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Determinants of Mathematics Performance of Bachelor of Secondary Education Major in Mathematics Students of Polytechnic University of the Philippines

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Abstract:

The main purpose of the study was to establish the predictive validity of mathematics teachers' attributes and attitude towards mathematics subject as determinants of the students' mathematics performance among Bachelor of Secondary Education major in Mathematics students from selected Campuses of Polytechnic University of the Philippines. Findings of the study showed that teachers handling College Algebra, Number Theory, and Spherical Trigonometry subjects have outstanding teacher attributes. Likewise, teachers handling Advanced Algebra, Plane Trigonometry, Differential Calculus, and Mathematical Logic have very satisfactory ratings. In terms of attitude towards mathematics, students possess positive attitude towards all mathematics subjects covered in the study. In terms of mathematics performance, students have satisfactory performance in all mathematics subjects except in Advanced Algebra

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with a fair performance. It was revealed that none of the dimensions of mathematics teachers' attributes and dimensions of attitudes towards mathematics significantly determined the performances of the students in College Algebra, Plane Trigonometry, Spherical Trigonometry, and Mathematical Logic. Furthermore, teachers' personal attributes and enjoyment of mathematics were significant determinants of Advanced Algebra performance. Likewise, teachers' personal attributes was revealed as a significant determinant of Plane Geometry performance. Lastly, self confidence with mathematics was a significant determinant of performances in Differential Calculus and Number Theory.

Key words: attitude, teacher attributes, performance, mathematics, determinants

INTRODUCTION

Given the emergent social demand for a more mathematically proficient work force, proficiency is regarded as a necessary component for success in today's world. To ensure proficiency, educational institutions may need to changeround their instructional approaches to teaching. Understanding the effect of school, classroom, teacher and self-efficacy on achievement may lead to instructional practices that may increase the percentage of students choosing to pursue related majors.

Creating a climate for learning is probably the most important and most difficult task a teacher faces, but it can be even more difficult for beginning teachers. As former U.S. Department of Education teacher-in-residence Mary Beth Blegan says, "Setting the classroom environment is the key. For a new teacher that means pretending that you know what you're doing. The most important action an effective teacher takes at the beginning of the year is creating a climate for learning."

Efforts for the advancement of mathematics teaching over the last decade has degenerated into an argument about traditional or modern teaching methodologies, the kind of instructional tools to be used, including or exiling calculators, ways to develop teacher training, and the best sequencing of mathematics courses in the curriculum. Far less attention has been directed to the exploration of students' attitudes. Although there is a body of research about attitudes toward mathematics, most of it is concerned only with anxiety. Success or failure in mathematics performance is greatly determined by personal beliefs. Regardless of the teaching method used, students are likely to exert effort according to the effects they anticipate, which is regulated by personal beliefs about their abilities, the importance they attach to mathematics, enjoyment of the subject matter, and the motivation to succeed. As teachers, struggle with reform to improve students' academic performance, their concerns must encompass more than instructional change. The fundamental core of effective teaching of mathematics combines an understanding of how children learn, how to promote that learning and how to plan for and assess that learning on a daily basis.

BACKGROUND OF THE STUDY

The Polytechnic University of the Philippines (PUP) is a government educational institution governed by Republic Act Number 8292 known as the Higher Education Modernization Act of 1997, and its Implementing Rules and Regulations contained in the Commission on Higher Education Memorandum Circular No. 4, series 1997. PUP is one of the country's highly competent educational institutions. PUP is a public, non-sectarian, non-profit institution of higher learning primarily tasked with harnessing the tremendous human resources potential of the nation by improving the physical, intellectual and material well-being of the individual through

higher occupational, technical and professional instruction and training in the applied arts and sciences related to the fields of commerce, business administration, and technology.

The University is committed in giving qualified and talented individuals access to quality and responsive education to support them in the achievement of their dreams and improvement of their lives.

One of the undergraduate programs offered by PUP is the Bachelor of Secondary Education major in Mathematics (BSEDMT). It is a four-year undergraduate program designed to meet the country's need for teachers in mathematics education in the secondary level. This program provides students with the theoretical insights, specialized knowledge of educational technology, teaching-learning applications, and integration of values that will enhance professional and personal development. The BSEDMT program is offered by different PUP Campuses namely PUP Bansud Campus, PUP Lopez Campus, PUP San Juan Campus, PUP Santa Maria Campus, PUP San Pedro Campus, PUP Sta. Mesa (Main) Campus, PUP Sta. Rosa Campus, and PUP Sto. Tomas Campus.

As future Mathematics teachers, it is very essential to understand how students learn Mathematics and how Mathematics learning can be affected by the teachers and students' attitude towards Mathematics.

THEORETICAL FRAMEWORK

A teacher is a reflective practitioner who continually evaluates the effects of his choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally. A good teacher is one who has the ability to learn as much from the students as he learns from himself. In an effort to many implications to these needs of students, this teacher spends

much time evaluating the implications of his teaching decisions in the classroom. This is the mark of a reflective practitioner. Such self – reflection leads to greatest knowledge about the students, the subject matter being taught and the act of teaching.

This research is anchored with three theories namely Social Learning Theory, Skinner's Theory of Classroom Management, and Socio-Cultural Theory of Learning. The Social Learning Theory of Bandura (1977) suggests that individuals can learn from observing others receive consequences. It emphasizes the importance of observing and modeling the behaviors, attitudes and emotional reactions of others. According to Bandura, "Learning would be exceedingly laborious not to mention hazardous, if people had to rely solely on the effects of their own actions to inform them what to do. Fortunately most human behavior is learned observationally through modeling: from observing others one forms an idea of how new behaviors are performed and on later occasions this coded information serves as a guide for action."

On the other hand, Skinner's Theory of Classroom Management (Skinner, 1953) accentuates that the frequent use of reinforcements or rewards modify and influence student's behavior and attitude. Skinner believes that the goal of psychology, as it relates to education, should be to find ways to make education enjoyable and effective for all students. His learning theory relies on the assumption that the best way to modify behavior was to modify the environment. Skinner's primary contribution to behavioral management philosophy has been from his research on operant conditioning and reinforcement schedules. An operant is a behavior that acts on the surrounding environment to produce a consequence. As the result of the consequence, the operant's likelihood of recurring is affected. The operant is said to be reinforced if the consequence increases the likelihood of the behavior's occurrence.

The Socio-Cultural Theory of Learning of Barbara Jaworski (2004) suggested that all learners are seen as members of a defined culture and their identity with this culture determines what they will encode about the world and the ways in which they will interpret information. This means that both teachers and students process information that is shaped by various socio-cultural factors such as social class, religion, gender, family background, and language group. Teachers teach based on certain beliefs they have about teaching and learning, about what to teach and how to teach. Learners on the other hand came to class with prior knowledge about their lives and a particular belief system shaped by their own socio-cultural context.

Modeling and observing the behaviors, attitudes and emotional reactions of students are very essential to understand the learning process of the students. This has been pointed out through the Social Learning Theory of Bandura (1977). Likewise, Skinner's Theory of Classroom Management (1953) emphasizes the importance of finding ways to make education enjoyable and effective for all students. On the other hand, the Socio-Cultural Theory of Learning of Barbara Jaworski (2004) accentuated that teachers and students process information that is shaped by socio-cultural factors. These theories anchored and supported the goal of the research study to look in to the possible impact of the students' attitude towards their Mathematics subjects and the attributes of their Mathematics teachers, with respect to their Mathematics learning as observed with their Mathematics performance.

CONCEPTUAL FRAMEWORK

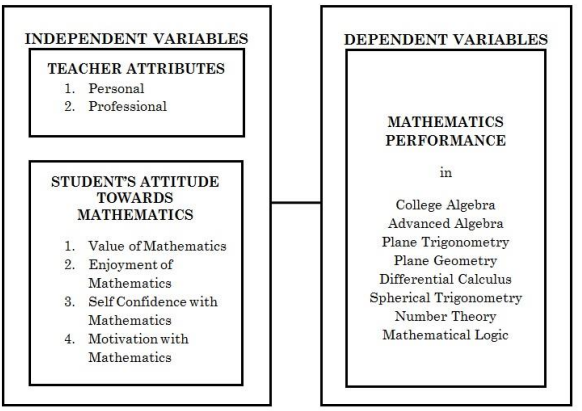

Figure 1. Research Paradigm

The conceptual framework of this study is schematically presented in Figure 1. The study intended to look which among Mathematics teachers' attributes and student's attitude towards Mathematics are significant determinants of the Mathematics performance of the students. Mathematics performance is the dependent variable while teacher attributes and attitude towards Mathematics are treated as the independent variables. Teacher attributes are characterized by the personal and professional attributes of the Mathematics teachers. On the other hand, students' attitudes towards Mathematics subjects were measure in terms of value and enjoyment of Mathematics, and self-confidence and motivation with Mathematics.

THE PROBLEM

This study aimed to determine the predictive validity of Mathematics teachers' attributes and student's attitude towards Mathematics, as determinants of the Mathematics performance of the BSEDMT students from three selected

campuses of PUP. Specifically, the study sought to answer the following questions:

1. What is the level of the Mathematics teacher's attributes in terms of the following:
    1.1 Personal Attributes;
    1.2 Professional Attributes; and
    1.3 Over-all Teacher Attributes?
2. What is the attitude of the BSEDMT students in their Mathematics subjects in terms of the following:
    2.1 Value of Mathematics Subject;
    2.2 Enjoyment of Mathematics Subject;
    2.3 Self Confidence with Mathematics Subject;
    2.4 Motivation with Mathematics Subject; and
    2.5 Over-all Attitude towards Mathematics Subject?
3. What is the mathematics performance of the BSEDMT students in the following subjects?
    3.1 College Algebra;
    3.2 Advanced Algebra;
    3.3 Plane Trigonometry;
    3.4 Plane Geometry;
    3.5 Differential Calculus;
    3.6 Spherical Trigonometry;
    3.7 Number Theory; and
    3.8 Mathematical Logic.
4. Which of the following variables are significant determinants of the Mathematics performance of the students?
    4.1 Mathematics Teachers' Personal Attributes;
    4.2 Mathematics Teachers' Professional Attributes;
    4.3 Value of Mathematics Subject;
    4.4 Enjoyment of Mathematics Subject;
    4.5 Self Confidence with Mathematics Subject; and
    4.6 Motivation with Mathematics Subject.

REVIEW OF LITERATURE AND STUDIES

Attitudes are psychological constructs theorized to be composed of emotional, cognitive, and behavioral components. Attitudes serve as functions including social expressions, value expressive, utilitarian, and defensive functions, for the people who hold them (Newbill, 2005). To change attitudes, the new attitudes must serve the same function as the old one. Instructional design can create instructional environments to effect attitude change. In the greater realm of social psychology, attitudes are typical classified with affective domain, and are part of the larger concept of motivation (Greenwald, 1989). Attitudes are connected to Bandura's (1977) social cognitive learning theory as one of the personal factors that affect learning.

Improving student behavior and academic performance generally requires changing the student's attitude. Change may require moving individuals and organizations along a continuum from "at risk" to "safe" to "thriving." This process takes time to accomplish.

Other researchers suggest that students may find Mathematics to be simply unappealing or socially unacceptable, although they may actually have high aptitude. In any case, it is crucial that any investigation of attitudes be assessed with an instrument that has good technical characteristics if research conclusions are to be meaningful. The relationship of affect to course selection, performance, achievement, and cognitive processes must be based solidly on a valid, reliable measure of attitudes. Attitude scales must withstand factor analysis, tap important dimensions of attitudes, and require a minimum amount of time for administration.

Finding a need for a shorter instrument with a straightforward factor structure, the Attitudes Toward Mathematics Inventory (ATMI) was developed. Martha Tapia and George E. Marsh II of Berry College, GA and The

University of Alabama (2004) designed the Attitudes Toward Mathematics Inventory (ATMI) to investigate the underlying dimensions of attitudes toward mathematics. The subjects were 545 high school students, 302 boys and 243 girls, enrolled in mathematics high school classes, including 135 freshmen, 153 sophomores, 168 juniors, 84 seniors, and five 8th-grade students. Only students taking mathematics were included in the sample.

The 40-items of the ATMI were constructed in the domain of attitudes toward mathematics to address factors reported to be important in research. Items were constructed to assess confidence, anxiety, value, enjoyment, and motivation.

1. *Self-Confidence*. The self-confidence category was designed to measure students' confidence and self-concept of their performance in mathematics.
2. *Value*. The value of mathematics category was designed to measure students' beliefs on the usefulness, relevance and worth of mathematics in their life now and in the future.
3. *Enjoyment*. The enjoyment of mathematics category was designed to measure the degree to which students enjoy working mathematics and mathematics classes.
4. *Motivation*. The motivation category was designed to measure interest in mathematics and desire to pursue studies in mathematics.

The factor structure of the ATMI covers the domain of attitudes toward mathematics, providing evidence of content validity. Content validity was established by relating the items to the variables: confidence, anxiety, value, enjoyment, and motivation. This structure is explained by the four-factor model supporting different interpretations for students' self-confidence, value, enjoyment and motivation as underlying dimensions of attitudes toward mathematics.

Attitudinal research should concern more than anxiety and competence, because it is clear that other factors are also important. Although there is a substantial body of research about attitudes toward mathematics, much of it is based on results with tools developed prior to current statistical standards for instrument development. In the meanwhile, factor analysis has matured as a method to examine interrelationships among a number of variables with minimal loss of information. The ATMI was constructed using these standards and may be an efficient and effective research tool to assess factors that influence expectations and performance in math because of its content validity, reliable factor scores, test-retest reliability, and brevity.

Positive attitude towards Mathematics cause an individual to learn more effectively and make students achieve better in Mathematics if they like Mathematics. By the way of contrast, negative attitudes cause a difficulty in Mathematics. The development of positive attitudes towards Mathematics and the students' involvement in it help in the learning of Mathematics. The following behavior is developed in the students: a) positive response to the use of Mathematics as a tool in practical situations b) confidence to apply Mathematics in real life situations c) willingness and ability to do work cooperatively with others and to value the contribution of others d) willingness to persist when solving problems and try different methods of attack e) interests and enjoyment in the pursuit of Mathematical knowledge (Yara, 2009).

Teacher quality matters. In fact, it is the most important school-related factor influencing student achievement. According to Ali (2013), a big factor that affects students' performance is student-teacher relationship. It appears that most lecturers in mathematical science department are not friendly, in other words, mentoring of students is not a common practice among mathematical science lecturers. A lecturer's bad

attitudes, poor teaching skills, and lack of involvement with students when teaching result in poor performance.

As stated by Suan (2014), teacher factor is the most recommended factors impacting students learning. Accumulated evidences suggest that it moderates the effect of other risk factors like parents educational level of attainments, gender of students, socio-cultural and socio-economic backgrounds. Teachers are responsible to the kind of learning and experiences the students may engage everyday as well as setting of educational goals and total personality development. Professional development of teachers on content-focused instruction has tremendous effect on student achievement. Suan (2014) provided a scientifically based evidence for its positive effect. The students of the teacher who participated in programs for faculty development had scored above the students whose teachers did not participate. The study of Hill, Rowan & Ball (2005) concluded that teacher's mathematical knowledge had strong significant relationship on student achievement. Quimbo (2003) says that teachers who always absent or did not teach had among the lowest score in mathematics achievement test. Thus, mathematics achievement can be improved by improving teacher's mathematical knowledge, commitment in the profession and always engaging in professional development.

RESEARCH METHODOLOGY

The descriptive method of research was used in the study. The population covered in was the First Year to Third Year BSEDMT students from three selected campuses of Polytechnic University of the Philippines namely PUP Sta. Mesa (Main) Campus, PUP San Juan Campus, and PUP Santa Maria Campus, with a total of 516 students. The researcher employed stratified random sampling and considered fifty percent (50%) of the population arriving with 260 students as sample.

The main instrument used in this study was a survey questionnaire. The first part of the questionnaire measured the Mathematics teachers' attributes in terms of personal and professional attributes. It consists 30 items from which 15 items measured personal attributes and the other 15 items measured professional attributes. The second part of the questionnaire is the Attitudes toward Mathematics Inventory (ATMI). The 40-items of the ATMI were divided into four factors namely, value of Mathematics, enjoyment of Mathematics, self-confidence with Mathematics and Motivation with mathematics. Mathematics performance of the students was measured using their grades in their Mathematics subjects.

The researcher used weighted mean and regression analysis to analyze and interpret the data collected. All statistical computations were done with the use of Statistical Package for the Social Sciences (SPSS).

FINDINGS

1. **Mathematics Teachers' Attributes**
   1.1 College Algebra teachers got a weighted mean of 4.27 for personal attributes and a weighted mean of 4.12 for professional attributes. Over-all, the weighted mean of 4.20 entails an outstanding teacher attributes.
   1.2 Advanced Algebra teachers obtained a weighted mean of 3.72 for personal attributes and a weighted mean of 3.61 for professional attributes. The over-all weighted mean of 3.67 implies a very satisfactory teacher attributes.
   1.3 Plane Trigonometry teachers gained a weighted mean of 4.02 for personal attributes and a weighted mean of 3.77 for professional attributes. The total

weighted mean of 3.90 signifies a very satisfactory teacher attributes.

1.4 Plane Geometry teachers acquired a weighted mean of 3.48 for personal attributes and a weighted mean of 3.38 for professional attributes. The over-all weighted mean of 3.43 implies a very satisfactory teacher attributes.

1.5 Differential Calculus teachers achieved a weighted mean of 4.21 for personal attributes and a weighted mean of 3.99 for professional attributes. In totality, the weighted mean of 4.10 entails a very satisfactory teacher attributes.

1.6 Spherical Trigonometry teachersgot a weighted mean of 4.36 for personal attributes and a weighted mean of 4.08 for professional attributes. The total weighted mean of 4.22 shows an outstanding teacher attributes.

1.7 Number Theory teachers obtained a weighted mean of 4.37 for personal attributes and a weighted mean of 4.10 for professional attributes. Over-all, the weighted mean of 4.23 signifies an outstanding teacher attributes.

1.8 Mathematical Logic teachers garnered a weighted mean of 4.24 for personal attributes and a weighted mean of 4.04 for professional attributes. The over-all weighted mean of 4.14 means a very satisfactory teacher attributes.

2. Attitude Towards Mathematics Subjects

2.1 In terms of attitude towards College Algebra, students have a weighted mean of 4.50 for value, 4.25 for enjoyment, 3.75 for self-confidence, and 3.84 for motivation. Over-all, the weighted mean of 3.99 is an indication of a positive attitude.

2.2 In terms of attitude towards Advanced Algebra, students obtained a weighted mean of 4.31 for value, 3.84 for enjoyment, 3.49 for self-confidence, 3.63 for motivation. In totality, the weighted mean of 3.78 signifies a positive attitude.

2.3 In terms of attitude towards Plane Trigonometry, students got weighted mean of 4.03 for value, 3.63 for enjoyment, 3.49 for self-confidence, and 3.58 for motivation. The over-all weighted mean of 3.66 is an implication of a positive attitude.

2.4 In terms of attitude towards Plane Geometry, students gained a weighted mean of 3.88 for value, 3.45 for enjoyment, 3.26 for self-confidence, and 3.42 for motivation. The total weighted mean of 3.47 is an indication of a positive attitude.

2.5 In terms of attitude towards Differential Calculus, students have a weighted mean of 3.90 for value, 3.66 for enjoyment, 3.38 for self-confidence, and 3.62 for motivation. Over-all, the total weighted mean of 3.60 means a positive attitude.

2.6 In terms of attitude towards Spherical Trigonometry, students got a weighted mean of 4.09 for value, 3.93 for enjoyment, 3.72 for self-confidence, and 3.70 for motivation. In totality, the over-all weighted mean of 3.86 is implies a positive attitude.

2.7 In terms of attitude towards Number Theory, students acquired a weighted mean of 4.09 for value, 3.97 for enjoyment, 3.75 for self-confidence, and 3.70 for motivation. The total weighted mean of 3.88 signifies a positive attitude.

2.8 In terms of attitude towards Mathematical Logic, students got a weighted mean of 4.07 for value, 3.83 for enjoyment, 3.62 for self-confidence, and 3.66 for

motivation. Over-all, the total weighted mean of 3.78 is an indication of a positive attitude.

3. Performance in Mathematics Subjects

3.1 In terms of College Algebra performance, students got an average grade of 2.05 which shows a satisfactory performance.

3.2 In terms of Advanced Algebra performance, the average grade of 2.65 implies a fair performance.

3.3 In terms of Plane Trigonometry performance, the average grade of 2.22 signifies a satisfactory performance.

3.4 In terms of Plane Geometry performance, students obtained an average grade of 2.25 which indicates a satisfactory performances

3.5 In terms of the Differential Calculus performance, students got an average grade of 2.29 which implies a satisfactory performance.

3.6 In terms of Spherical Trigonometry performance, the average grade of 1.93 is an indication of satisfactory performance.

3.7 In terms of Number Theory performance, students got an average grade of 2.04 which shows a satisfactory performance.

3.8 In terms of Mathematical Logic performance, the average grade of 1.93 implies a satisfactory performance.

4. Determinants of Mathematics Performance

4.1 In terms of determinants of College Algebra performance, using multiple linear regression, it was revealed that the p – values of personal attributes (p = .089), professional attributes (p = .174), value of College Algebra (p = .933), enjoyment of College Algebra (p = .690), self-confidence with College

Algebra (p = .655), and motivation with College Algebra (p = .278) are greater than the critical p – value of .05. This implies that these variables do not significantly determine the College Algebra performance.

4.2 In terms of determinants of Advanced Algebra performance, it was found that the p – values of personal attributes (p = .098), professional attributes (p = .647), value of Advanced Algebra (p = .466), self-confidence with Advanced Algebra (p = .380), and motivation with Advanced Algebra (p = .358) are greater than the critical p – value of .05. This implies that these variables do not significantly determine the Advanced Algebra performance of students. On the other hand, the p – value of enjoyment of Advanced Algebra (p = .005), which is less than the critical p – value of .05, signifies that enjoyment of Advanced Algebra significantly determine the performance of the students in Advanced Algebra.

4.3 In terms of determinants of Plane Trigonometry performance, results of multiple regression analysis showed that the p – values of professional attributes (p = .122), value of Plane Trigonometry (p = .869), enjoyment of Plane Trigonometry (p = .658), self-confidence with Plane Trigonometry (p = .768), and motivation with Plane Trigonometry (p = .343) are greater than the critical p – value of .05. This implies that these variables do not significantly determine the Plane Trigonometry performance of the Second Year students. Meanwhile, the p – value of teachers' personal attributes which is .017, which is less that the critical p – value of .05, signifies that personal attributes of Plane Trigonometry teachers significantly determine the performance of the students.

4.4 In terms of determinants of Plane Geometry performance, the p – values of professional attributes (p = .400), value of Plane Geometry (p = .894), enjoyment of Plane Geometry (p = .440), self-confidence with Plane Trigonometry (p = .133), and motivation with Plane Geometry (p = .830) are greater than the critical p – value of .05. This shows that these variables do not significantly determine the Plane Geometry performance of the students. On the other hand, the p – value of teachers' personal attributes which is .001, which is less that the critical p – value of .05, implies that personal attributes of Plane Geometry teachers significantly determine the performance of the Second Year students.

4.5 In terms of the determinants of Differential Calculus performance, the p – values of personal attributes (p = .281), professional attributes (p = .373), value of Differential Calculus (p = .452), enjoyment of Differential Calculus (p = .280), and motivation with Differential Calculus (p = .325) are greater than the critical p – value of .05. This implies that these variables do not significantly determine the Differential Calculus performance. On the other hand, self-confidence with Differential Calculus got a p – value of .047, which is less that the critical p – value of .05, signifies that self-confidence with Differential Calculus is a significant determinant of the students' performance.

4.6 In terms of determinants of Spherical Trigonometry performance, the p – values of personal attributes (p = .436), professional attributes (p = .794), value of Spherical Trigonometry (p = .120), enjoyment of Spherical Trigonometry (p = .162), self-confidence with Spherical Trigonometry (p = .929), and

motivation with Spherical Trigonometry (p = .435) are greater than the critical p – value of .05. This implies that these variables do not significantly determine the Spherical Trigonometry performance.

4.7 In terms of determinants of Number Theory performance, it was revealed that the p – values of personal attributes (p = .444), professional attributes (p = .611), enjoyment of Number Theory (p = .167), self-confidence with Number Theory (p = .251), and motivation with Number Theory (p = .435) are greater than the critical p – value of .05. This implies that these variables do not significantly determine the Number Theory performance. The p – value of 0.046 for the attitude towards Number Theory in terms of the value of Number theory is less than the critical p – value of .05. This is an indication that value of Number Theory is a significant determinant of the students' performance.

4.8 In terms of determinants of Mathematical Logic performance, the p – values of personal attributes (p = .255), professional attributes (p = .976), value of Mathematical Logic (p = .924), enjoyment of Math Logic (p = .496), self-confidence with Mathematical Logic(p = .420), and motivation with Mathematical Logic (p = .995) are greater than the critical p – value of .05. This implies that these variables do not significantly determine the Mathematical Logic performance.

CONCLUSIONS

Based on the findings, the researcher has drawn the following conclusions.

1. Mathematics Teachers' Attributes

Teachers handling College Algebra, Number Theory, and Spherical Trigonometry subjects have outstanding teacher attributes. This signified the exceptional personal characteristics, and extensive professional qualities of the mathematics teachers. Likewise, teachers handling Advanced Algebra, Plane Trigonometry, Differential Calculus, and Mathematical Logic have with very satisfactory rating. This implied that teachers have very pleasing personal characteristics and traits, and professional qualities and capabilities.

2. Attitude Towards Mathematics Subjects

Students have favorable beliefs on the usefulness, relevance and worth of their mathematics subjects. They also have high level of enjoyment, positive outlook and self-concept, and are confident in working with mathematics. This clearly proved that students have positive and favorable emotional disposition towards their mathematics subjects.

3. Performance in Mathematics Subject

In terms of mathematics performance, students have satisfactory performance in College Algebra, Plane Trigonometry, Plane Geometry, Differential Calculus, Spherical Trigonometry, Number Theory, and Mathematical Logic. On the other hand, students have fair performance in Advanced Algebra subject.

4. Determinants of Mathematics Performance

Using Stepwise Multiple Regression, it was revealed that none of the dimensions of mathematics teachers' attributes and dimensions of attitudes towards mathematics significantly determined the performance of the students in College Algebra, Plane Trigonometry, Spherical Trigonometry, and Mathematical Logic. On the other hand, teacher's personal

attributes and enjoyment of mathematics are significant determinants or predictors of Advanced Algebra performance. Likewise, teachers' personal attributes was revealed as a significant determinant of Plane Geometry performance. Lastly, findings of study showed that self-confidence with mathematics is a significant predictor of performances in Differential Calculus and Number Theory.

RECOMMENDATIONS

Based on the findings and conclusions derived from the study, the following recommendations are proposed.

1. The University should provide opportunities for mathematics teachers to develop their personal being and their professional career. Faculty members should be given chances to attend seminars, workshops, conferences, and trainings to abreast themselves with new trends in mathematics education. Stipends, allowances and travelling expenses should be provided by the university when attending seminars which will be a big help in the part of the faculty member.
2. Since BSED Mathematics Program prepares the students to be future mathematics teachers, it is necessary and essential that their attitude towards mathematics be improved. Various seminars on career orientation, motivation and personality development should be given to mathematics education students for them to instill in their minds the essence and importance mathematics teaching.
3. BSED Mathematics Program Coordinators, Academic Heads or Chairpersons, and Administrators should plan for different programs that will help their students improve their performance in mathematics.

4. Further Researches on the possible factors influencing the attitudes of the students in mathematics and performance of students shall be conducted for further developments.

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