PREDICTORS OF SENIOR HIGH SCHOOL STUDENTS' PROCEDURAL KNOWLEDGE IN GENERAL MATHEMATICS

Marife Valenton- Ubalde , Michelle Calimbo
University of Science and Technology of Southern Philippines, Lapasan, Cagayan de Oro City, Philippines
Correspondence Tel.: +63 905 136 4531, E-mail: marifeubalde@ymail.com; marife_ubalde@ustp.edu.ph.

ABSTRACT: *This study was conducted to test how predictors relate the procedural knowledge of the Senior High School students in General Mathematics. These predictors included parent factors, individual factors, and instructional factors. The economic status and parent's educational attainment were measured in the parent factors. Parent's educational attainment may relate to the students' procedural knowledge [1]. It is because students inquire help from their parents when they are at home for a specific assignment given by the teacher at school. When any other factors are disregarded, individual factors may give a big impact in the student's performance at school when basically they do not have interest in a class specifically in mathematics. In the instructional factors, teachers' competency and their instructional strategies and techniques were also investigated in this study. It is believed that one needs a good understanding of what students already know when they come into the classroom to design effective teaching environment. This study used descriptive type of research. The researchers chose the 30 grade-11 students of Bonbon National High School who were enrolled in General Mathematics during the 1st semester SY 2017-2018 as the respondents. The data were gathered using 15- item test from 16 items after the validation. The data was interpreted with the use of descriptive statistics to get the mean and standard deviation of the scores of the students' procedural test and Pearson Correlation r to get the relationship. The result of the study was found that procedural knowledge of the students had no relationship with the parent factors, individual factors and instructional factors.*

Key Words: predictors; procedural knowledge; factors

1. INTRODUCTION

Procedural knowledge is a knowledge of how to perform mathematical tasks and is perhaps best defined as a ''goal-directed action sequence''. It means to generate the right answers to a given type of problem [2] without the need to look outside the set of rules that define the procedure.

It can be characterized as specific bits of knowledge — for example, knowing how to divide a three-digit number by a two-digit number without any connection to other bits of knowledge that might relate to it, such as knowing how to multiply a three-digit number by a two-digit number.

However, this becomes a difficulty due to lack of interest of students specifically the Grade 11 Senior High School of Bonbon National High School. Identifying these factors may help to utilize limited resources including financial resources and time more effectively [3].

One of the predictors of their low performance might include the parents' income, educational background, instructional design of teaching used by the teachers and their tools in delivering the subject and student's self-directed learning and motivation.

Instructional design alone cannot produce better learning and achievement. The teacher must know crucial factors that relates students' learning and build a bridge between goals and their performance. Proper learning management as guided by the teachers may have a positive relationship of students' procedural knowledge.[4]

Students' motivation and interest of learning mathematics may also relate their performance. It is because their interest to understand and cooperate with their peers may give them the opportunity to learn from the others successfully.

Thus, research provides the same factors as mentioned above, which could have an impact on students' achievement in terms of procedural knowledge such as *family structure, parents' educational level, socio-economic status, parent and student attitudes toward school*, and *parent involvement.* Fluty, D. [5] in the mathematical cognition literature, many researchers have differentiated between student's procedural understanding of math problems and their knowledge of procedures that could be used to solve these problems. Thus, procedural knowledge is not any tidbit of knowledge in and of itself but rather the understanding of how these tidbits of knowledge are interrelated to each other [6].

With these end in view, this study attempted to investigate the predictors of senior high school students' conceptual and procedural knowledge in General Mathematics.

2. METHODOLOGY

2.1 Research Design

This study determined the predictors of Senior High School students' procedural knowledge in General Mathematics of Bonbon National High School. The descriptive type of research was used in this study. Descriptive research was designed for the investigator to gather information about the present existing condition [7]. Travers, M. [8] defined descriptive research as involving collection of data in order to test hypothesis or to answer questions concerning the current status of the subject of the study. A descriptive study determined and report the way things are. The descriptive survey was used in gathering the data for analysis and interpretation.

2.2 The Instruments

One of the instruments utilized in the study was the researchers-made test. For content validity, the coverage of the test was based on the K-12 curriculum guide in mathematics. A table of specifications was prepared by the researchers to guide them in preparing the test items. The 16 item test was shown to the adviser of the researchers. The test was administered to the 3rd year college students who had taken up the same set of topics for item analysis. The result of the test obtained a coefficient reliability of 0.84.

The self-test for the predictors was the other instrument used in this study. This was integrated to the researchers-made test and was indicated as the first part of the test.

2.3 The Participants

The participants of this study were the Grade 11 Senior High School Students of Bonbon National High School who enrolled in General Mathematics during the 1st

Semester SY 2017-2018.

2.4 Data-Gathering Procedure

A letter was made by the researchers and consulted it to their adviser and signed by the department chairperson for the approval. It was given to the Principal of Bonbon National High School for the consent to allow the researchers to conduct their data gathering. The researchers clarified to the respondents the intention of the study. The questionnaires were administered and collected immediately after they had been answered. Confidentiality was assured to the respondents.

3. RESULTS AND DISCUSSIONS

The presentation, analyses and interpretation of data gathered from the respondents of the study, the Bonbon National High School Grade 11 Senior High Students who were enrolled in General Mathematics this school year 2017-2018 as follows.

Table 1. Frequency and Percentage Distribution of Parent Profile in Terms of Family Income

Family Income (Pesos)	Frequency	%
0 – 5,000	24	80
5,001- 10,000	6	20
10,001 – 20,000	0	0

In table 1, it has shown that no one of the students had parents whose combined monthly income reached 10,001 and above. Another group of six or 20 percent of the parents earned from 5,001–10,000. Twenty-four or 80 percent of the students had parents whose income got 0–5,000 which was not enough to survive the present cost of living.

This outcome was substantial among grade 11 Senior High School students because even how much they were interested on the subject if their parents does not have enough income to support their needs, might lead them to have a low performance in terms of procedural knowledge in General Mathematics.

Table 2. Frequency and Percentage Distribution of Parent profile in terms of educational attainment

Level of Education	Frequency	%
College Graduate/College Level	8	26.70
High School Graduate/High School Level	17	56.60
Elementary Graduate/ Elementary	5	16.70

Table 2 presented the educational attainment of parents of the Senior High School students in Bonbon National High School. It could be collected from the table that of the 30 parents, only five or 16.70% were elementary graduate or elementary level, eight or 26.70% were college graduate or college level, and seventeen or 56.60% were high school graduate or high school level. This level of education acquired the biggest and the highest groups of less privileged individuals. This means that the educational attainments of the parents were comprised as it might become a factor to relate the procedural knowledge of the Senior High School students in General Mathematics.

Table 3. Mean and Standard Deviation in the Procedural Test of Students

Variable	Number of Students	Mean	SD
Score	30	8.333	4.310

The table 3 revealed the mean and standard deviation of the students' procedural test in General Mathematics. Based on the result, the mean score of the students were small and scattered. Only one student got a score of 20 out of 24 while others got scores 11 below.

Table 4. Correlation of the Parent Factors, Individual Factors, and Instructional Factors to the Procedural Knowledge of the grade 11 Senior High School students in General Mathematics

Procedural	Parent Factors	Individual Factors	Instructional Factors
Pearson Correlation	0.066	-0.342	-0.072
N	30	30	30

The table above showed that the parent factors had no linear relationship with the procedural knowledge and the individual factors had a weak downhill (negative) relationship.

On the other hand, the instructional factors had a strong downhill (negative) relationship. This means if the procedural knowledge of the students was not good, the following factors did not relate to their performance.

The multiple regression analysis output designated that the independent variables were not significantly correlated with students' procedural knowledge in General Mathematics was found as predictors. Independent variables found as predictors of students' procedural knowledge in General Mathematics were the parent factors, individual factors, and instructional factors. Table 5 has shown that predict students' procedural knowledge in General Mathematics.

Table 5. Parent Factors, Instructional Factors, and Individual Factors that predict students' Procedural Knowledge in General Mathematics

	REGRESSION COEFFICIENTS				
Independent variables	β	std error	β	t	sig
Parent Factors	234	.582	.077	-.408	.688
Individual Factors	-.055	.327	-.299	-.850	.442
Instructional Factors	-.053	.059	-.348	-1.905	422

R Square = .035
SEE = .1831
Adjusted R = .001

This means that 3.5% of the variations in the students' procedural knowledge were explained by the three variables: parent factors, individual factors, and instructional factors. The rest 96.5% were attributed to other factors which were not included in the study. The

parent factor with a beta weight of 0.077 was the best predictor. This means the variables that do not forecast students' procedural knowledge were the individual factors and instructional factors.

4. CONCLUSION AND RECOMMENDATION

In the light of the aforementioned findings of the study, conclusion regarding the relation of parents' factors, individual factors, and instructional factors to the student' procedural knowledge is formulated. There is no significant relationship between the procedural knowledge as related to parents' factors. individual factors and instructional factors .The researcher recommends that another set of investigation may be required to establish consistency and validity, for it is the curriculum of educational system that may be greatly relate in which consequently redounds to the lessening of expenditures.It was also suggested similar studies may be conducted in consideration of the other predictors that relate procedural knowledge of the students in mathematics, aside from those included in this study. Hence, this study has absolutely served its purpose.Moreover the school principal and the teachers may adopt interventions that would address scholastic activities and programs of the students, considering the predictors to enhance their performance in mathematics.

5. REFERENCES

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