INTELLECTUAL AND NON - INTELLECTUAL PREDICTORS OF MATHEMATICS ACHIEVMENT OF SENIOR HIGH SCHOOL STUDENTS

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APPROVAL SHEET

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The researcher

DEDICATION

To my ever supportive and loving wife,

Cristina C. Bongalon

and

to my children,

Rico Jr.
Roque

Rico

ABSTRACT

The main purpose of this study is to determine the intellectual and non-intellectual predictors of the Mathematics achievement of fourth year high school students of the Samar State College of Agriculture and Forestry San Jorge, Samar, during the school year 2001-2002. This study employed the descriptive correlational method of research wherein the basic instrument used was the questionnaire and achievement test which was conducted to suit the different needs and abilities of the respondents. The extent to which the variables when taken singly, predict individual achievement in Mathematics IV revealed that: 3.1) The study showed that 15 percent of the students' achievement in Mathematics IV is due to mental ability; 3.2) More than 40 percent of students' achievement in Mathematics IV is due to their attitude towards the subject. A typical fourth year high school student enrolled in Mathematics IV at SSCAF during the SY. 2001-2002 is female, with an average mental ability, good performance in Mathematics III and English III and has an unfavorable attitude towards Mathematics. Achievement in Mathematics IV is moderately affected by factors such as mental ability, grades in Mathematics III, grades in English III and attitude towards Mathematics. Among the intellectual and non-intellectual factors, achievement in Mathematics III and attitude towards Mathematics best explain or predict achievement in Mathematics IV. Achievement in Mathematics IV is moderately affected by the intellectual and non-intellectual factors combined as indicated by their R2 value.

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Chapter 1

THE PROBLEM AND ITS SETTING

Introduction

Every mathematics instructor would like to know how well his students perform after spending a lot of time listening to his lecture as well as performing seatwork, homework, and discussing guide materials. Mathematics instructors complain about a large number of students who have poor mathematics background as well as those who fear or dislike mathematics. Only few students can say that mathematics is their favorite subject. Students who are not well knowledgeable in mathematics would rather take up courses, which do not need mathematical ability. Maybe because of the abstractness of mathematics, many students are not able to comprehend its ideas completely, resulting in the low achievement. Some students

not fully aware of the many uses of applications and demands of mathematics.

Instructors of mathematics who are concerned with the learning improvement of their students must teach the essential, relevant and meaningful mathematical knowledge and skills by means of the most appropriate methods and materials at the command of the instructors themselves. A desired outcome of mathematics instruction includes better achievement as well as positive attitude and interest towards mathematics.

Achievement of students is usually measured in terms of teacher - made achievement test which suits the specific program of classroom instruction. It usually measures the amount and quality of learning that has taken place in a specific area or the amount of progress each student has made in attaining a given objective by the use of instruments such as test. The results of the test provide the most objective basis whether the student has learned what the instructor has tried to teach.

Similarly, tests provide the students with the opportunity to master the content of instruction. It is essential not only in diagnosing the students' needs and abilities but it helps the teacher to identify what instructional enrichment can be provided to improve classroom instruction and students' awareness toward the subject.

According to Ebel (1965 : 359) to teach without testing is unthinkable. The most important functions of testing are assessing the individual's accomplishment or performance and diagnosing students' needs and difficulties for unless the teachers and supervisors or heads of schools can accurately appraise their work, they have no intelligent basis upon which to improve teaching and learning.

The Samar State College of Agriculture and Forestry (formerly SNAS) is one of the agricultural colleges in Eastern Visayas (Region VIII) offering laboratory high school. The College has established a practice of giving entrance examination and personal interview to

incoming freshmen. These students are expected to have better academic achievement especially in mathematics. An examination of the students' permanent records showed low performance in Mathematics IV. The data obtained from the first grading period of fourth year high school students showed a very discouraging result. Approximately, 28% or 18 out of 65 students have grades lower than 80.

Low Mathematics achievements of students are associated with several factors. As stated by Douglas (1980: 30) if teachers identify talented students on the basis of intelligence tests alone, approximately seventy percent (70%) of the most creative are eliminated. It only shows that intelligence tests alone do not ascertain student's mental ability. Some are better than others at problem solving; others at originality and some excel in mental tasks requiring persistence. There are many factors which may influence the student's mathematics performance.

As a mathematics instructor who has been with the college for the last five years, the

researcher is continuously seeking new ideas or effective techniques of teaching high school mathematics. For an instructor who is particular at improving his teaching strategies, it is neither a rewarding nor fulfilling experience to see his students' inability to do certain task that requires knowledge of the subject being taught.

Some observers believe that students' achievements are greatly influenced by the teacher's competence in the subject. Teachers also claim on the other hand that achievement is due to student's dislike or attitude and interest for the subject. Instructional improvement suffers because of disruption of classes due to staff meeting and extra activities that they undertake thus requiring increased responsibility as non-academic role of mathematics teachers. Students making their own conjectures say that some of them are poor achievers because of inferiority complex and inability to cope with teachers' demands and expectations and teachers'

failure to adjust to students' needs and capabilities.

Success in academic achievement does not depend on intelligence but also on other factors. Based on the series of related studies, intelligence alone is not an effective means of predicting academic performance. Aside from the intellectual ability of a student that contributes to school achievement, revealed that non-intellectual factors such as sex, family background, interest and attitudes can affect student's academic achievement.

It is very necessary therefore, that a study on the intellectual and non - intellectual factors affecting the academic achievement in mathematics be made to determine what implications for instructional redirections may be derived from the results of the study. This could be made to fully develop student's capabilities and potentials of the subject. Identifying these factors will help devise appropriate measures to assist the students at improving their academic performance.

Statement of the Problem

The main purpose of this study is to determine the intellectual and non - intellectual predictors of the Mathematics achievement of fourth year high school students of the Samar State College of Agriculture and Forestry San Jorge, Samar, during the school year 2001 - 2002. Specifically, it sought answers to the following questions:

1. What is the profile of the fourth year high school students with respect to the following predictors:

1.1 Intellectual factors

1.1.1 mental ability scores;

1.1.2 grades in Mathematics III; and

1.1.3 grades in English III ?

1.2 Non- intellectual factors

1.2.1 sex;

1.2.2 educational attainment of parents;

1.2.3 occupation of parents;

1.2.4 gross family monthly income; and

1.2.5 attitude towards mathematics ?

2. What is the mean Percentage Score of the fourth year high school students in Mathematics IV ?

3. Is there a significant relationship between the intellectual and non - intellectual predictors when taken singly to the students' achievement in Mathematics IV?

4. Is there significant relationship between the intellectual and non-intellectual predictors when taken as a whole to the strudents' achievement in mathematics IV?

5. What implications for instructional redirection may be derived from the results of the study?

Hypotheses

Based the specific questions above, the following null hypothesis were tested:

1. There is no significant relationship

between achievement in mathematics and the following intellectual and non- intellectual factors taken singly:

1.1 mental ability scores;

1.2 grades in Mathematics III;

1.3 grades in English III;

1.4 sex ;

1.5 educational attainment of parents;

1.6 occupation of parents

1.7 monthly income of parents;

1.8 attitude towards mathematics;

2.There is no significant relationship between achievement in Mathematics IV and the intellectual and non-intellectual factors when taken as a whole.

2.1 Intellectual factors;

2.2 Non-intellectual factors; and

2.3 Intellectual and non-intellectual factors.

Theoretical Framework

The theoretical framework of this study is anchored on the ideas and concept expressed by Skinner (1971 : 397) that the child's knowledge, ideas, skills, habits, attitudes and interests develop as a consequence of many contributing factors. These factors may either enhance or cause difficulty in learning Mathematics. An analysis of all these causal factors involved reveals that there are both predisposing precipitating factors and that these may be responded as biological, sociological, or psychological in nature. There may be certain structural weakness in the child due to heredity, brain damage, endocrine disorders, sensory defects, virus infections, malnutrition and the like. The impact of numerous environmental and sociological factors cannot also be discounted. All these factors affect the child's learning.

However, many learning difficulties stem from unfortunate learning experiences, which emanate from the student himself. This may be due to his

lack of learning readiness and basic mathematical competencies, his interest and attitude towards mathematics, and his poor study habits.

Pressy et; al (1979: 40-41) described that factors of abilities are realized through: (1) the adequacy of information and skill that will help a person meet the situation; (2) the manner of procedure in getting such information or skill; and (3) the emotional involvement. A person will do his utmost effort for a certain task in which he is interested even if he has less in intellectual potential. Likewise a person with good intellectual potential may do less effort if he is emotionally disturbed. Generally, the person will be able to show himself in a situation where he acquired needed information and special skills, had efficient methods of attack and of work on problem, and encouraged by interest and success or disinterested and distraught by failure.

Integrating the above cited theories and the researcher's own perception, it can be stated that the intellectual and non - intellectual factors

affect students' mathematical achievement. And that the two factors are not independent of each other, rather they may interact with the effects of other variables in the teaching - learning process. Studies reviewed on intellectual and non - intellectual factors brought out some issues on the extent of students' achievement in mathematics. Such seeming confusion due to contradictory findings may be attributed to the types of data gathered and the statistical analysis applied, to answer the different specific questions. Such inclusive and conflicting directions of findings, and consistent similarities in the results provided a clear need for more studies to be conducted to obtain more valid and reliable conclusions.

Conceptual Framework

The conceptual framework of the study as evolved from the theories cited in the preceding section is illustrated by the paradigm in Figure 1

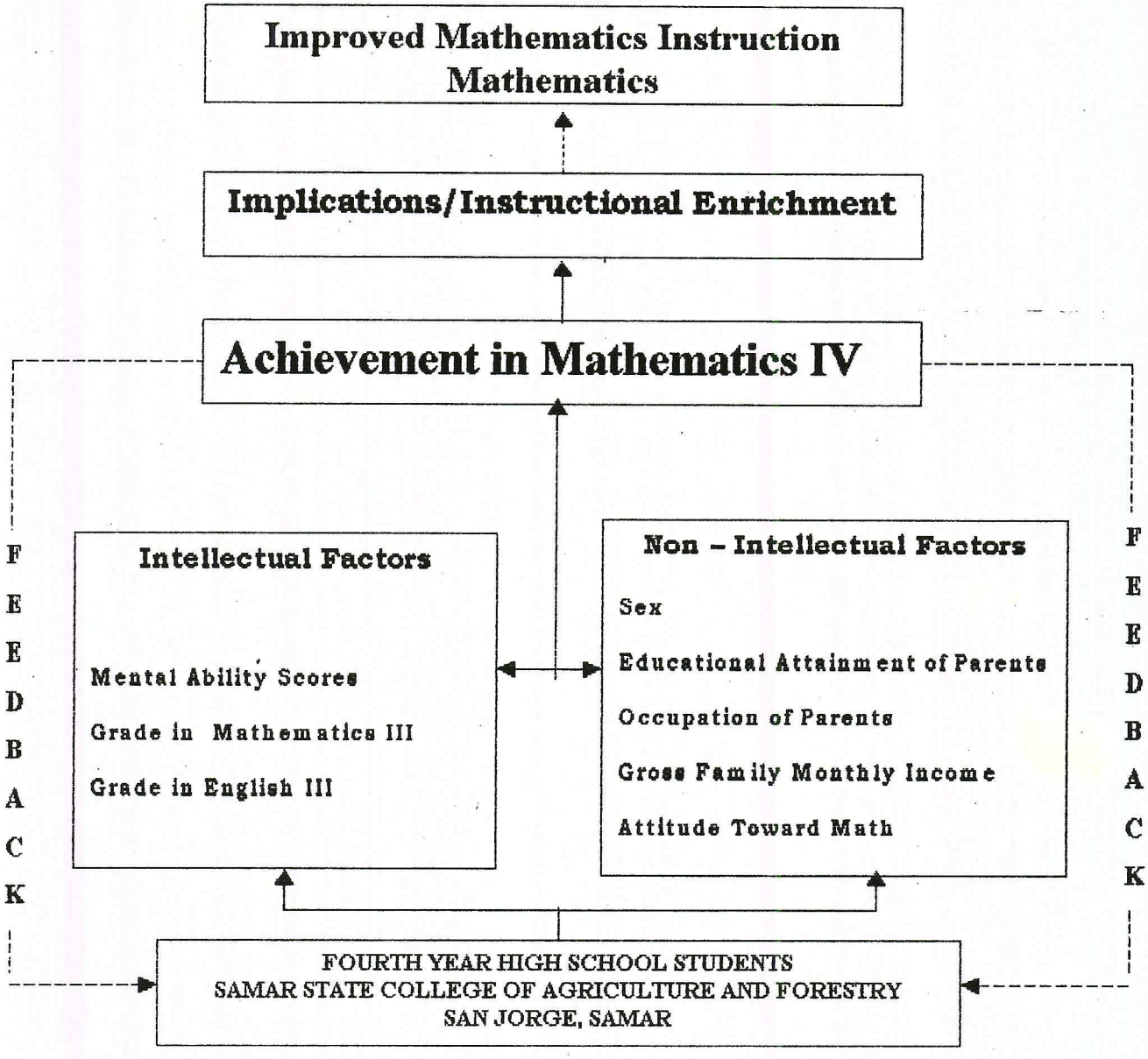

Figure. 1 The Conceptual Framework of the Study

The base frame is the place and respondent of the study composed of the fourth year high school students in SSCAF. The left column contains the intellective factors affecting the students learning namely: entrance test results, mental ability, previous grades in Mathematics III, and English III. Previous studies show that the ability of the students to cope with mental tasks is dependent on the basic knowledge previously learned. Previous studies also show that students who are good in English will have probability of performing better with their mathematical skills. Some educators claim that achievement of the students varies according to their intellectual capability.

The upper right side frame shows the non - intellectual factors which affect the learning of the students, namely: sex, parents education, occupation, monthly income and attitude towards Mathematics.

The research paradigm recognizes that achievement in Mathematics is attributed to intellectual and non - intellectual factors that

contribute to success. Since learning is closely associated with or related to achievement, the researcher believes that the identification of the factors affecting the achievement in Mathematics of fourth year high school students will aid in improving the efficiency with which learning takes place in SSCAF and schools similar to it. The instructor may then adapt his materials and methods of instruction to the needs and interests of the students particularly the low achievers in Mathematics. Moreover, the identified factors and their implications could serve as feedback mechanisms to the students concerned for instructional enrichment and improved mathematics instruction.

Significance of the Study

The study carefully examined the intellectual and non - intellectual factors and how these factors are related to the academic success especially in Mathematics. The researcher addresses this study to the various sectors of the College, who are concerned with and involved in

the teaching of Mathematics. Specifically, the study would contribute to the following concerns.

Students. Knowledge of factors that enhance performance would motivate them to use these factors maximally to attain their purposes for the pursuit of higher education. The findings would make students aware of their present knowledge in Mathematics. An awareness of their strength and weaknesses could help in improving themselves in the subject and may inspire them to develop positive attitude and interest in Mathematics.

Teachers. It is hoped that this study could be used by teachers determined to improve themselves professionally; that is, work toward competence in teaching Mathematics and adapt methods and techniques that will motivate and encourage the students to learn the subject. A knowledge of these factors that affect performance would enable teachers to make necessary remedies and provide directions and guidance to learners. Moreover, the findings could serve as an eye - opener for mathematics instructors to develop better attitude toward the subject as well as

better understanding of students with mathematical difficulties.

Administrators. The administrators may use the findings as a barometer of determining if their objectives are obtained and may serve as insights for better educational planning.

Guidance. It would be useful to guidance counselors in counseling their students regarding career choices, thereby minimizing the incidence of drop - outs and failures particularly in Mathematics.

Parents. Knowing their children's capabilities, interest and needs can give parents a better understanding and support of the career choices of the former. They can also help motivate and encourage their children to learn the subject and guide them in adopting positive attitude toward their assigned task in Mathematics.

To Educators and Researchers. Furthermore, the data that may be obtained from the study can provide them with baseline information, which may

serve as basis for further investigation and analysis.

Scope and Delimitation

This is a descriptive study that determined the extent of influence of some selected intellectual and non - intellectual factors related to successful achievement in mathematics of fourth year secondary students. The respondents of the study are fourth year secondary students of SSCAF.

As a whole, there were 65 students involved this study. The criterion measure used in this study is the achievement in Mathematics IV represented by students' grades. The predictors of achievement are the students' intellectual factors such as: mental ability scores, grades in Mathematics III and grades in English III and the non - intellectual factors namely: sex, educational attainment of parents, occupation of parents, family monthly income, interest and attitude towards mathematics. It concentrated on finding the relationship between students'

achievement in Mathematics IV and their intellectual and non - intellectual factors computing for the simple and multiple correlation coefficients.

The study was undertaken during the school year 2001 - 2002.

Definition of Terms

To facilitate understanding of this study and to provide a common frame of reference the following are herein defined conceptually and operationally.

Achievement. The accomplishment or proficiency of performance in a given skill or body of knowledge. (Good, 1973: 7). In this study, this refers to the final grades of fourth year secondary students in their academic subjects like Mathematics and English.

Achievement in Mathematics III. It is the final grade obtained by the students in Mathematics III.

Achievement in Mathematics IV. This refers to the scholastic grades obtained by fourth year

secondary students at the end of the second grading period of the given school year.

Attitude. This term refers to a condition or set of characteristics regarded as symptomatic of an individual's ability to acquire proficiency in a given area. (Grolier International Dictionary, 1990:85) In this study, attitude refers to the 25 statements of a student's feeling and thoughts about Mathematics.

Factors. In this study, factors refer to variables, which may not affect or influence a student's achievement in mathematics.

Intellectual factors. In this study, it refers to the variables such as mental ability, and previous Mathematics and English grades.

Mental ability. In this study, it is the measure of students intelligence.

Non - intellectual factors. In this study, this refers to variables such as sex, family background, interest and attitude towards Mathematics.

Teacher. refers to a person engaged in teaching at the secondary level.

Predictor. The variable (s) from which projections are made in a prediction study. (Frankel and Wallen, 1994: 555). In this study, it refers to predict what factors or variables affect students' achievement in mathematics.

Chapter 2

REVIEW OF RELATED LITERATURE AND STUDIES

This chapter includes the review of related literature and studies that provided the researcher with better insights into the conduct of the study. It discusses the various literature and studies done in relation to intellectual and non - intellectual factors related to student achievement particularly in mathematics.

Related Literature

The literature reviewed and presented in this section are related to the study since they deal with the factors associated with students' achievement.

Educators and psychologists agree that a wide range of individual differences exists in a typical classroom. Students differ in motivation, previous experiences, and capacities. Each student presents a unique combination of knowledge, abilities, skills, habits and

interests. These variables determine students' readiness for any learning experience.

In support to the above contention, Aquino (1989 : 295) pointed out that students differ from one another physically, intellectually socially and emotionally. Not only do they differ from each other; they also have different levels of aptitude and achievement.

Stiwell and Worell (1981 : 70) expressed the idea that students bring to school their required patterns of behavior, values, attitudes and ways of relating to people which are shaped by the cultural and economic circumstances of their home life. Some of these values and patterns of behavior may be compatible to standards of behavior set by the school, but others are not, and are likely to affect teaching.

Aquino and Razon (1985: 202) likewise said that, many different conditions affect the efficiency as well as the amount and quality of an individual's learning. Some of these conditions are his mental ability, degree of maturation, readiness, interest, attitude, experiential

background, mental and physical health, previous achievements and social adaptability.

On the concepts of study habits and attitudes, Powell (1983: 45) described that every individual learns to develop habits and attitudes by modeling and reinforcing; hence students learn habits subconsciously by imitating the behavior of older students and parents. Several researchers studying mathematical achievement have assured that a positive attitude toward the topic contributes meaningfully to higher achievement in mathematics.

The above concept was also stressed by Jadar and Quinn (1987: 366) when they said that in learning mathematics, students learn more effectively when they are interested in what they learn and that they will achieve better in mathematics if they like and enjoy mathematics. Hence, continuous attention should be directed toward creating, developing, maintaining and reinforcing positive attitude.

There are attitudes, which cause a person to seek more activities in a given area; there are

positive attitudes about selected aspect of the environment. Interests are a learned through instruction with social objectives and in social events or situations. However, lack of comprehension adds seemingly to the difficulty of the subject and augment the negative attitude and dislike for it thereby affecting the children's performance in Mathematics.

Clark and Miller (1970 : 98 -100) pointed out that attitudes and beliefs tend to be consistently related. A student for example, who has negative attitude toward Mathematics, may believe that Mathematics is a dull and difficult subject. On the other hand, a student with a positive attitude toward Mathematics will probably have no such belief. The consistency between attitude and belief provides the basis for one approach to changing attitudes. If the beliefs that support attitudes are changed, the attitude itself will tend to change. If for example, the student with negative attitude toward Mathematics could be convinced that Mathematics is a challenging, interesting subject and other such values, there

would be tendency for him to alter his negative stance toward Mathematics.

Another parallel idea on the concept of interest and attitudes toward Mathematics is expounded by Battad (1977 : 44-45). He pointed out that pupils lose interest in the subject simply because they do not understand it. Interests have an important bearing on educational pursuit of children.

Armstrong and Price (1982 : 99) stated that a negative attitude towards Mathematics and inability to perceive the usefulness of Mathematics has affected men and women's participation in Mathematics. Mathematics can become functional and useful in one's daily life only if it is understood. Intelligent application of those ideas can be achieved only when there is real comprehension of those ideas.

Apparently, sex could also affect academic achievement. As pointed out by Bank (1980 : 25), sex is a strong predictor of human context and many differences have been documented among the attitudes, behaviors and achievements of males and

females. Females are superior to males in verbal ability from 10 to 11 years old and males' area superior in quantitative skills and visual spatial ability from the onset of adolescence. This was supported by Archer and Lloyd's (1985 : 32) documented gender differences intellectual-ability. They found male superiority in mathematical ability, which they described, also in early adolescence. Moreover, Park et. al (1998 : 133) found that the gender differences exist showing that girls in their study performed better than boys in mathematical computation, while boys performed better than girls in terms of mathematical concepts and application.

Another parallel idea on sex was cited by Shemesh (1990 : 34) He revealed that the males' prior performance of cognitive task is due to their ability to extract spatial and logical relationships independently of the contextual components of the tasks. This ability helps them to cope with rather abstract scientific concepts, especially when the concepts are introduced through their mathematical, quantitative dress.

Girls on the other hand, are less analytical, and they tend to elucidate the meaning of the concept from the connotative content. They also possess the ability to form association between conceptually seemingly unrelated ideas.

Related Studies

Several studies have shown that there are several factors which influence students' mathematics achievement. This section summarized a review of related studies on intellective and non - intellective factors related to academic achievement, which provided the understanding and insights necessary for the development of the logical literature of this study.

A research dealing with factors affecting students' achievement in mathematics was conducted by Lariego (1990). He determined the home factors affecting sophomore students' attitudes toward mathematics and achievement in mathematics. He found out that favorable attitude toward mathematics and parents' educational involvement relate significantly with attitude. Students'

attitude towards mathematics is significantly and positively related to his mathematical achievement. Mathematics achievement and parents' involvement are the best predictors of mathematics attitude while achievement is best determined by the student's attitude towards the subject, his father's occupation and parental involvement.

Based on the findings of Amporin (1994) in her study of predictive of academic achievement of first year high school students in St. Anthony School, the following conclusions were drawn: (1) There were positive relationships between the school grade point average and the different variables. Those found significant were: sex, IQ, study habits attitudes and study orientation; (2) There were significant differences among the IQ scores, high school and elementary grade point averages, study habits, attitudes and orientation of male and female respondents and; (3) There were significant predictors of high school grade point average. They are elementary grade points average and IQ scores.

Pacolor (1993) conducted a study entitled " "Determinants of Achievement in Mathematics of Fourth year Secondary Students in Samar Island: An Input to Model Training Design." The researcher utilized the descriptive method of research using comparative and correlational analysis. The study focused on variables namely: students' scholastic rating in mathematics, study habits and attitudes toward mathematics'. The results, statistical analysis and interpretation of the data served as an input to a training design for mathematics teachers in the three provinces in the island of Samar. Based on the findings of the study, he concluded that: (1) The average students who perceived that they have proper study habits in mathematics are more likely to be good achievers in the same subject; (2) On the average, students who perceived that they have favorable or positive attitude towards mathematics are expected to have higher level of performance in the same subject and (3) there is a high relationship between the students' achievement in math and their math scholastic ratings, study habits, and attitudes

toward the secondary mathematics curriculum and socio-economic status of their parents represented by their educational attainment, income, and occupation.

The studies conducted by Lariego, Amporin and Pacolor showed the influence of some factors as they relate to students' achievement mathematics. These studies have the same bearing with the present study because they all attempted to determine the relationships of some factors that affect or influence students' achievement in mathematics. However, they differ from the present study in terms of choice of setting, subject and respondents.

The study of Lupot (1998) of intellective and non - intellective correlates of mathematics entry skills among the engineering freshmen at the University of Bohol found out that students' mathematics performance prove to have the basic numerical skills. Approximately 87.3% of them manifested a lukewarm attitude toward mathematics. It only shows that students need to motivate and appreciate the subject. She further explained

that previous grade should not be considered as a reference for their performance; but instead the factors should be considered. In her study male students perform better than female in their mathematics performance. The performance of the students depends on the individual differences not on the type of school they came from. The students perform better depending on his work attitude to learn. The study also revealed that mathematics entry skills and attitude grade and sex show significant relationship. While entry skills and the type of school, and self-concept, show no significant relationship.

The present study is similar to the previous study since both have focused on the student factors. Only that there is a slight difference on the factors being identified, the place of study, and the respondents.

Perez (1998) conducted a study on mathematical performance and difficulties met by the third year students in Gandara National High School. He employed descriptive - correlational research design using questionnaire, achievement

test and documentary analysis in gathering the data. In his findings- of the 80 respondents, 43 were females and 37 were males. The monthly average income of parents pegged at P 5, 199.50, which falls "below average income". The students posted an average performance of 29.50 in the achievement test, which is considered "fairly low performance". With the use of appropriate statistical tool he found out that there are significant relationship between the students' achievement grade in Mathematics III and their (1) performance in the achievement; (2) final grades in Mathematics 1; and (3) final grades in grades Mathematics 11. However, he found out that there is no significant relationship between achievement in Mathematics 111 and their age and sex. As revealed by the result of the achievement test in Mathematics, the difficulties of the students were in the following concepts; rational exponents, simplifying negative exponents, simplifying negative rational exponents, changing expression with fractional exponents to radicals, simplifying

rational exponents, addition of rational expression, and combining rational expression.

Based from the findings, he concluded that majority of the respondents were young and active, belonging to below average income bracket. It also showed that age and sex do not affect their mathematical ability. He also pointed out that the high performers are those with high income while the low performers are the opposite with insufficient mathematical skills.

The study conducted by Perez is related to the present study in the sense that both are geared to students profile and its relationships with performance. However, they differ in some aspect particularly in the setting, content area, variables used in the study as well as the use of multiple regression.

Labine (1996) investigated the factors associated with the computational and problem solving skills in mathematics of special class freshmen in Samar National School. He determined whether there is significant relationship between the computational and problem solving skills

possessed by special class students and their age, sex, study habits, attitudes toward mathematics, elementary mathematics grade, and DOST qualifying examination. He found out that there is a very high relationship between students' test performance in mathematics and age, but not significant with students' sex. However, in terms of study habits, attitudes and their elementary grades in mathematics prove to have a substantial relationship with test performance in mathematics. He recommended that teachers should therefore emphasize the reading comprehension skills relating to problem solving such as sequencing of events, critical thinking through what, how and why of questions, making comparisons and evaluation. These skills in reading comprehension are necessary to solving problems in mathematics.

This study has the same bearing with the present study since both are concerned with the relationship between students' achievement in mathematics and their profile in terms of sex, age, attitude, and study habits. However, they differ in setting, grade level of the respondents,

content area, and the inclusion of intellective factors.

Verunque (1999) in which his study of factors related to the computational and problem solving skills in mathematics of freshmen students in Biliran province he identified factors of students teachers and parents affecting the computational and problem solving skills of the students. He found out that students variable as significant predictors of their computational and problem solving skills than the teacher and parent variable.

This study has the same bearing with the present study since both are concerned with relationship between achievement in mathematics and their profile in terms of sex, age, attitude, and study habits. However, they differ in setting, grade level of the respondents.

This study has the same bearing with the present study because both are concerned with study habits, attitude toward math, and previous grade in math. However they differ in the sense since that the previous study includes parent and

teacher variable while the present has focused on the students' intellective and non - intellective variables.

Abanador (1998) made a study on the factors related to the achievement in mathematics I of the students from among the vocational schools in Eastern Samar . Student achievement by type of vocational schools, namely: craftsmanship, fisheries, agriculture, and trade, cannot be compared to the achievement of students in another type of vocational school. However, in the attitude, it turned out that the attitude towards Mathematics is related to the students achievement in all types of vocational schools under the study Hence the more favorable the students' attitude towards Mathematics, the higher is their achievement in Mathematics I. He also found out that students' with positive Self Concept would have a better result in Mathematics Achievement. While the attitudes towards mathematics came out to be the factor being most significant related to students' achievement in mathematics I. He also

found out that teacher factor is significant in the students' achievement in Mathematics.

This study has the same bearing with the study of Abanador because both deal on assessing students' performance in mathematics but they differ in grade level, setting and content area.

The mathematical readiness of first year high school students was conducted by Flores (1990). Based on the findings of the study, she concluded that (1) first year students lacked mastery of the fundamental skills they were supposed to have learned in the elementary grades; (2) first year students performed differently from difficult to very difficult in the different topics in elementary mathematics; (3) variables of sex and income bracket of parents did not affect students performance while there is a relation between mental ability and performance in the achievement test. She recommended that a diagnostic testing or readiness test be conducted to determine students' weaknesses and strengths at the beginning of the school year and that teachers should prepare varied activities to find the

abilities and needs of the students. Learning tasks should be made more interesting, meaningful and relevant to the students' need.

The study of Petilos (1995) on Predictors of Mathematics Performance of Fourth Year High School in the Division of Leyte found out important variables that directly influence the students' Mathematics performance. The result indicated that even the students who were on top of their classes were low in their Mathematics performance in the 1994 NSAT and Test All in 1995. The study revealed that English proficiency and previous grades of students in mathematics have strong impact or significantly correlated to Mathematics performance of students. He also stressed that teaching experience of the teacher and pedagogical training are associated with the students Mathematics performance. However, parents' education and occupation did not show any direct effect on the performance of students in Mathematics.

The study of Petilos has the same bearing with the present study since both deal with

variables that affect the performance of the students in Mathematics. However, they differ in setting, contents and kind of data.

The study of Bautista (1992) is concerned with the mathematics performance and difficulties met by the sophomore students at San Juan Municipal High School. The respondents were selected by systematic random sampling from among the seventeen sections of second year high school. She concluded that 1) most of the sophomore students graduated from elementary schools in Metro Manila are below average in their final grades in elementary and high school mathematics; 2) the trend of the distribution of the sophomore students in the following variables namely, achievement grades in elementary, freshmen and second year final grades in mathematics together with the diagnostic test and achievement test are significantly divergent from the average or normal trend of distribution. There is a divergence of students' distribution in the above variables. 3) There were significant correlates obtained between the final grades in high school math of the

students and each of the variables mentioned. She suggested the following recommendations: 1) the teacher must be well equipped with a variety of instructional devices in teaching mathematics subject; 4) The teacher should provide aim towards their students' mastery of the concepts discussed for that day; 5) Mathematics teachers provide remedial and tutorial classes to slow learners.

The study of Bautista is similar to this study in terms of analyzing students' performance in Mathematics as well as relating test performance to previous mathematics grades and admission test results but differ in terms of grade level, setting, scope and learning contents in mathematics.

Gayas (1991) in her study about time spent in doing homework assignment and its effect on the attitudes and mathematical performance among average and below average freshmen students of Leyte National High Schools proved that giving homework assignment to the average and below average subjects had significant effect on their attitude toward mathematics. That giving less

homework assignment to the whole and average group has significant effect on their attitudes toward mathematics. However, this did not show any significant effect with below average group. Meanwhile, the number of exercises or quantity homework assignment led to the development of favorable attitudes among the subjects as a whole and as an average group, but not with the case below average subjects. The study also revealed that giving more homework assignment has no significant effect or attitudes of the subjects toward mathematics I. Hence, the quantity of practice exercise given as follow - up of learned skills had no effect on attitude of the subjects towards mathematics I. The investigation showed that giving more homework assignment to the subjects has the same effect as their mathematical performance. Although homework assignment was a requisite to follow up learned skills; the quantity of practice exercises has no significant difference on the effect of the mathematical performance of the learner. Thus, homework assignment should be moderate.

This study is similar to the present study since both agree on students' attitude toward the subject. However, they differ in the sense that in the present study the attitude of the students to math subjects is identified as the non - intellective factor.

The study of Villarante (1994) determined the predictors of the level of students' performance in Mathematics II in the four secondary schools in the city of Tacloban. She analyzed the profile of students' peer, home, and teacher factor and the level of performance in arithmetic, algebra, consumer math, geometry and statistics. The result of her study revealed that there is no significant relationship between the students' performance in mathematics II and each of the factors mentioned above. And no identifiable combination of factors that best predict the performance of students in mathematics II.

The present study is related to the previous study since both are after the relationship of the students' profile and students performance. However, they differ in the manner of the

presentation, the setting, and slight differences of the identified variables.

A similar study on factors associated with achievement in mathematics was conducted by Olasiman (1998). She determined the relationship of Mathematics performance of fourth year high school students in the newly nationalized high school in the Division of Biliran. Based on the findings of the study she concluded that the academic preparations of students are still the best preparation for achievement in mathematics. Achievement in mathematics is a product of cumulative learning as shown by the average grade in mathematics from first to the third year as highly correlated with and a predictor of achievement in mathematics. The mathematics teacher plays an important role in mathematics learning thus, it means that mathematics is best learned through the guidance of a teacher. The mother is still the greatest influence in the learning of their children. Occupation of the mother is significantly correlated with achievement in mathematics. Achievement in

mathematics is not correlated with either attitude of students nor parents. Educational attainment of the parent also is not correlated with achievement in mathematics. Mathematics learning is achieved best in school, under the guidance of the teacher, rather than at home under the guidance of the parents. This study is similar with the previous study of Olasiman in terms of variables used like age, sex and students family background and previous grades in Mathematics. However, they differ in terms of the combinations of variables or fractions involved that will determine the influence of students' achievement in Mathematics.

A very recent research dealing with factors affecting students' achievement in Mathematics was conducted by Bejar(2001). The researcher utilized the descriptive method of research using comparative and correlation analysis. Based on the findings, the following conclusions were drawn: 1) The freshmen college students from SSCAF possessed the age characteristics of a typical student. Majority of the students had proper study habits

and had positive attitudes towards mathematics, 2) There was a need to develop the computational and problem solving skills of the students, 3) Students who graduated from urban schools were much better in computational skills than those who graduated from rural schools, 4) Students who were found to have good study habits, attitudes, and high school math grades were significantly correlated with computational and problem solving skills and grades in College Algebra and 5) Achievement in College Algebra could be predicted for study habits, attitude towards mathematics, and high school mathematics grade.

The present study has the same bearing with the study conducted by Bejar because both deal with determining variables which could predict better performance in mathematics. The present study differs from the aforementioned study in terms of year level, content, and procedure.

The related studies cited, somehow provided valuable information and clear insights and directions in the proper conduct of the study. Likewise, they aided the researcher in

rationalizing the factors identified in the present study as to influences on students' achievement in mathematics.

Chapter 3

METHODOLOGY

This chapter describes the research methodology that was applied in this study. This included research design, instrumentation, and validation of the instruments, sampling procedure, data gathering and statistical treatment of data.

The Research Design

This study employed the descriptive correlational method of research wherein the basic instrument used was the questionnaire and achievement test which was constructed to suit the different needs and abilities of the respondents. The problem under consideration focused on finding student factors that are significantly related to achievement in mathematics. The relationships among two or more variables were studied without any attempt to influence them. The study focused on the following factors: mental ability scores, grades in Mathematics III, grades in English III, grades in Mathematics IV, sex, educational

attainment of parents, occupation of parents, family monthly income and students' attitude towards mathematics.

The instruments used to gather the data from the respondents of the study were questionnaire - checklist on students rating scale for their attitude in mathematics, teacher made achievement test, mental ability test and documentary analysis. The frequency counts; mean percentage, standard deviation, skew ness and kurtosis were used to describe the profile of respondents. The data were analyzed using the frequency distribution, mean, standard deviation, skew ness, kurtosis, Pearson r correlation, Fisher's t-test, multiple correlation, and regression analysis.

Instrumentation.

The primary data of the study were gathered through the use of questionnaire - checklist, teacher made achievement test and standardized mental ability test. The following instruments were used to obtain data for the study: were:

The questionnaire. Part I is a questionnaire for student respondents designed to determine their family background. The elements considered are their parent's education, occupation or profession and monthly income. Part II is a questionnaire for students' attitude towards mathematics. This is a twenty-five item questionnaire intended to measure the feelings and practices or attitude of the students towards mathematics. The Likert type of summated rating was adopted. For each statement a five - point scale was provided for indicating extent of phenomenon under study: 5 for Strongly Agree (**SA**); 4 for Agree (**A**); 3 for Undecided (**U**); 2 for Disagree (**D**); and 1 for Strongly Disagree (**SD**).

Achievement Test. This is one of the main instruments for gathering data. To ensure the content validity of the test, a table of specifications was constructed based on the specific objectives of Mathematics IV. After the construction of the table of specification, the researcher, prepared a test of 80 items distributed among the learning areas namely:

Counting Techniques, Polynomial Functions, Circles, Plane Coordinate Geometry. The test is designed to determine as to what extent the objectives of Mathematics IV have been achieved. The test items are of the objective type using multiple choice with four possible options or choices to facilitate administering, scoring and interpretation of test results. The results of the test served as basis for determining the students' achievement in mathematics IV.

Mental Ability Test. The mental ability of the students was measured through standardized test by the Guidance Office.

Documentary Analysis. The school records of the students such as Form 137 - A also served as an instrument in this study. They provided the final grades of the students in Mathematics III and English III.

Validation of the Instruments.

The 80 item test was constructed based on the prepared Table of Specifications (Appendix C) taking into consideration the suggested time

budget in the Mathematics IV of the Department of Education and Philippine Secondary School Learning Competency PSSLC Objective based on each learning area. The draft of the test was submitted to the Math teachers for comments and suggestions. With the suggestions incorporated, the corrected draft was given to the adviser for further refinement. The final draft comprising of 80 items was tried out with the senior students of Gandara National High School(GNHS). The students involved in the try - out were given enough time to answer the test.

After the try - out, the items were subjected to item analysis to determine the index of discrimination and the facility value and later revised based on the analysis. The original 80 items test was reduced to a 50 item test.

The questionnaire - checklist for students' attitude in mathematics was validated with the senior students of GNHS. The test - retest method was applied with four days interval to obtain the coefficient of correlation. The computed coefficient of correlation was determined between

the first test and second test by using the Pearson Product Moment. The computed r was 0.78 which implies high positive correlation. (Appendix D.

Sampling Procedure.

The study utilized total enumeration for the selection of student respondents from the SSCAF laboratory high school. The respondents of the study consisted of 65 senior students.

From a total population of 65 fourth year high school students enrolled in Mathematics IV at the SSCAF during the school year 2001 - 2002, 100% were chosen as respondents for the study. The researcher utilized total enumeration for the selection of respondents. The respondents of the study consisted of 28 males and 37 females.

Data Gathering Procedure.

The researcher requested permission from the College President to allow him to field out and administer the research instrument to the intended respondents. The formal communication explained the nature and objective of the study.

One month after the pre - oral examination, the researcher finalized the measuring instruments such as the achievement test in Mathematics IV, questionnaire - checklist on students" attitude in mathematics. On the other hand, some intellective factors like achievement in Mathematics III and English III were taken either from the Office of Registrar or class advisers.

The researcher personally administered the mental ability test and questionnaire checklist in mathematics classes. The respondents were oriented with the objective of the research and were assured that their answers are strictly confidential through the use of code numbers. It was also emphasized that they have to answer the questions truthfully and to the best of their ability to achieve the objective of the study. The respondents were encouraged to ask questions if they are confused about any item and were given enough time to answer the questions. The researcher obtained a 100% retrieval of the completed questionnaire.

Statistical Treatment of Data

To arrive at the solutions to the problems in this study, responses were tallied, classified, and tabulated in appropriate tables to facilitate analysis and interpretation of results.

The following statistical methods were used for analysis of data and interpretation of results.

1.To obtain measure that described the "average" in terms of academic achievement in Mathematics III, English III, and mental ability, the mean of each set of data was computed. To estimate the variation or deviation of distribution of data in each of the above variables, the standard deviation was computed.

2. To gain the profile of the respondents, skewness and kurtosis were computed. The formula isshown below (Spiegel, 1978: 90-91).

$$\text{Skewness} = \frac{3(\text{mean} - \text{media})}{\text{standard deviation}}$$

$$\text{Kurtosis} = \frac{\text{Quartile deviation}}{P_{90} - P_{10}}$$

To test the relationship between the students' achievement in Mathematics IV and each of the predictor variables, namely: grades in the second grading, mental ability scores, grades in Mathematics III, grades in English III, and attitudes toward mathematics, the researcher applied simple correlational analysis and multiple regression analysis. The simple correlation by the use of Pearson Product Moment formula was computed (Ferguson: 1989: 125). The formula is shown below.

$$r = \frac{N\ (\Sigma xy) - (\Sigma x)\ (\Sigma y)}{\sqrt{[N\ (\Sigma x^2) - (\Sigma x)^2\ ]\ [\ N\ \Sigma y^2 - (\Sigma y)^2\ ]}}$$

where N = total number of students under study:

Σxy = is the summation of the cross products

Σx = is the summation of the independent variable

Σx^2 = is the summation of the square of each observation

Σy = is the summation of the dependent variable

Σy^2 = is the summation of the square of each observation

To test for the significance of the computed coefficients of correlation, the Fisher 's (Walpole, 1982: 383) t - test formula was used.

$$t = \frac{r\sqrt{N-2}}{\sqrt{1-r^2}}$$

Verbal descriptions of computed coefficients of correlation are as follows:

r		Degree of Relationship
1.00		perfect correlation
±0.71	±0.99	very high relationship
±0.41	±0.70	moderate correlation
±0.21	±0.40	low correlation
±0.01	±0.20	negligible or very low correlation

where:

r = coefficient of correlation between two variables

N = total number of paired variables.

To determine the best predictor of academic performance in Mathematics IV, the factor which gave the highest percentage contribution based on the value of Coefficient of Determination was considered the best predictor. The coefficient of Determination's is expressed as:

$$r^2\% = r^2 \times 100\ \%$$

The Linear Regression Equation (Ferguson, 1989:120) was used to predict individual achievement in Mathematics IV with respect to the variables whose correlation found significant.

$$y = a + bx$$

where: $$b = \frac{\Sigma xy - \Sigma x \Sigma y/n}{\Sigma y^2 - (\Sigma y)^2/n}$$

and $a = \overline{X} - b\overline{Y}$, $\overline{X}$ being the mean X and $\overline{Y}$ is the mean of Y.

The multiple correlation coefficient (R) and regression were computed using the following formula. To test the significance of multiple

correlation coefficient, F ratio (Ferguson, 1989:501) was used, given by the formula:

$$F = \frac{R^2(N-g-1)}{(1-R^2)\ g}$$

where, R = multiple correlation coefficient

N = number of respondents

g = number of independent variables.

Chapter 4

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

The data gathered from the respondents of the study, the statistical treatment, analysis, discussion and interpretation of findings are presented in this chapter. The data consist of students' profile, mean percentage score, and relationship between achievement in mathematics IV and their intellectual and non - intellectual factors.

Profile of Fourth Year Secondary Students

Mental Ability. A closer examination of the data from Table 1 revealed that of 65 respondents 36.92% have "average" mental ability, 6.15% belongs to "high average" level, and 10.77% belongs to "above average" level. Nobody from the group belongs to the "superior" and "inferior". It could be noted that some of the respondents belong to " low and below" ability, however, no one was found to be mentally deficient. The

computed mean and standard deviation were 27.8 and 8.2 respectively. The mean mental ability of the respondents is described as "average" based on computations and classification of students at the Guidance Office.

To measure the symmetry of distribution, skewness was computed. A distribution that is skewed to the left has a negative value, a normal or symmetrical distribution has zero skewness.

Table 1

Frequency and Percentage Distribution of Respondents According to Mental Ability

Class Limits	Frequency	Percent
41 –47	4	6.15
34-40	7	10.77
27-33	24	36.92
20-26	17	26.16
13-19	13	20
Total	65	100

$\bar{X} = 27.8$ Skewness = 0.55
s = 8.2 Kurtosis = 2.74

Zero skewness or skewness with the range of -1 to +1 are normally distributed. Moreover, the degree of peakedness or flatness of a distribution or kurtosis was also computed. For normal distribution, kurtosis is equal to three. Its curve is called mesokurtic. If kurtosis is higher than three, the curve is leptokurtic, and if less than three, the curve is platykurtic.

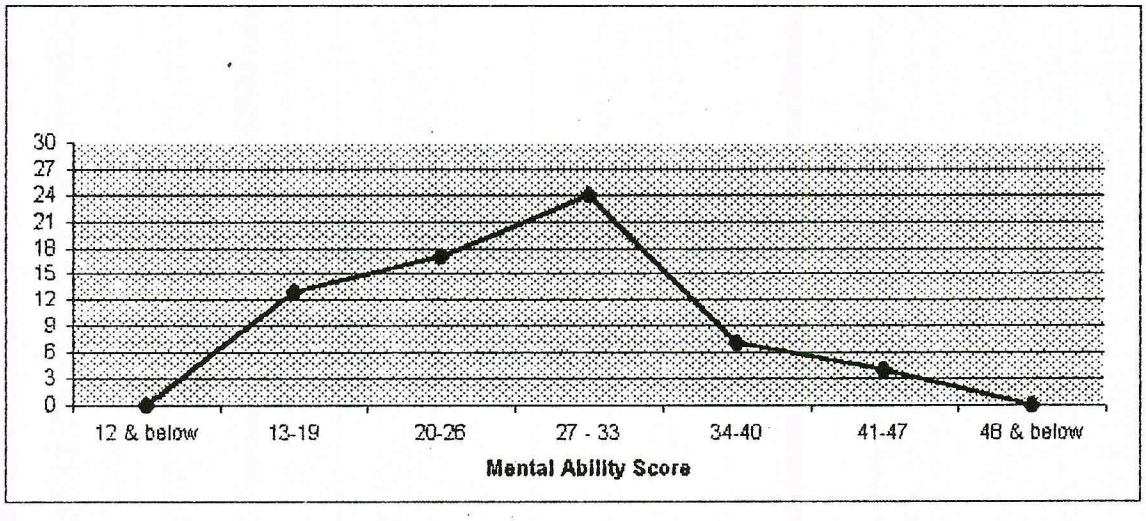

Figure 3

Distribution of Respondents According to Mental Ability

Table 2 shows that 53.85% of the students obtained "satisfactory" grades in the subject, 32.31% had "good" grades, 7.69 had "passing" grades, 6.15% "very good" grades and nobody had "excellent performance".

The distribution has a mean of 80.5 and a Standard deviation of 4.16. Thus, the final grades, in Mathematics III of the respondents could be described as "satisfactory." Moreover, the distribution in figure 4 also shows that, it is skewed to the right and is leptokurtic as indicated in the computed values of skewness and kurtosis which are .39 and 4.3 respectively. The graph (Figure 4) is skewed to the right indicates the large values in the right tail are not offset by correspondingly low values in the left tail and consequently the mean is greater than the median.

The graph (Figure 3) shows that the respondents' mental ability scores tend to be skewed to the right since the value is greater than zero(0) and it is platykurtic as indicated in the value of kurtosis which is less than 3.00

Grades in Mathematics III. The mean was interpreted in accordance with the following description as used in Samar State Ccollege of Agriculture and Forestry:

Grade	Verbal Description
94 - 100	Excellent
88 - 93	Very Good
82 - 87	Good
76 - 81	Satisfactory
75	Passing
74 & below	Failing

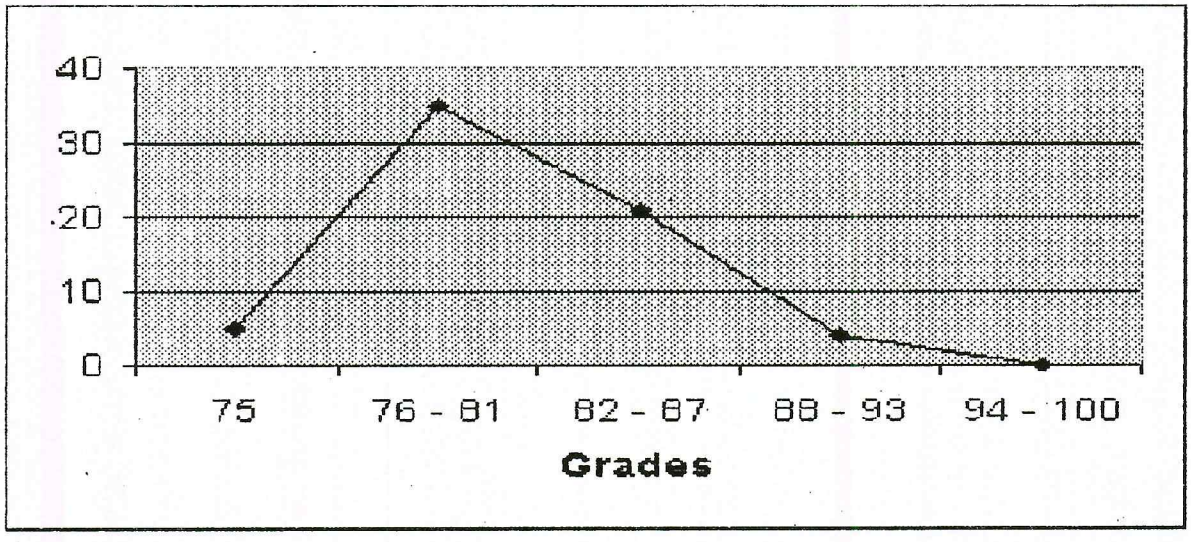

Figure 4

Distribution of Respondents According to Grades in Mathematics III

Table 2

Frequency and Percentage Distribution of Respondents According to Academic Performance in Mathematics III.

Class Limits	Frequency	Percent
94-100	0	0
88-93	4	6.15
82-87	21	32.31
76-81	35	53.85
75	5	7.69
Total	65	100

$\overline{X}$ = 80.5 Skewness = 0.39

s = 4.16 Kurtosis = 4.3

Grades in English III. Data shown in Table 3 reveal that out of 65 respondents, 50.77% of them got " satisfactory performance in English III; 35.38% of the respondents had "good" grades, 9.23% had "very good" grades, and the remaining 4.62% performed "passing" grades.

The distribution has a mean of 81.6 and standard deviation of 4.05. Thus the final grades of the students in English III could be described

Table 3

Frequency and Percentage Distribution of Respondents According to Academic Performance in English III

Class Limits	Frequency	Percent
94-100	0	0
88-93	6	9.23
82-87	23	35.38
76-81	33	50.77
75	3	4.62
Total	65	100

$\bar{X}$ = 81.6
S = 4.05

Skewness = 0.63
Kurtosis = 2.78

as "good". Figure 5 shows that, from the computed values of Skewness and Kurtosis, the distribution is skewed to the right and is platykurtic.

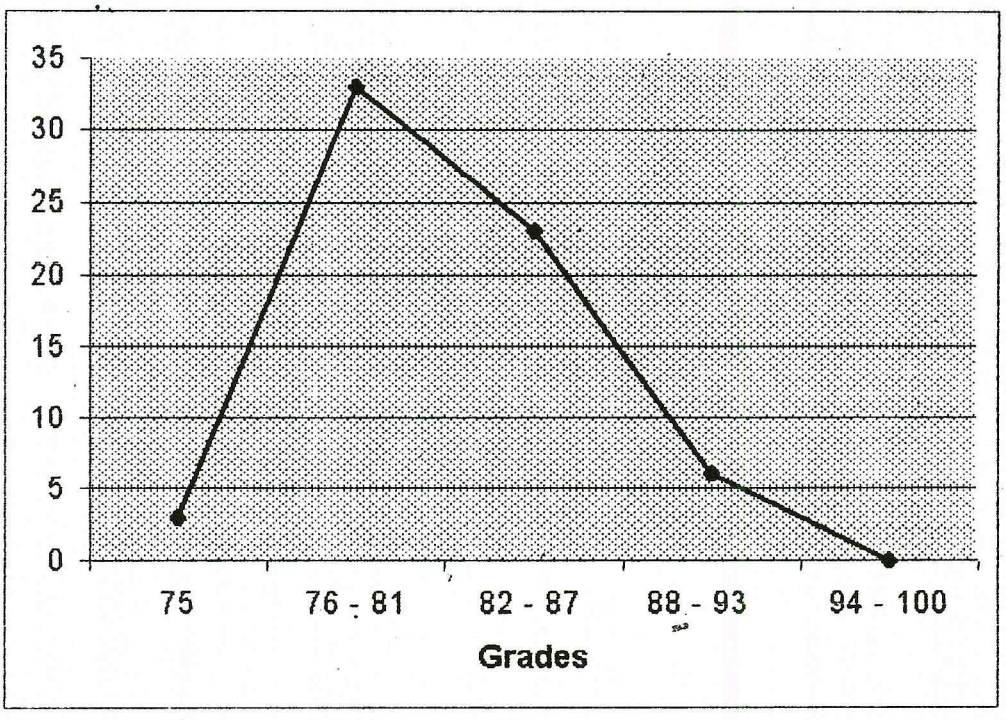

Figure 5

Distribution of Respondents According to Grades in English III

Sex - Table 4 shows that 37 (56.92%) were female respondents and 28(43.08%) were male respondents which reveals that a greater number of female who enrolled in fourth year high school during the school year 2001-2002

Table 4

Frequency and Percentage Distribution
Of Respondents According to Sex

Sex	Frequency	Percent
Male	28	43.08
Female	37	56.92
Total	65	100.00

Attitudes Towards Mathematics - Table 5 shows that 55.39 percent of the respondents belong to the 68-75 class interval showing that 36 students have unfavorable attitude towards Mathematics while 21.54 percent of the respondents have very unfavorable attitudes towards the subject. However, 15.38 percent of the respondents are undecided and the remaining 7.69 percent have favorable attitudes towards the subject.

Table 5

Frequency and Percentage According to Attitudes Towards Mathematics

Class Limits	Frequency	Percent
92-100	0	0
84-91	5	7.69
76-83	10	15.38
68-75	36	55.39
60-67	14	21.54
Total	65	100.00

$\bar{X}$ = 71.00
s = 5.89

Skewness = 0.17
Kurtosis = 3.58

Figure 6 shows that, the distribution is skewwed to the right and leptokurtic as indicated by the computed values of the moment of coefficient of Kurtosis equal to 3.58 and a moment coefficient of skewness equal to 0.17. It has a mean of 71.00 and standard deviation of 5.89. This implies that the respondents attitude towards mathematics could be generally described as "unfavorable".

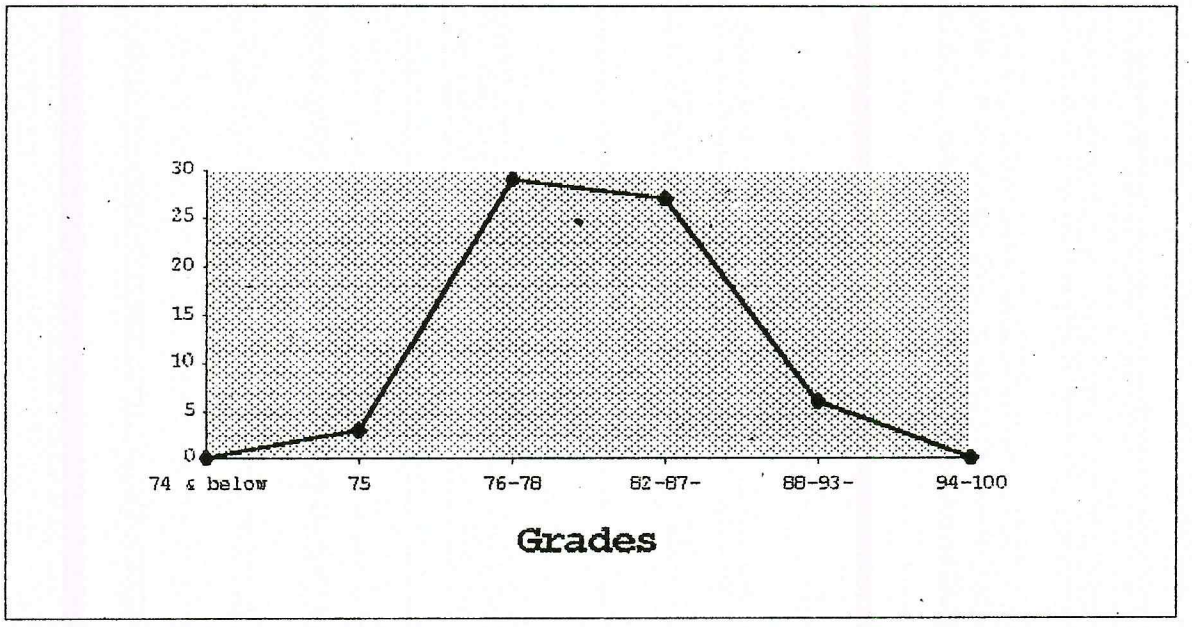

Figure 6

Distribution of Respondents According to Attitude Towards Mathematics

Educational Attainment of Parents. Table 6 shows the educational attainment of students' parents. The largest proportion of schooled group registered 22% of the fathers of the students indicate some years in high school. This was followed by elementary graduate which comprise 20% of the total fathers involved and some 14% each stayed some years in elementary, high school graduates and some years in college, 12% are

Table 6

Educational Attainment of Parents

Educational Attainment of Parents	Father	%	Mother	%
No Schooling	2	3		0
Some years in elementary	9	14	8	12
Elementary Graduate	13	20	12	18
Some years in High School	14	22	20	31
High School Graduate	9	14	8	12
Some years in college	9	14	3	5
College Graduate	8	12	14	22
With Master's Unit		0		0
Master's Degree	1	2		0
Total	65	100	65	100

college graduates, 4% had no schooling and 2% had earned master's unit.

Similarly, 31% of the mothers of the students had stayed some years in high school, 18% were elementary graduates, 22% were college graduates, 12% stayed some years in elementary and high school graduates and the remaining 5 percent stayed some years in high school.

It is evident from the data that the students appeared to have parents who have varied educational attainments. The largest proportion of parents of the students - respondents stayed some years in high school followed by elementary graduates.

Occupation of Parents. Data shown in Table 7 revealed that out of 65 students, 71% of them indicated that their fathers' were farmers/fishermen. This was followed by 14% of them who were government employees, 9% self-employed and 3% each for non-government employee and self-employed.

Table 7

Occupation of Parents of Respondents

Occupations	Father	%	Mother	%
Farmer/ Fisherman	46	71	10	15
Housekeeper	0	0	37	57
Government Employee	9	14	13	20
Non-Government Employee	2	3	1	2
Self – Employed	6	9	2	3
Others	2	3	1	2
Jobless	0	0	1	2
Total	65	100	65	100

On the other hand, some 57% of the mothers of the students were plain housekeepers. This was followed by government employee of 20 percent and 15 percent were farmers. It is evident from the data that more than half of the mothers of the students involved in the study were housekeepers.

Monthly Income. A closer examination of the data in Table 8 clearly revealed that the proportions of the students consisting of 29 respondents (44.62%) have a family monthly income that ranges from P2,000 to P5,000. This was followed by 15 respondents (23.08%) whose family income ranges from P5,001 to P8,000. The next income range of P8,001 to P11,000 registered 8 respondents (12.31%). The findings revealed that the monthly income of the majority of parents of the respondents implies low income. Furthermore, the table also showed that 75% of the parents had a monthly income range between below average income to very low income.

Table 8

Gross Monthly Income of Parents of Respondents

Income Limits	Frequency	Percent	Interpretation
17,000 & above	1	1.54	Very high income
14,001-17,000	4	6.15	High income
11,001-14,000	3	4.62	Above average income
8,001-11,000	8	12.31	Average income
5,001-8,000	15	23.08	Below average income
2,000-5,000	29	44.62	Low income
below P2,000	5	7.69	Very low income

Table 9 presents the description data of the fourth year high school students in terms of intellectual, non-intellectual and independent variable taken singly, namely: mental ability, grades in Mathematics lll grades in English lll, attitude towards mathematics, and grades in Mathematics lV.

Among the academic achievements, the students had the highest mean in Mathematics lV the mean being 82.11. It is also followed by grades in

Table 9

Modal Profile of the Respondents

Factor	Mean	S	SK	K	Verbal Interpretation
Mental ability	27.80	8.20	0.55	2.74	Average
Grades in Mathematics III	80.50	4.16	0.39	4.30	Satisfactory
Grades in English III	81.60	4.05	0.63	2.78	Good
Attitudes towards Mathematics	71.00	5.89	0.17	3.58	Unfavorable
Grades in Mathematics IV	82.11	3.59	3.59	2.47	satisfactory

Where : S = standard deviation

SK = Skewness

K = Kurtoses

English III, 81.60; and grades in Mathematics III, 80.50. Moreover, the computed standard deviation in the order of decreasing mean are 3.59, 4.05 and 4.16.

The academic performances of the students in English can be described as "good" while their academic performances in Mathematics III and Mathematics IV are considered "satisfactory". The

computed standard deviation in Mathematics 111 (4.16) and English 111 (4.05) revealed that the students' academic performances in these subjects are more varied than their academic performances in Mathematics 1V (3.59). These implies that the group of respondents is hetorogeneous in terms of their academic performances in Mathematics 111 and English 111. The academic performance of the students in Mathematics 111 as indicated by the standard deviation of 4.16, ranges from 76.34 (satisfactory) to 88.82 (very good); in Emglisg 111 as indicated by standard deviation of 4.05 ranges from 77.55(satisfactory) to 89.70(very good); in Mathematics 1V as indicated by the standard deviation of 3.59, ranges from 78.52(satisfactory) to 89.29(very good). These findings show that the students have consistent academic performances in Mathematics 111, English 1V and Mathematics 1V from "satisfactory" to "very good".

Achievement in Mathematics 1V. Table 10 shows That nobody from the students obtained failing grades as well as excellent grades. However,

4.61% Had "passing" grade, 44.02% had "satisfactory", 41.54% had "good" performance and 9.23% had "very good" performance. The percentage equivalent of the mean grade, 82 with a standard deviation of 3.59 implies that generally, the students have satisfactory performance in Mathematics IV. The distribution is skewed to the right and is platy kurtik as shown in figure 7.

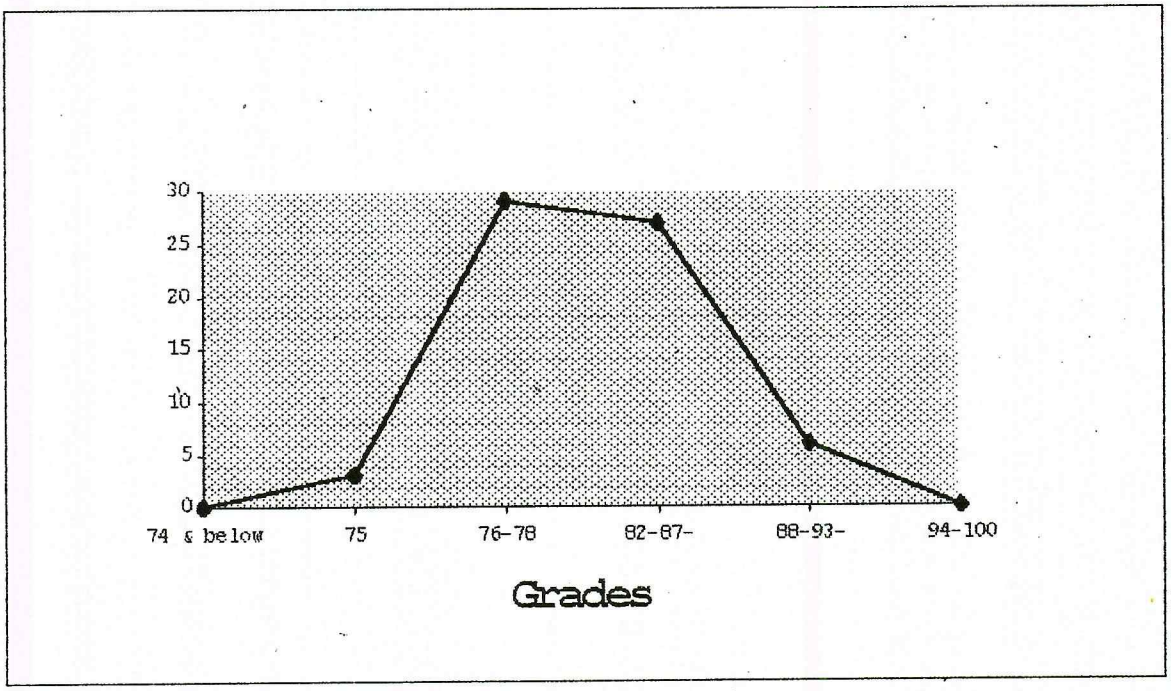

Figure 7

Distribution of Respondents According to Academic Achievement in Mathematics

Table 10

Frequency and Percentage Distribution of Respondents According to Performance in Math IV

Class Limits	Frequency	Percent
94-100	0	0
88-93	6	9.23
82-87	27	41.54
76-78	29	44.62
75	3	4.61
74 & below	0	0
Total	65	100

$\bar{X}$ = 82.11 Skewness = 0.36

s = 3.59 Kurtosis = 2.47

Correlation between the Achievement in Math IV and the Variables Taken Singly.

The researcher, in the presentation of his findings about the relationship involved between achievement in Mathematics IV and the predictive variables of the study, aimed to discover which variables would play a significant role in determining the students' ability to perform well in Mathematics IV. Table 11 presents the

correlation coefficient and the computed t values corresponding to the coefficients. It was tested on the null hypothesis that r = 0 with a tabular value ± 2.00 at 0.05 level of significance.

A. Intellectual Predictors

Mental Ability. The table reveals that computed r being equal to 0.39 is verbally described as low or substantial correlation. However, the computed t - value of 3.36 is greater

Table 11

Summary of Correlation Coefficient and t-value

Factor	Correlation	Verbal Interpretation	t-value
Mental Ability	0.39	Low	3.36*
Grades in Math III	0.68	Moderate	7.40*
Grades in English III	0.62	Moderate	6.31*
Sex	0.63	Very low	0.48
Monthly Income	0.06	Very low	1.37
Education of Parents	0.17	Very low	0.33
Occupation of Parents	0.04	Very low	0.56
Attitudes Towards Math	-0.07	moderate	6.49*

*Significance at 0.05 level

than the tabular t - value of 2.00 at 0.05 level which shows that the correlation is significant. Its significant correlation implies that a student with a high mental ability level tend to perform well in Mathematics IV.

It may be pointed out also that students with a good mental ability are likely to be able to perform cognitive tasks well, such as, problem identification, analysis and reasoning which are essential in mathematics IV. Considering its own finding, the present study rejects the null hypothesis that there is no significant relationship between achievement in mathematics N and mental ability. The significant relationship between mental ability and achievement in mathematics lends further statistical support to the findings of the study conducted by Amporin and Flores. The relationship between achievement in mathematics IV and achievement in Mathematics III is given by the correlation coefficients of 0.68, which is interpreted as "high". Tested at 0.05 level with a computed t - value of 7.40, the relationship was found to be very significant

thus, rejecting the hypothesis that there is no significant correlation between the aforementioned variables. This finding implies that students who have good performance in Mathematics III could be expected to achieve more in Mathematics IV than those who did not perform well in Mathematics III.

Grades in English III. The correspondence between achievements in English III is given by the correlation coefficient of 0. 62, which is verbally interpreted as " moderate" Correlation and was found significant at 0.05 level with its t - value equal to 6.31. . This indicates that achievement in English proficiency instructions slightly affects the achievement in Mathematics IV. The hypothesis that there is no significant relationship between the variables is rejected. This implies further that students with better grades in English lll likewise obtained better grades in Mathematics lV. Student with high level ability in English succeeds academically.

A synthesis of the preceeding analysis and interpretations of data gathered presented indicates that intellectual predictors such as

mental ability, grades in Mathematics lll and grades in English lll are correlated witrh achievement in Mathematics lV as shown by the obtain r's 0.39, 0.68 and 0.62 respectively are all significant at the 0,05 significance level. This may explained by the fact that all intellectual predictors reflect or connote possession of skills and abilities in cognitive such as identification and analysis of problems, comparison abstraction, mastery of fundamental processes and logical thinking, which, among others all positively contribute to good performance in Mathematics lV.

B - NON-INTELLECTUAL PREDICTORS

Sex. On the relationship between sex and achievement of students in Mathematics lV, the computed coefficient of correlation was -.07. This denotes a negligible or very low relationship between these two variables. The computed t-value of 0.56 is very much lower than the twbular value of 2.00 indicating no significant relationship between sex and achievement in Mathematics lV. It

can be implied that sex does not affect or influence students' achievement in mathematics. This finding was in consonance with the research findings of Labine, Flores and Olasiman.

Educational Attainment of Parents. The computed coefficient of correlation between education of parents and students' achievement in Mathematics lV was 0.17. This denotes a very low relationship between these two variables. The computed t-value of 1.37 is smaller than the tabular value of 2.00. Therefore, the null hypothesis that there is no significant relationship between educational attainment of parents and students' achievement in Mathematics lV is accepted at .05 level of significance. The finding implies that the educational attainment of parents have nothing to do with the achievement in Mathematics lV.

Occupation of Parents. On the relationship between the achievement of students in Mathematics lv and the occupation of their parents, the computed coefficient of correlation was 0.04. This denotes a very low correlation between these

two variables. The computed t-value of 0.33 is very much smaller than the tabular value of 2.00. This connotes, therefore, the acceptance of the null hypothesis. The finding implies that the parents' occupation do not affect or have nothing to do with students' achievement in Mathematics lV.

Occupation of Parents. On the relationship between the achievement of students in Mathematics IV and the occupation of their parents, the computed coefficient of correlation was 0.04. This denotes a very low correlation between these two variables. The computed t-value of 0.33 is very much smaller than the tabular value of 2.00. This connotes, therefore, the acceptance of the null hypothesis. The finding implies that the parents' occupation do not affect or have nothing to do with students' achievement in Mathematics IV.

Monthly Income. On the relationship between the students' achievement in Mathematics lV and their family's monthly income, the computed coefficient of correlation was 0.06. this denotes a very low relationship between those two

variables. The computed t-value of 0.48 is very much lower than the tabular value of 2.00. This connotes, therefore, the acceptance of the null hypothesis. This finding implies that whether a student come from a family with a high or low income, he could excel in Mathematics lV. This also indicates that the monthly income of the family has nothing to do with achievement in Mathematics lV.

Attitudes Towards Mathematics. There exists a "moderate" relationship between achievement in mathematics IV and attitude towards Mathematics as shown by the computer of 0.63. Tested at 0.05 level with a computed t - value of 6.49, the relationship was found to be significant thus, rejecting the hypothesis that there is no significant correlation between the aforementioned variables this illustrates that generally, students have a positive attitude towards Mathematics is likely to perform well in the subject.

Interpreting the finding of this study further, a positive attitude generally brings

about positive reactions to learning situations and experience which contribute to effective learning and consequently, good or even better performance. The finding is related to the findings of Pacolor, Lariego, Lupot, and Labine, that there is a significant relationship between the two variables. However, much of these studies pointed out that it is possible to have a group of students who may achieve it is possible to have group of students who may achieve well but may not have a favorable attitude towards Mathematics. This connotes, therefore, that there are other factors that affect academic achievement besides attitude, particularly the competence of the teacher to motivate effectively and to use strategies and techniques that generate positive mindsets and draw out the best in students.

Among the non-intellectual predictors, attitudes towards mathematics shows significant correlation with achievement in Mathematics IV of senior high school students. However, sex, education of parents, occupation of parents and monthly income of parents were not found to be

significantly related to the achievement in Mathematics lV.

Extent to which Selected Variables Predict Individual Achievement in Mathematics lV.

Among the variables, only the predictive ability of those found with significant correlation was discussed. This is because a statistically significant correlation is indicative of the actual relationship rather than do to chance.

Table 12 presents the predictive ability of selected variable, which found significant in previous problem. It shows that, the amount of variation of achievement in Math lV due to mental ability is approximately 15.21%, about 15 percent of the total variance. This indicates that only 15 percent of the students' achievement in Mathematics lV was due to mental ability.

The amount of variation in the grade in Math lV influenced by the achievement in Math III is 46.24%. From this, it can be explained that two-fifths of the student's achievement in Math lV was attributed to the achievement in Math lll. It

Table 12

Summary of Correlation Coefficient of Determination and Regression Equation

Factor	r	r^2	Regression Equations
Mental ability (a)	0.39	0.1521	y=54.82+1.01 a
Grades in Math lll (b)	0.68.68	0.4624	y=29.98+61 b
Grades in English lll (c)	0.62.62	0.3844	y=23.78+.71 c
Attitudes towards Math (d)	63.63	0.3969	y+-13.46+1.02 d

significant to note that students learn the Mathematical skills though a gradual and progressive approach where new concepts to be acquired depend upon a careful mastery of the previous learned skills.

The amount of variation in the grade in Math lV influenced by the achievement in English lll is 38.44%. From this it can be explained that approximately one-third of the students'

achievement in Math lV was attributed to the achievement in English lll.

Of the non-intellective factors investigated, attitude towards mathematics was found to be significantly correlated with achievement in Math lV. The amount of variation in the grade in Mathematics influenced by attitude towards mathematics is 39.69 percent implying that more than one-thing of the students achievement in Mathematics lV is due to their attitude towards the subject.

Extent to which the Intellectual and Non-intellectual Predictors taken As a whole predict Achievement in Mathematics IV

Table 13 presents the multiple correlation coefficient, coefficient of determination, and non-intellectual in Mathematics lV taken as a whole.

It could be seen that intellectual factors taken as a whole has 0.56 correlations coefficient with respect to achievement in Mathematics lV which could be described as moderate relationship. This was found significant at 0.05 level with a

computed F. value equal to 12.22. The amount of variation in the achievement in Mathematics IV due to combined effects of the intellectual factors is 31.36%. This further indicates that almost one-third of the students' achievement in Mathematics IV could be attributed to the combined effects of the intellectual factors namely: mental ability, grades in Mathematics III and grades in English III or English proficiency instructions.

As for the combined effects of the non-intellectual factors in Mathematics IV, the correlation coefficient is 0.38. This is significant at 0.05 level with an F value of 6.94. Approximately 14.44 percent. Students' grade in Mathematics IV is due to the influence of the non-intellectual factors combined.

The intellectual and non-intellectual factors taken together has a computed R value equal to 0.45 which is significant at 0.05 level with an F value equivalent to 3.95. The value of R could

Table 13

Summary of Multiple Correlation-Coefficient, Coefficient of Determination and F-Ratio

Predictor	Multiple r	r^2%	F
A-Intellectual			
Mental Ability (a) Grades in Mathematics III (b) Grades in English III (c)	0.56	31.36	12.22
B- Non Intellectual			
Sex (d) Educ. Attainment of Parents (e) Occupation of Parents (f) Monthly Income of Parents (g) Attitude Towards Mathematics (h)	0.38	14.44	6.67
C- Intellectual and Non-Intellectual Predictors (a,b,c,d,e,f,g,h)	0.45	20.25	3.95

be described as moderate. The coefficient of determination which is 20.25% shows that one-fifth of students' achievement in Mathematics is explained by the intellectual and non-intellectual factors investigated in this study.

Implications

A significant relationship between achievement in Mathematics and mental ability would require teachers to match the activities in

the Classroom with the motivation of students to increase students' success. Students with high mental ability are also high achievers and vice versa.

A significant relationship between achievement in Mathematics IV and their grades in Mathematics III would require teachers to develop the mathematical skills if their students through a gradual and progressive approach where new concepts to be acquired depend upon a careful mastery of the previous learned skills. Moreover, teachers would need insight on how to improve teaching - learning situations through a wise selection of objectives, contents and activities. Teachers should be able to supplement some teaching method and techniques that would cater to the needs and abilities of their students.

A significant relationship between achievement in Mathematics and grades in English 111 would need teachers to consider that academic achievement is attributed to various factors including comprehension skills. Proficiency in the English Language can be used as a factor for

deciding what courses to take that require mathematical ability.

A significant relationship between achievement in mathematics and students' attitudes towards the subject would need teachers to understand that different students have different attitudes towards mathematics. The rapport of the teachers has a significant impact on students' learning. Although knowledge may be gained from books but the love for knowledge is transmitted only by way of personal contact. Students learn more effectively when they have the proper attitude and interest in what they learn and what they achieve in mathematics if they like and enjoy mathematics. Hence, continuous attention should be directed toward creating, developing, maintaining, and reinforcing positive attitude of the students.

Chapter 5

SUMMARY OF FINDINGS, CONCLUSIONS & RECOMMENDATIONS

The chapter contains the summary of findings, conclusions and recommendations of the study.

Summary of Findings

The findings of the study are herein presented vis-à-vis the specific questions and null hypothesis already stated.

Based on the data gathered, the following results were obtained:

1. The profile of the fourth year high school students of SSCAF in terms of the specified variables are as follows:

1.1 Mental ability	- average
1.2 Grades in Mathematics III	- good
1.3 Grades in English III	- good
1.4 Sex	- female
1.5 Educ'l. attainment of Parents	- some years in high school

1.6 Occupation of their Parents	-	Farmer/ fishermen
1.7 Monthly income of the Family	-	Low income
1.8 Attitudes towards Mathematics	-	Unfavorable

2. The relationship between academic Achievement in Mathematics lV and each of the intellectual and non-intellectual factors is described as follows:

2.1 The study showed a direct low relationship between mental ability and achievement in Mathematics lV as manifested by a correlation coefficient of 0.39

2.2 There is a direct and moderate relationship between grades in Mathematics III and achievement in Math lV as reflected by a correlation by a correlation coefficient of 0.68.

2.3 There is a direct and moderate relationship between achievement in English lll and achievement in Mathematics lV with a correlation coefficient of 0.62.

2.4 There is a negative non-significant correlation between achievement in Mathematics 1V and sex with a correlation coefficient of -0.07. This implies that sex has no effect in the academic achievement in Mathematics 1V. Male performed equally with female.

2.5 There is a positive non-significant, very low relationship between achievement in Mathematics 1V and the education of their parents. This implies that the education of parents have no effect in the achievement in Mathematics 1V.

2.6 There is a positive non-significant, negligible relationship between achievement in Mathematics 1V and occupation of their parents. This implies that the occupation of their parents have no effect in the achievement in Mathematics 1V.

2.7 There is a positive non-significant, negligible relationship between achievement in Mathematics 1V and the monthly income of their parents.

2.8 There is a direct and moderate relationship between the achievement in

Mathematics 1V and attitude towards Mathematics with correlation coefficient of 0.68

3. Extent to which the variables when taken singly, predict individual achievement in Mathematics 1V.

3.1 The study showed that about 15 percent of the students' achievement in Mathematics 1V is due to mental ability since $r^2\% = 15.21\%$.

3.2 More than 40 percent of students' Achievement in Mathematics 1V is attributed to achievement in Mathematics 111 since $r^2\% = 46.24\%$

3.3 About one-third of the students' achievement in Mathematics 1V is due to their attitude towards Mathematics as revealed by r^2 equal to 39.69.

4. Extent to which intellectual and non intellectual factors taken as a whole predict academic achievement in Mathematics 1V.

4.1 Achievement in Mathematics 1V and Intellectual Factors. The coefficient of correlation is equal to 0.56 showing a moderate relationship between achievement in Mathematics 1V and intellectual factors such as: mental ability, grades in Mathematics 1V and grades in English 111

taken as a whole. The coefficient of determination which is 31.36 percent implies that more than 30 percent of the students' grade in Mathematics 1V could be attributed to the combined effects of the intellectual factors.

4.2 Achievement in Mathematics 1V and non intellectual factors in the computed coefficient of correlation of 0.38 implies that there is a low relationship between achievement in Mathematics 1V and the non-intellectual factors taken collectively. However, this is significant at 0.05 level. The computed coefficient of determination is 14.44 percent. This findings implies that approximately 14 percent of the students' grades is due to the influence of attitude towards Mathematics, educational attainment of parents, occupation of parents, monthly income of parents and sex.

4.3 Achievement in Mathematics 1V and the Intellectual and non-intellectual factors combined in the coefficient of correlation is equal to 0.45 showing a moderate relationship between achievement in Mathematics 1V and the intellectual and non-intellectual factors combined. The

computed value of R is significant at 0.05 level. The coefficient of determination is 20.25%. This implies that 20 percent of the students' grades in Mathematics 1V is explained by the following: mental ability, grades in Mathematics III, and grades in English 111, sex attitude towards Mathematics, education of parents, occupation of parents and income of parents.

As a whole, the findings are supportive of the theoretical framework of the study where intellectual and non-intellectual factors influenced achievement in Mathematics 1V but there are other factors not included in this study which also affect achievement. The findings revealed that the best intellectual predictor is the achievement in Mathematics III while the best non-intellectual predictors is the attitude towards Mathematics.

Conclusion.

The following conclusions were drawn on the bases of the findings of this study;

1. A typical fourth year high school student enrolled in Mathematics IV at SSCAF during the S.Y. 2001-2002 is female, with an average mental ability, good performance in Mathematics III and English III and has unfavorable attitude towards Mathematics.

2. Achievement in Mathematics IV is moderately affected by factors such as mental ability, grades in Mathematics III, grades in English III and attitude towards Mathematics.

3. Among the intellectual and non-intellectual factors, achievement in Mathematics III and attitude towards Mathematics best explain or predict achievement in Mathematics IV.

4. Achievement in Mathematics IV is moderately affected by the intellectual and non-intellectual factors combined as indicated by their R^2 value.

Recommendations.

Based on the conclusions arrived at, the following recommendations are proposed:

1. Since attitude is subject to modification by knowledge, awareness and experience, this findings is potentially useful in defining the content of the guidance program of the school. The guidance counselors are the ones who give advises to students who encounter academic difficulties.

2. More exercises should be given to students in Mathematics lll since achievement in Mathematics lV is highly affected by their achievement in Mathematics III.

3. Students should be encouraged to revive or organize Mathematics Clubs that allow students to discuss mathematics problems and come up with correct solutions.

4. Mathematical abilities of students should be diagnosed at the start of the school year. Using the result of the diagnostic test, the teacher will be guided accordingly on where to start the class, what points need to be emphasized

or what learning areas need not be taught in details.

5. A study on the difficulties of students in Mathematics lV be conducted to trace what topic/s should be given more emphasis in teaching.

5. Researches should be conducted to determine other possible combination of factors that may influence teaching-learning effectiveness in Mathematics as well as in other subjects.

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A P P E N D I C E S

Appendix A

Republic of the Philippines

SAMAR STATE POLYTECHNIC COLLEGE

Catbalogan, Samar

September 13, 2001

The Dean of Graduate Studies
Samar State Polytechnic College
Catbalogan, Samar

SIR:

In my desire to start writing my thesis proposal, I have the honor to submit for your approval and the committee one of the following research titles, preferably No. 1

1. "MATH ACHIEVEMENT: CORRELATED TO INTELLECTIVE AND NON - INTELLECTIVE FACTOR",
2. "MATH ACHIEVEMENT: CORRELATED TO TEACHER'S VARIABLE AND STUDENT'S VARIABLE",
3. "MATHEMATICS ACHIEVEMENT: A COMPARISON BETWEEN TEACHING STYLE AND LEARNING STYLE A PROPOSED MODEL".

I hope for your favorable action on this matter.

Very truly your

RICO P. BONGALON
Researcher

Appendix B

TABLE OF SPECIFICATION

TOPICS COVERED	K	C	A	HA	TOTAL
A. Counting Techniques					
1. Counting Principles	1	1	1	2	5
2. Permutations and Combinations	1	1		3	5
3. Probability	2	1	1	1	5
4. Multiplying or Adding Probability			1	1	2
B. Polynomial Functions					
5. Polynomial Functions of Degree 1 & 2	1		2		3
6. Finding the Values of Polynomial				2	2
7. Finding the Factors of Polynomials	1			5	5
8. Polynomial Function of Degree Greater than 2	2				2
9. Integral Zeros of a Polynomial Functions			3	3	3
10. Graphs of Polynomial Functions Degree Greater than 2	1				1
C. Circles					
11. Circles, Radii and Chords	6				6

12. Central Angles and Arcs	4	1		3	8
13. Inscribed Angles and Arcs	1	1	1		3
14. Tangents to Circles		2			2
15. Angles Formed by Secants and Tangents	1	3	4	3	11
D. Plane Coordinate Geometry					
16. Cartesian Coordinate Plane	2	1	1	2	6
17. Distance Between Two Points				2	2
18. Midpoint Formula				1	1
19. Slope of a Line	1			1	2
20. Angle Form by Two Lines		1			1
21. Equation of the Locus				1	1
TOTAL NO. OF ITEMS	**24**	**12**	**14**	**30**	**80**
%	**30**	**15**	**17.5**	**37.5**	**100%**

Appendix C

Achievement Test in Mathematics IV

Name:
_____Sec.____Date:_____Score_____
(Optional)

Direction: Read each item carefully. Select the best answer from the given choices. Write only the letter corresponding to your answer on your answer sheets.

_____1. Evaluate (9 - 9) 1!

a. 0 b. 2 c. 1 d. 3

_____2. In preparing his class schedule, a student has a choice of one of the 4 sections in math and any one of the 3 sections in English. Determine the number of ways he can prepare his schedule.

a. 3 b. 4 c. 7 d. 12

_____3. Using digits 1, 2, 3, how many two digit numbers can be formed if repetition is not allowed?

a. 2 b. 4 c. 6 d. 7

_____4. Which of the following best describes factorial?

a. arrangements c. products

b. compositions d. combination

_____5. Which of the following is a permutation?

a. A list of three winners from five contestants in a singing contest.

b. A list of all possible ways of arranging four digit numbers from a set of the first six counting numbers, repetition of digits is not allowed.

c. A list of all possible selections of three from twelve available flavors.

d. None of the above.

_____6. Évaluate the permutations or arrangements of 8 objects taken 2 at a time or ${}_8P_2$.

a. 56 b. 48 c. 34 d. 28

_____7. Four books in Mathematics, 3 in English, 2 in Chemistry are to be arranged on a shelf that has space just enough for these 18 books. Assuming that the books

in the same subject are identical, how many ways can they be arranged?

a. 1 260 b. 2 410 c. 3 600 d. 1 540

_____8. How many three-digit numbers can be formed out of the first five counting number, if repetition of digits is not allowed?

a. 30 b. 40 c. 50 d. 60

_____9. What is the degree of the polynomial $5x^6 + x + 7x^4 - 8$?

a. 6 b. 4 c. 1 d. 8

_____10. What are the coordinates of the origin?

a. (0,0) b. (1,0) c. (0,1) d. (1,1)

_____11. If a unit circle was divided into eight congruent arcs, what is the length of each arc in Π units?

a. Π / 4 units c. 2Π / 6 units

b. 2Π / 4 units d. 3Π / 4 units

_____12. A unit circle is marked on the ground. Suppose a runner goes around the circle at a constant speed of 2 units per second. At what time will it take for a trip around the unit circle?

a. 2Π / 4 per seconds c. Π seconds

b. 2Π seconds d. 3Π seconds

_____13. In the polynomial $f(x) = x^2 + 5x + 2$, what kind of zeros will it be?

a. irrational c. rational

b. integral d. not real

_____14. What is the quotient when $2x^3 + 4x^2 + x - 1$ is divided by $x + 1$

a. $2x^2 + 2x - 1$ c. $2x^2 + 2x + 1$

b. $2x^2 + 3x - 1$ d. $4x^2 + 2x - 1$

_____15. What is the remainder when $x^4 - 2x^2 - 7x + 6$ is divided by $x - 1$?

a. -2 b. 2 c. 1 d. -1

_____16. For the polynomial P(x), if P(c) = 0, then x - c is a factor of P(x). Is what theorem?

a. integral zero theorem

b. Gauss theorem

c. Remainder theorem

d. Factor theorem

_____17. Which binomial is a factor of $x^3 + 2x^2 - x - 2$?

a. $x + 4$ c. $x - 1$

b. $x + 3$ d. $2x + 1$

_____18. How many integral zeros does $f(x) = x^3 + 3x^2 + 6x + 4$

a. 1 b. 2 c. 3 d. none

_____19. What are the integral zeros of $P(x) = x^3 - 27$?

a. 9 b.-3 c. 3 d. 9

_____20. Which of the following sets are the zeros of $x^4 - 3x + 2$?

a. 2 and 1 c. 2 and -2

b. 1 and -1 d. 32 and 1

_____21. Which of the following best illustrate a circle?

a. a peso coin c. hot cake

b. pizza pie d. moon

_____22. How will you describe a stone thrown on still fond?

a. create circles

b. produce concentric circles

c. it has an oblong shape

d. tidal waves

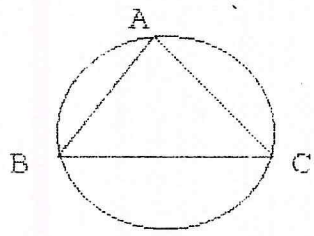
_____23. If ∠ ABC were right angle, what is AC ?

a. arc b. cord c. radius d. diameter

_____24. How do you describe a segment that passes through the center?

a. diameter b. chord c. radius d. arc

_____25. Given in the figure, what is AC ?



a. major arc

b. semi circle

c. minor arc

d. both major & minor

_____26. Refer on the figure of item no. 25, if m $\overset{\frown}{AB}$ is 130°. What is m $\overset{\frown}{BCA}$?

a. 140° b. 230° c. 260° d. 190°

_____27. Which of the following statements is true in the above figure?

I m $\overset{\frown}{ABC}$ = $\overset{\frown}{ACB}$

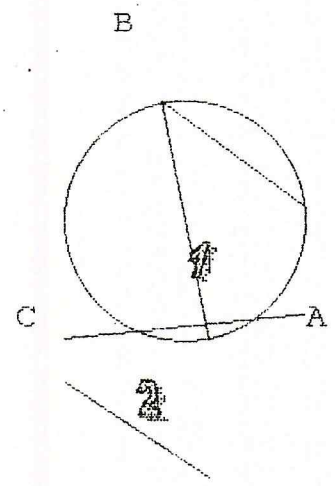
II m $\overset{\frown}{ABC}$ = m $\overset{\frown}{AB}$

III m ∠ABC = m ∠CBA

a. I only c. I and II

b. II only d. III only

_____28. Which of the following statements is true?



I m ∠ 1 > m ∠ 2

II m ∠ 1 < m ∠ 2

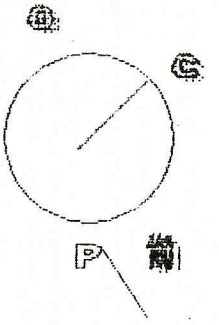
III m ∠ 1 = m ∠ 2

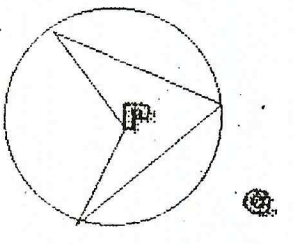
a. I only c. III only

b. II only d. I - III

_____29. In circle P, ∠CPD measures 100 °, what is m $\overset{\frown}{CD}$

a. 110 ° b. 160 ° c. 100 ° d. 320 °





_____30. In circle P, which is the central angle?

a. ∠ FPD c. ∠ CPD

b. ∠ CFD d. ∠ PFC

_____31. The central angle in the figure of item 30 intercepts which arc?

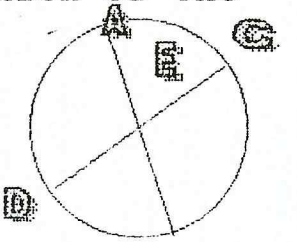
a. FC b. FD c. CD d. FCD

_____32. The measure of a minor arc is always

a. equal to 180° c. greater than180°

b. less than180° d. is equal to 360°

_____33. In circle E, m AC = m DB. Which of the following is true?



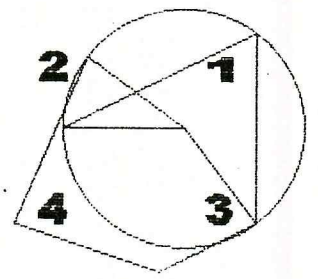
a. m∠ AED = ½ m BEC

b. m∠ AED > m∠BEC

c. $m\angle AED < m\angle BEC$

d. $m\angle AED = m\angle BEC$

_____34. In circle Q, which is the inscribed angle?



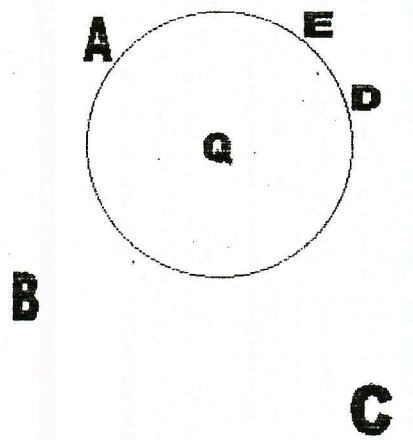
a. 1

b. 2

c. 3

d. 4

_____35. If the chords were drawn , which angle would have the smallest measure?



a. $\angle AQB$

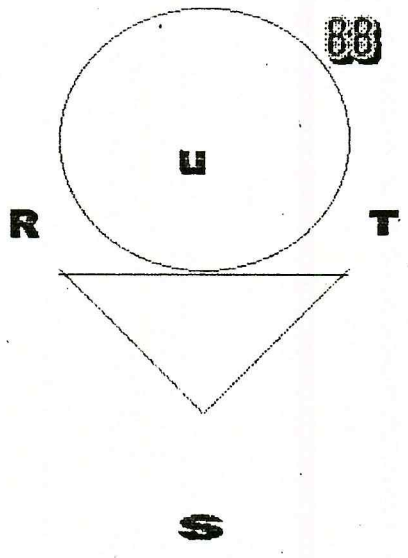
b. $\angle BQC$

c. $\angle CQD$

d. $\angle DQE$

_____36. RT is a diameter. How many degrees is angle RST?

a. 86 b. 92 c. 98 d. 80



_____37. What is the measure of angle T ?

a. 40 b. 44 c. 62 d. 90

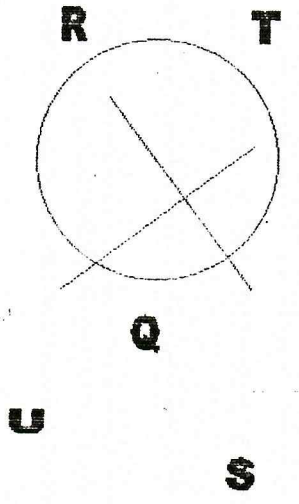
_____38. What is the measure of RST?

a. 278 b. 264 c. 272 d. 198

_____39. In ~~circle~~ Q, RS and TU pass through point Q. What kind of quadrilateral will be determined by points RSTU?

a. square c. rhombus

b. b. rectangle d. general



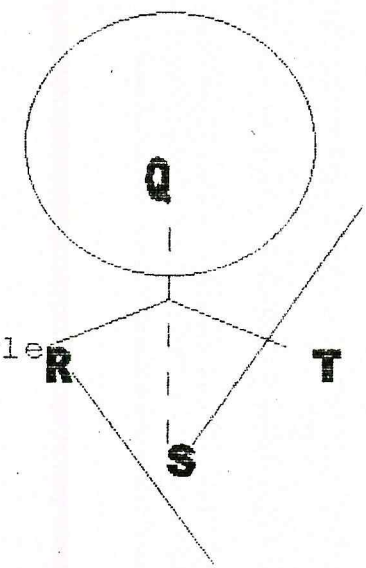
_____40. SR and ST are tangents to circle Q.

Which statement is true?

I. $\overline{QR} \cong \overline{SR}$

II. $\overline{SR} \cong \overline{ST}$

III. $\triangle QTS$ is a right triangle



a. I and III

b. III only

c. I only

d. All of the above

_____41. In circle Q of question 61, if $m\angle Q = 130$. What is $m\angle S$?

a. 60° b. 50° c. 70° d. 40°

_____42. What is the measure of an angle if the hand of the clock is at 3:00 p.m.?

a. 60° b. 80° c. 70° d. 90°

_____43. If the radius of the circle is 20 cm, what is the longest chord?

a. 60 b. 40 c. 30 d. 50

_____44. Which of these arc has least measure?

a. minor c. semi – circle

b. major d. circle

_____45. If you will be given a short bond paper with a circle unmarked at the center. How can you plot the center point with out using the protractor and compass?

a. Draw two straight lines connecting the opposite corners of the paper and mark a point on the intersection point.

b. Estimate and plot a point on the center.

c. Have a free hand drawing of two lines intersecting to each other.

d. Fold the paper halfway and marked a point on the center.

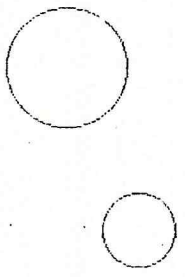
_____46. How will you describe a line if a radius will bisects a chord?

a. congruent lines c. perpendicular lines

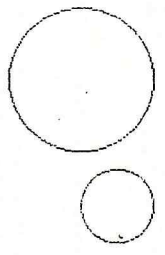
b. parallel lines d. line bisector

_____47. Which figure show concentric circle?

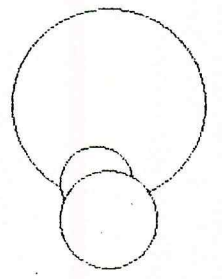
a.



b.



c.



d. none

_____48. Which of the following best describe probabilities?

a. it ranges only between 0 to 1

b. it is by getting its factor

c. it ranges between o to -1.

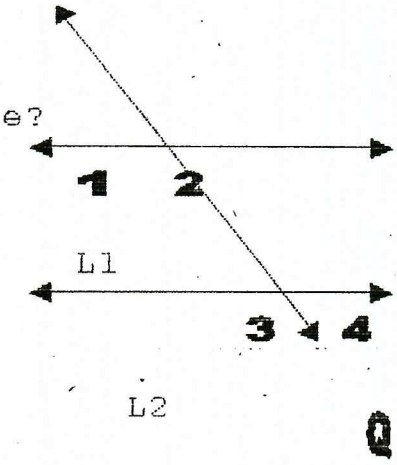
d. it is a possibilities

_____49. What is the coordinate of the terminal point corresponding to Π / 2?

a. (2 , 0) c. (1, 0)

b. (-1, 0) d. (0, 1)

_____50. Given L1 ‖ L2 is cut by transversal L q.



Which of the following is not true?

a. □1 Ù □4; □2 □ □3

b. □1 □ □3; □2 □ □4

c. □1 □ □4; □1 □ □3

d. □2 □ □4; □2 □ □3

End of the test

Appendix D

Profile of the Respondents

PART I – A On STUDENT'S FAMILY BACKGROUND.

Directions : The following students are intended to get information of your family background. Please check or write your answers on the appropriate box for each item.

1. Name : (optional) _____

2. Home Address : _____

3. What is the educational attainment of your parents?

	Father	Mother
No schooling	_____	_____
Some years in elem.	_____	_____
Elementary graduate	_____	_____
Some years in H.S.	_____	_____
High school graduate	_____	_____
Some years college	_____	_____
College graduate	_____	_____
Some master's units	_____	

Master's degree _____ _____

Others (specify) _____

4. What is the occupation / profession of your parents?

	Father	Mother
Jobless	_____	_____
House keeper	_____	_____
Farmer / Fisherman	_____	_____
Self employed	_____	_____
Government Employee	_____	_____
Non - Government Employee	_____	_____
Others (specify)	_____	

5. What is the family's gross income per month?

_____

PART I - B STUDENTS ATTITUDE TOWARD MATHEMATICS

INSTRUCTION: Below is presented a variety of statements pertaining to your attitude towards mathematics. Please express your feelings toward the subject. There are no right or wrong responses or answers. Encircle each of the numbers in the scale as follows:

5 - I Strongly Agree (SA)

4 - I Agree (A)

3 - Undecided (U)

2 - I Disagree (D)

1 - I Strongly Disagree (SD)

ATTITUDE	SA	A	U	D	SD
1. Of all my subjects, I Like mathematics most.	5	4	3	2	1
2. I can see much value in mathematics.	5	4	3	2	1
3. I enjoy attending my mathematics class.	5	4	3	2	1
4. I never got tired working with numbers.	5	4	3	2	1
5. I find mathematics very useful to one's life.	5	4	3	2	1
6. I would like to spend more time in school working with math.	5	4	3	2	1
7. I feel I have a good foundation in mathematics.	5	4	3	2	1
8. I think mathematics is the most enjoyable subject I have taken.	5	4	3	2	1
9. I feel mathematics is an important subject just like any other subjects.	5	4	3	2	1

10. Mathematics can help a student think logically.	5	4	3	2	1
11. I enjoy doing problems when I know how to make them well.	5	4	3	2	1
12. I enjoy doing exercises and assignment on my own.	5	4	3	2	1
13. If I am to plan my career, I would choose teaching mathematics.	5	4	3	2	1
14. I spend more time studying mathematics since I was in the elementary grades.	5	4	3	2	1
15. I like mathematics because of its practical use.	5	4	3	2	1
16. I feel confident working with math problems.	5	4	3	2	1
17. Mathematics is a very challenging subject to me.	5	4	3	2	1
18. I feel comfortable only in math class.	5	4	3	2	1
19. I like mathematics, but I liked other subjects as well.	5	4	3	2	1
20. I think mathematics is fun and I always want to do well in it.	5	4	3	2	1
21. I have always been interested in math since I was in the elementary grades.	5	4	3	2	1

10. Mathematics can help a student think logically.	5	4	3	2	1
11. I enjoy doing problems when I know how to make them well.	5	4	3	2	1
12. I enjoy doing exercises and assignment on my own.	5	4	3	2	1
13. If I am to plan my career, I would choose teaching mathematics.	5	4	3	2	1
14. I spend more time studying mathematics since I was in the elementary grades.	5	4	3	2	1
15. I like mathematics because of its practical use.	5	4	3	2	1
16. I feel confident working with math problems.	5	4	3	2	1
17. Mathematics is a very challenging subject to me.	5	4	3	2	1
18. I feel comfortable only in math class.	5	4	3	2	1
19. I like mathematics, but I liked other subjects as well.	5	4	3	2	1
20. I think mathematics is fun and I always want to do well in it.	5	4	3	2	1
21. I have always been interested in math since I was in the elementary grades.	5	4	3	2	1

22. My interest in mathematics is the same as my interest in Physics.	5	4	3	2	1
23. I am interested to obtain further knowledge in mathematics.	5	4	3	2	1
24. Worded problems is difficult but interesting.	5	4	3	2	1
25. I can work on mathematical problems for a long time without losing interest.	5	4	3	2	1

CURRICULUM VITAE

NAME : **RICO P. BONGALON**

POSITION : INSTRUCTOR

HOME ADDRESS : CATBALOGAN, SAMAR

CIVIL STATUS : Married.

Birthday : January 28, 1970

Wife : Cristina Crisostomo Bongalon

Child : Rico C. Bongalon Jr.

EDUCATIONAL QUALIFICATION	**YEAR COMPLETED**
Bachelor of Secondary Education	1995
Master of Arts in Teaching Mathematics	(Still in Process)

CIVIL SERVICE ELIGIBILITY

PBET	1995

WORK EXPERIENCE

Census Enumerator	1996
Secondary School Teacher	(1996 to present)

Membership in Organization	**LEVEL**
Philippine Association of Vocational Education	National Level
Philippine Association of Graduate Education	Regional Level
Secondary Mathematics Teacher Association	Division Level

LIST OF TABLES

LIST OF FIGURES