Rigette Ryan S. Ramos, Enrique G. Baking, Dolores T. Quiambao, Reynaldo C. Nicdao, Alvin V. Nuqui, Reynaldo C. Cruz

Don Honorio Ventura Technological State University, Philippines

Correspondence should be addressed to Alvin V. Nuqui

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ABSTRACT

This study dealt with the different factors affecting the mathematics proficiency level of high school students of the public secondary schools in Sta. Ana, Pampanga. It described the school factors in terms of facilities and book student ratio; the teacher - respondents' highest educational attainment, age, civil status, teaching experience and seminars/trainings attended; the proficiency levels of the students in reading comprehension and mathematics and; the educational attainment of the parents and monthly income of the family of the students. The problems encountered by the mathematics teachers in teaching the subject and the proposals to remedy the problems were likewise included. The data gathered were treated with the use of frequency distribution, weighted mean, and percentage. Correlational analysis and chi – square test were also used in this study. Based from the results, all school related factors and teacher related factors in terms of civil status, years of teaching and seminars/trainings attended affect the mathematical proficiency of the students; reading comprehension level is significantly correlated to the students mathematics proficiency level while the teacher related factors along the aspects of educational attainment and age and all family related factors were not significantly related to the mathematics proficiency level of the students.

KEYWORDS: Mathematics Proficiency Level, High School Students

INTRODUCTION

As a student enters high school, he is expected to face the different challenges in life specially in academics coupled with making decisions, projects, assignments, quizzes; to mingle with other students; to meet new friends and classmates; and to study all necessary lessons specially in solving problems in Mathematics subject. For a student to be considered highly competitive nowadays he must be good in at least 3 subjects namely, Filipino, English and Mathematics. The lesson being studied in the secondary level in the above mentioned subject areas are continuation of what was learned in the previous years of elementary schooling.

Mathematics is one of the subjects in high school which most of the students hate because they do not want to solve, interpret, and analyze numbers. Solving and interpreting different kinds of word problems enable the students to think intelligently and to act critically. As he faces the different Mathematics subjects in high school like algebra, geometry, and statistics more mathematical skills and techniques must be needed especially when these subjects are fused with other disciplines.
Marwaha (2009) in his article entitled “How to Tackle the Problems of Mathematics in Schools” stated that Mathematics in general is construed as a subject in which is very difficult and thus students fear this subject resulting in low scores. However, the fact is otherwise. In order to tackle this problem, the teaching of Mathematics has to change. It should be child-centered.

The development of K to 12 Program of Aquino administration has been made possible by the collaborative efforts of members of the steering committee which is composed of Department of Education, Commission on Higher Education (CHED), Technical Education and Skills Development Authority (TESDA) and other stakeholders. These include other government agencies, private sector, civil society organizations, associations of public and private schools, Senate, House of Representatives, Parents – Teachers Association (PTA), teacher organizations, student organizations and other individuals who are committed to improving the quality of Philippine education.

As stated by Bro. Armin Luistro (2012), the Enhanced K+12 Basic Education Program in the Philippines has been officially started. It has been initiated by the Aquino administration where students will have to undergo a new system of education. This program will require all incoming students to enroll into two more years of basic education. Thus, the K+12 System will basically include the universal kindergarten, 6 years of elementary, 4 years of junior high school with an additional 2 years for senior high school. Moreover, the program aims to uplift the quality of education in the Philippines in order for graduates to be easily employed. The program also aims to meet the standards required for professionals who would want to work abroad. Most importantly, the system aims to fully enhance and develop the students in order for them to be well-prepared especially in emotional and cognitive aspects. Through this, graduates will be able to face the pressures of their future workplace.

The Third International Mathematics and Science Study (TIMMS) is the largest international study of student achievement ever undertaken. It is administered to students in the third, fourth, seventh, eighth and 12th grades. When TIMMS was first conducted in 1995 among 42 countries, the Philippines placed 41st in science and 30th in mathematics. The two subjects are premium in the entrance exams to national science high schools.

According to philstar.com (2010), the results of the Third International Mathematics and Science Study-Repeat (TIMSS-R), Filipino students are still weak in math and science. A report of the Department of Science and Technology (DOST) said that the 6,601 Filipino students who took the TIMSS last year ranked 36th in both science and mathematics tests out of a field of 38 countries. The DOST revealed that Filipino participants garnered a score of 349 and 350 in science and math respectively, way below the international average of 489 in both subjects. In the mathematics test, it noted, Filipino students did best in data representation, analysis and probability, and poorest in algebra. Other Asian countries dominated the 1999 TIMMS tests. Chinese Taipei and Singapore were tops in science, followed by Hungary, Japan and South Korea. In math, Korea, Taipei and Hong Kong bagged the top scores.

Curiously, the study showed that Filipino students have a better attitude toward the two subjects than the international standard. But even if these students spent more time studying science and math and were more inclined to join related clubs, "this did not translate to a performance better as would have been expected."

As stated by Sulit (2012) the idea of teaching and learning through real-life problems follows along with the National Council of Teachers of Mathematics (NCTM) principles of learning and assessment. Students are building new mathematical knowledge through problem solving. The student is using reasoning to solve real-life problems. They will be making connections through what they had learned in class and the problem in front of them. It is the goal of every teacher to be able to give the kids the knowledge they need to function in the real world. More importantly, it is our ultimate goal to have our students go out in the real world and solve problems they may not have been solved before. In order to do this, they need the ability to use and unique ways of coming up with solutions. Presenting students with new types of problems will give students the comfort needed to be an avid problem solver.

Structure in mathematics reveals both the discipline and the need for consistent rules and order as well as for the creative abilities to develop and construct such structures of explicit purposes and objectives. Mathematical structures have their advantages, for once stated, they can be examined and assess without human emotional stresses and changes. Mathematics has process and form. Its processes and transition are fundamental to solutions of problems. Its transformations are used to reveal different characterization of content through their forms.

Gallup (2010) conducted the poll that asked students to name the school subject that they considered to be the most difficult. Not surprisingly, Mathematics came out on top of the difficulty chart. Dictionary.com (2010) defines the word difficult as not easily or readily done; requiring much labor, skill, or planning to be performed successfully.

Manjunath (2010) stated that Mathematics education is the study of the practices and methods of teaching Mathematics. The goal of Mathematics education are (i) to develop a sense of enjoyment rather than fear it; (ii) to learn Mathematics as a process of deriving new knowledge to be applied in real life situations but not as mere formulæ and perfunctory procedures; (iii) learner must see Mathematics as something to talk about, to communicate, to discuss among themselves, to work together on; and (iv) to use the abstractions to perceive relationships, to see structure, to reason out things, to argue and articulate the truth or falsity of statements. Mathematics knowledge imparted should cultivate the values such as development of concentration, Economical living, the power of expression, self-reliance, Attitude of discovery and above all the quality of hard work and all these qualities are essential for human being to survive in the world. So, there is a definite place for Mathematics in education. However, for such all-around development, teaching of Mathematics at school level should be very effective. For such effective and meaningful teaching of Mathematics, it has to
seriously deal with constructive invention, motivation intuition, application and aesthetics within the framework of “deductive for of Mathematics”. The question is how to make such effective and meaningful teaching of Mathematics, when present status of teaching of Mathematics at school level as at doldrums due to valid factors.

Limin (2008) stated that mathematics education prepares students to cope with real life successfully. It is necessary to equip students with an understanding and mastery of basic concepts and skills to live intelligently. Man would no longer base his life on trial and error present but it is a product of critical thinking of and scientific work. The role of mathematics in the present scientific age is significant in education. The school, being the agent of change makes mathematics teaching and learning more responsive to the needs and demands of the ever-changing society. The teacher should be able to transfer his knowledge to the students through the appropriate choice of teaching strategies. He should choose carefully the instructional materials which he plans to use and adopt them from for primer effectiveness in enabling the students to attain the desired goal. One aspect of learning which educators must be concerned with is the student’s attitudes, particularly, attitudes towards mathematics. Talented students who have the capacity for learning are not taking up courses with advanced units in mathematics. A positive attitude towards mathematics will cause high performance in any mathematics subject.

Many teachers are saying that teaching Mathematics subjects in high school is quite difficult due to several factors influencing the instruction environment: lack of textbooks, visual aids and other teaching materials among others. If one goes to the countryside, there is a bad reality that public education suffers lack of many things to the detriment to the poor student population. Teachers should be responsible in devising the learning experience of the students. Thus, problems that impair the effectiveness of the teaching – learning process should be discovered so that alternatives can be suggested for their solution to foster and facilitate improved mathematical instructions. Such the researcher conducts an in-depth research to determine the problems affecting the Mathematics proficiency level of the students and teachers toward teaching Mathematics. This served as a springboard to find ways and means in evolving an improved Mathematics instruction that satisfied the present demands for developing Mathematics instruction.

**FRAMEWORK**

Figure 1 shows the schematic diagram of the conceptual framework of the study. It has three significant components: Input, Process and Output. The Input includes the factors affecting the Mathematics proficiency level of the students; school factors, teacher factors, student factor, and family factors. Mathematics proficiency level of the students and the problems encountered by the teachers in teaching the subject are also included. The Process shows the instrument used in gathering the data through questionnaires, assessment of students through their grades in Mathematics and English. Output identified the factors affecting the Mathematics proficiency level of the students and the solutions to remedy the problems encountered in teaching Mathematics.

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**Figure 1: Schematic Diagram of the Study**

**INPUT**
- Factors affecting the Mathematics Proficiency Level of the students:
  - School Factors
  - Teacher Factors
  - Student Factor
  - Family Factors
- Mathematics proficiency level of the students
- Problems encountered in teaching the subject

**PROCESS**
- Questionnaires
- Grades in Mathematics and English
- Assessment of the problems encountered by the teachers in teaching the subject

**OUTPUT**
- Assessed factors affecting the Mathematics Proficiency Level of the Students
- Solutions to remedy the
STATEMENT OF THE PROBLEM

This study aimed to determine the factors affecting the Mathematics proficiency level of high school students of public secondary schools in Sta. Ana, Pampanga, and School Year-2014.

Specifically, this study sought the answers to the following questions:

I. How may the following factors be described in terms of:
   a. School Factors
      i. Facilities, and
      ii. Book - Student Ratio?
   b. Teacher Factors
      i. Educational Attainment,
      ii. Age,
      iii. Civil Status,
      iv. Teaching Experience, and
      v. Seminars and Trainings Attended?
   c. Student Factor
      i. Reading Comprehension Skills?
   d. Family Factors
      i. Educational Attainment of Parents, and
      ii. Family Income?

II. How may the Mathematics Proficiency Level of the students be described?

III. Are there significant relationships between school, teacher, student and family related factors and students' Mathematics proficiency level?

IV. What are the problems encountered by the Mathematics teachers in teaching the subject?

V. How may the problems be remedied?

MATERIALS AND METHODS

Research Design

The descriptive – survey method was used in gathering data and information to assess and describe the factors affecting the Mathematics proficiency level of the students. As stated by Abuzo, M.A., et. al. (2013) descriptive statistics is a statistical method concerned with describing the properties and characteristics of a set of data. This method is very appropriate because the study involved the description of facts together with the appropriate remedial measures for the problems encountered by the teachers and students in solving mathematical problems. The questionnaires were the main instruments used to gather data needed in the study.

Locale of the study

To determine the sample of the study, stratified random sampling method was used in selecting samples from the students as respondents. According to Abuzo, M.A., et. al. (2013) random sampling is a method of selecting size from universe such that member of the population has an equal chance of being included in the sample and all combinations of size have an equal chance of being selected as the sample. Only 20% of the whole population or 346 students and 100% of the Mathematics teachers or 16 teachers were chosen to be the respondents of this study.

Instrumental Analysis

The questionnaires were the main instruments used in collecting the data in this study. The related literature and studies were taken from reading of researchers whose works have similar bearing on this study and helped the researcher in the formulation of the questionnaires.

School Questionnaire. The questionnaire contains the profile of the school in terms of facilities of the school and the book – student ratio.

Teachers’ Questionnaire. The questionnaire contains the teachers’ highest educational attainment, age, civil status, teaching experience and seminars/trainings attended, major problems encountered in teaching Mathematics and proposals to remedy the problems.

Students’ Questionnaire. The questionnaire contains the highest educational attainment of the parents of the students and the monthly income of the family.

Students’ Proficiency Level in English Comprehension and Mathematics. These are the average grade of the students in English comprehension and Mathematics from first grading period to third grading period.

Unstructured interviews and observations were employed to generate more valuable data. They were tabulated, analyzed and interpreted.

Data Analysis

In analyzing and interpreting the data gathered, descriptive statistical techniques such as frequency, percentage, and weighted mean were used. In terms of the school related factors, teacher related factors and family related factors, the frequency and percentage were used to interpret the data. Frequency and percentage were used to determine the distribution of all respondents in each category.

The descriptive ratings of the numerical ratings of the students’ proficiency levels were based on the following:
The scale used in determining the descriptive ratings of the numerical ratings of the problems encountered by the Mathematics teachers was as follows:

<table>
<thead>
<tr>
<th>Weighted Mean</th>
<th>Point Scale</th>
<th>Descriptive Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.51 – 5.00</td>
<td>5</td>
<td>VS – Very Serious</td>
</tr>
<tr>
<td>3.51 – 4.50</td>
<td>4</td>
<td>FS – Fairly Serious</td>
</tr>
<tr>
<td>2.51 – 3.50</td>
<td>3</td>
<td>S – Serious</td>
</tr>
<tr>
<td>1.51 – 2.50</td>
<td>2</td>
<td>NS – Not Serious</td>
</tr>
<tr>
<td>1.00 – 1.50</td>
<td>1</td>
<td>NP – Not a Problem</td>
</tr>
</tbody>
</table>

The descriptive ratings of the numerical ratings on the proposals to remedy the problems of the teachers were based on the following:

<table>
<thead>
<tr>
<th>Weighted Mean</th>
<th>Point Scale</th>
<th>Descriptive Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.51 – 5.00</td>
<td>5</td>
<td>VU – Very Urgent</td>
</tr>
<tr>
<td>3.51 – 4.50</td>
<td>4</td>
<td>FU – Fairly Urgent</td>
</tr>
<tr>
<td>2.51 – 3.50</td>
<td>3</td>
<td>U – Urgent</td>
</tr>
<tr>
<td>1.51 – 2.50</td>
<td>2</td>
<td>NU – Not Urgent</td>
</tr>
<tr>
<td>1.00 – 1.50</td>
<td>1</td>
<td>NN – Not Needed</td>
</tr>
</tbody>
</table>

Correlational analysis was used to determine the relationship of the proficiency level in Mathematics and English Comprehension. To identify which among the factors can affect the Mathematics Proficiency level of the students multiple regression analysis was used. Chi-square tests were performed to determine the significant relationship of the school related factors, teacher related factors and family related factors to the students Mathematics Proficiency Level.

**RESULTS AND DISCUSSION**

**School Factors**

All of the three schools respondents have library, only two (2) schools have covered court, TLE room, TLE tools, science laboratory, science tools, and computer room while only one (1) school has reading center, LCD projector and Mathematics Garden. Regarding the book – student ratio, the three schools respondents differ from one another; 1:1, 1:2, and 1:3.
Teacher Factors

From the teachers’ highest educational attainment, 62.50% of the teacher respondents finished Bachelor of Secondary Education (BSEd), 18.75% of the Mathematics teachers had Masteral Units, 18.75% also of the respondents graduated Master of Arts in Education (MAEd) and all of the teacher respondents were not yet enrolled in doctoral courses.

Regarding the age of the respondents, their mean age is 18. Fifty percent (50%) of the Mathematics teachers fall under the bracket 21 - 30 years old. The 6.25% of the respondents have an equal age under the bracket of 31 – 40 and 51 – 60 and 37.50% of the Mathematics teachers’ age fall under the bracket of 41 – 50.

In terms of civil status, nine (9) of the teachers are married and the remaining seven (7) Mathematics teachers are still single. As indicated in the results, the teacher – respondents have been teaching Mathematic from 0 – 30 years. The average number of years of experience of the teachers as Mathematics teachers is 14.50. The 56.25% of the teachers have been in the service for 1 – 10 years, 18.75% of the respondents have been teaching the subject for 11 – 20 years and 25% of Mathematics teachers have been in the service for 21 – 20 years. None of the teacher – respondents has been teaching the subject from 31 – 40 years of experience as a Mathematics teacher.

Meanwhile, 11 out of 16 Mathematics teachers attended division seminars/trainings. Five (5) of them attended cluster level, three (3) for regional seminars/training and only two (2) for national level seminars/trainings.

Students’ Proficiency Level in Reading Comprehension

The mean of the students’ English comprehension level is 85.58 with a descriptive rating of “Proficient”. The 11.85% of the students are “Advanced”, 57.51% are “Proficient”, 21.97% are “Approaching Proficiency” and 8.67% of the 346 students are “Developing”. None of the student respondents are in the “Beginning” level in reading comprehension.

Family Factors

In terms of the highest educational attainment, 33.20% of the parents finished high school level. Thirteen and thirty hundredth percent (13.30%) of the parents were elementary and college undergraduates. The 12.10% of the parents are high school graduates, 23.10% of the parents finished college level and 4.90% finished technical/vocational courses.

Regarding the monthly income of the family of the students, 37.60% have an income of P5,001 – P10,000, 32.10% of them have below P5,000 income a month, 12.10% of them have an income of P10,001 – P15,000, 9.20% of them have P15,001 – P20, 000 and 9% of the students’ family have an income of above P20,001.

Mathematics Proficiency Level

The mean of the Mathematics proficiency level of the students is 84.61 with a descriptive rating of “Proficient”. The 13.29% of the students are “Advanced”, 37.28% are “Proficient”, 36.99% are “Approaching Proficiency”, 12.14% are “Developing” and only 0.29% of the 346 students are “Beginning” level.

Problems Encountered by the Mathematics Teachers

The problems encountered by the teachers in teaching Mathematics were rated as “Fairly Serious”. These are as follows:

- Item no. 4 – Poor retentive memory
- Item no. 5 – Poor analytical thinking
- Item no. 6 – Poor study habits
- Item no. 7 – Lack of comprehension
- Item no. 8 – Effect of modern technologies
- Item no. 9 – Negative attitude of the students towards the subject

The problems encountered by the teachers in teaching Mathematics were rated as “Serious”. These are as follows:

- Item no. 1 – Lack of supervisory assistance
- Item no. 2 – Lack of instructional materials
- Item no. 3 – Inattentiveness of the students
- Item no. 10 – Poor basic foundation in Math / High School Math Readiness

Proposals to Remedy the Problems Encountered

The proposals to remedy the problems encountered by the Mathematics teachers were rated as “Fairly Urgent”. These are as follows:

- Item no. 2 – Purchase enough textbooks and reference
- Item no. 3 – Give proper motivation regarding the topic
- Item no. 4 – Give additional activities/seatworks/drills
- Item no. 5 – Assist the students in understanding mathematical concepts and their application
- Item no. 6 – Give take home activities
- Item no. 7 – Conduct remedial classes
- Item no. 9 – Develop positive attitude in the students

The proposals to remedy the problems encountered by the Mathematics teachers were rated as “Urgent”. These are as follows:

- Item no. 1 – Extend supervisory assistance from the principal
- Item no. 8 – Allow students to use calculators and mathematical software, tools, equipment and devices
- Item no. 10 – Review the four fundamental operations regularly

CONCLUSION

Based from the summary of the findings, the researcher came out with the following generalizations:

- School Factors in terms of facilities are limited. Book – student ratio ranges from 1:1 – 1:3. Regarding the teacher factors along the aspects of educational attainment, half of the teachers are bachelor’s degree holders. In terms of age, the teachers are young and mostly married. Most of the Mathematics
Teachers are new in the service. Majority of them have attended different seminars/trainings in the different levels. The students were proficient in reading comprehension. With regard to the family factors, most of the parents of the students are high school graduates and majority of them have monthly income of P5,001 – P10,000.

- Students were proficient in Mathematics.
- School factors in terms of facilities and student – book ratio are related to the Mathematics proficiency level of the students. Similar to this factor, the teachers’ civil status, years of teaching and seminars/trainings attended by the mentors can affect the students Mathematics proficiency level. The reading comprehension skill of the students is one of the major factors in solving the different mathematical problems to improve their grade in Mathematics.
- Poor study habits, poor analytical thinking and effect of modern technologies are the main problems encountered by the Mathematics teachers in teaching the subject are fairly serious.
- Majority of the proposals to remedy the problems encountered by the Mathematics teachers are having remedial classes, develop positive attitude in the students and assist the students in understanding mathematical concepts and their application.

RECOMMENDATIONS

Based from the findings of the study and the above stated conclusions, the researcher offers the following recommendations:

- The principal, teachers. stakeholders and with the help of the local government must find ways to purchase needed equipment and textbooks of the students. Teachers are advised to enroll in graduate school for them to gain new ideas in teaching their subjects. Parents should cooperate and participate in the different activities of the school for them to know the academic condition of their children.
- Students should give more time and efforts in understanding the different concepts, methods and techniques in solving the problems they encountered in Mathematics to improve their proficiency levels.
- School heads should see to it that the facilities of the school and textbooks for teachers and students are available as this contributes to facilitate the teaching and learning process. Teachers should spend more time in preparing their lessons and activities suited to the Mathematics proficiency of their students so that they will excel in their Mathematics subject. Students should spend more time in understanding different reading materials to enhance their comprehension skills, thereby be able to think critically in solving the problems in Mathematics. Parents should continue to support their children holistically so that their children can be more active in their academic endeavors. Coaching and mentoring the child’s daily activities are important to be able to get good performance in school.
- Mathematics teachers should continue to develop in themselves the desirable competencies necessary for Mathematics teaching and keep themselves abreast to modern technologies in teaching the subject so that the students would be more prepared, interested and motivated.
- There is an urgency to remedy the problems encountered by Mathematics teachers in teaching the subject for them to upgrade the Mathematics proficiency level of the students.

REFERENCES