploratory approach.
2. The level of interest of the respondents in the control group had an over-all mean of 3.91 which is lower than the level of interest of respondents in the exploratory as



indicated by the over-all mean of 3.86. The respondents have also a favorable attitude towards the use of traditional method. The traditional method had also a little influenced on their level of interest.

**D. Relationship Between Achievement and Level of Interest of Students on their Level of Interest in Mathematics of Investment**

The achievement of both groups is significantly correlated with their level of interest in Mathematics of Investment as shown by the computed r-value of 0.76 and 0.41 respectively.

However, the experimental group showed a higher relationship than the control group because the control group showed only a small or weak positive correlation that exists between the attitude and achievement of the students toward Mathematics of Investment.

**E. Significant Difference in the Mean Achievement of Students in Exploratory and Control Group.**

1. The two groups showed non-significance in the pretest. This implies that the two methods did not influence the result in their pre-test considering the fact that the groupings of students were identical and the same prior to the study.
2. The results of the performance of the respondents in the achievement posttest that was given at the end of the experimental period show a significant difference between the two groups. This means that the exploratory approach enhanced the achievement level of students. This further implies that exploratory approach is more effective than lecture/discussion method in teaching Mathematics of Investment.

**F. Test of Difference Between Pre-test and Post-test of the Experimental and Control Group.**

When pretests of both groups were subjected to t-test and mean gain, the findings showed that the experimental group performed better than the control group as indicated by the mean gain of 7.27 and t-ratio of 7.44 as compared to the control group with a mean gain of 2.87 and t-ratio of 2.27. However, based on the computed t-ratio of pretest and post test, 1.25 and 4.6 respectively in comparison to the t-tabular value of 1.70, the computed value is greater than the t-tabular value,



hence, both groups have a significant difference in the pre-test and post test. This means that exploratory approach is better more effective than the lecture/discussion method in the teaching of Mathematics of Investment.

#### G. Level of Interest of Students in Mathematics of Investment

1. The level of interest of respondents in the experimental group had an over-all mean of 3.86 with a descriptive scale of generally true to me. This means that the respondents in the experimental group have a positive or favorable attitude towards their subject Mathematics of Investment when exploratory approach is being used in the teaching of the subject. This implies further that their interest level was influenced by the use of the exploratory approach.
2. The level of interest of the respondents in the control group had an over-all mean of 3.91, which is lower than the level of interest of respondents in the exploratory as indicated by the over-all mean of 3.86. The respondents have also a favorable attitude towards the use of traditional method. The traditional method had also a little influence on their level of interest.

#### H. Relationship Between Achievement and Level of Interest of Students on their Level of Interest in Mathematics of Investment

The achievements of both groups are significantly correlated with their level of interest in Mathematics of Investment as shown by the computed r-value of 0.76 and 0.41, respectively.

However, the experimental group showed a higher relationship than the control group because the control group showed only a small or weak positive correlation that exists between the attitude and achievement of the students toward Mathematics of Investment.

### **CONCLUSIONS**

On the basis of the findings, the following conclusions were drawn.

The hypothesis stated earlier was rejected in the achievement post-test since there is a significant difference between the mean achievement of the students taught with the use of exploratory in comparison to the students taught with the traditional method in mathematics of Investment.



The test of effectiveness of the exploratory method showed that it was really an effective strategy/approach in teaching-learning process. This has also influenced on the attitude of students towards their subject.

## **RECOMMENDATIONS**

In view of the findings and conclusions of this study it is recommended that:

1. There should be enriched activities given to the students to further enhance and develop the curiosity level of the students particularly in mathematics.
2. Students should be encouraged to join mathematics activities and programs such as Quiz bee, posters and slogan contest to develop more favorable attitude and interest towards the subject.
3. Mathematics educators should try varied approaches, methods and techniques in teaching Mathematics of Investment in order to meet the needs, interest, and enhanced the mathematical skills and competencies of students.
4. Mathematics teachers should be competent, energetic and enthusiastic to motivate students to love mathematics.
5. A follow-up study should be conducted using a large sample size using the same design on a longer period of time and wider scope from institutional and higher levels.

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