Conceptual Understanding, Attitude And Performance In Mathematics Of Grade 7 Students

Jocelyn Ceballos Andamon, Denis Abao Tan

Abstract: The study investigated the conceptual understanding, attitude and performance in mathematics of grade 7 students. This study sought to; describe the students' demographic profile, in terms of gender, family income and parent's educational attainment; determine their level of performance in mathematics; ascertain the level of students' conceptual understanding in mathematics; describe students' attitude towards mathematics; correlate the students' performance in mathematics to students' demographic profile, conceptual understanding, and attitude; and identify which of the variables singly or in combination best predict performance in mathematics. There were 225 grade 7 students in six participant – catholic schools in Valencia City. These schools were all member of Bukidnon Association on Catholic Schools (BUACS). The instruments used were teacher-researcher made test on conceptual understanding in mathematics with two sub-topics, the skills transferring knowledge, and the complete understanding in the language of mathematics; Fennema and Sherman Likert attitude scale; standardized mathematics test for grade 7 adopted from department of education k to 12 curriculum; and a demographic profile sheet. Results revealed that: students' demographic profile by gender showed that there were more females than males, almost three parts of the total population had finished the college category and half of the total population belongs to the poverty line. Students' performance in mathematics belongs to the range of approaching to proficiency which implies moderate or in the average level of learning. For the overall students' level of conceptual understanding in mathematics, the result described as approaching to proficiency meaning moderate. The students' attitude towards mathematics overall mean rated as uncertain implies further that students were neutral with regards to their attitude towards mathematics, they are fair. Students' performance in mathematics did not relate significantly to respondents demographic profile, and conceptual understanding in mathematics. Students' attitude towards mathematics and conceptual understanding in mathematics were found the best predictors of students' performance in mathematics.

Index Terms: Attitude, Conceptual Understanding, Performance in Mathematics

1 INTRODUCTION

One of the main aims of mathematics is to solve a problem in a systematic way so that similar problems can be solved more easily in the same way. Mathematics is very important every day, its uses to solve problems in such areas as astronomy, business, computer science, economics, navigation, physics, and statistics. Mathematics equips students with a uniquely powerful set of tools to understand and change the world. These tools include logical reasoning, problem-solving skills, and the ability to think in abstract ways. The common core standards in mathematics stress the importance of conceptual understanding as a key component of mathematical expertise. Conceptual mathematics understanding is a knowledge that involves thorough understanding of underlying and foundation concepts behind the algorithms performed in mathematics. Thus, it involves a situation where students are allowed to make choices and apply their understanding through active engagement. A student must have both understanding if they were to understand mathematics in depth. Teachers will more confidently recognize when students are prepared for standard-based testing and can demonstrate true understanding of concepts. They should be intrigued about the relationship between concept in mathematics and learning.

- *Jocelyn Ceballos Andamon is currently pursuing his doctorate degree in Mathematical Sciences major in Mathematics Education in Central Mindanao University, Philippines. She is a mathematics instructor at San Agustin Institute of Technology, Valencia City. +639368813565, jocelyn_andamon@yahoo.com*
- *Denis A. Tan is a faculty of the College of Education, Central Mindanao University (CMU), Philippines. She is currently the School Principal of the CMU Laboratory High School and the Director of the Office of Admissions, Scholarships and Placement in the same university. +639177103100, teacher.tansined@gmail.com*

The problem may not be lack of intelligence, nor inability to learn mathematics. The problem, most likely, is that the wrong study method that causes the lack of mathematical competence which closes the doors for solving problems requiring mathematical skills like conceptual understanding. Students need to learn a new set of mathematics basics that enable them to complete fluently and to solve problem creatively and resourcefully (Generalao, 2012). Another common conceptual problem is, understanding, that an equal sign (=) refers to equality – that is, mathematical equivalence. Students often think it signifies "put the answers here." "Mathematics is by nature an abstract discipline; such that, students have difficulty in comprehending mathematical concepts and operations. They tend to develop apprehension that they will not pass the subject. Feeling of anxiety and nervousness are easily developed among them, hence, mathematics phobia is evident". With this main problem in mathematics education, the researcher explored more studies relating to conceptual understanding (skills transferring knowledge and complete understanding in the language of mathematics), students' attitude towards mathematics and performance in mathematics. Its goal would increase mathematical skills both procedural and problem solving, and then explore whether or not it impacted conceptual understanding of grade 7 students of catholic schools in Valencia City.

1.1 Statement of the Problem

This study investigated the conceptual understanding and attitude of grade 7 students in mathematics as they relate to their performance. Specifically, it sought to answer the following questions: what is the demographic profile of the respondents in terms of gender, family income, and parents' educational attainment?; what is the level of grade 7 students' performance in mathematics?; what is the level of grade 7 students' conceptual understanding in mathematics?; what is the grade 7 students' attitude towards mathematics?; is there a relationship between performance in mathematics

and demographic profile, conceptual understanding, and attitude?; and which of the variable, singly or in combination, best predicts students' performance in mathematics?

2 METHODOLOGY

2.1 Research Design

Descriptive-correlational research designed was employed in this study. It used three sets of questionnaires in three different sessions including the demographic profile sheets which were administered in every respondent school in this study. It described the demographic profile of grade 7 students (gender, parents' educational attainment both father and mother and their family income), conceptual understanding (skills transferring knowledge and complete understanding in the language of mathematics) and attitude of the grade 7 students. It determined the level of students' performance in mathematics and the level of conceptual understanding of grade 7 students. It also defined the relationships between performance in mathematics and students' profile, conceptual understanding and attitude of grade 7 students. Pearson product moment correlation was used to determine the relationship among the variables. Linear regression was used to determine which variable predicts performance in mathematics.

2.2 Respondents and Locale of the Study

This study was conducted among six (6) secondary schools, member of Bukidnon Association of Catholic Schools (BUACS) in Valencia City, with grade 7 students. These 6 member schools were under private sectarian headed by the principal, managed by the directress, and administered by the bishop of Malaybalay, the chairman of the board of trustees. Most of these schools were founded by the late Caroselli, (1975). Good counsel high school is located at the heart of Mailag, Valencia city with 41 grade 7 respondents. This school functions as a branch of San Agustin Institute of Technology (SAIT). Immaculate Concepcion high school (formerly Guinoyuran High School) is situated at Guinoyuran. In 1984, it was changed to Immaculate Concepcion High School with DECS approval, then, functioned independently through the supervision of a diocesan priest. Sacred heart academy of Valencia Inc. Is located at Barangay Dagatkidavao. Saint Joseph High School (SJHS) is located at Laligan, named before, Laligan High School and was established in school year 1972-1973 as a branch school of San Agustin Institute of Technology. In the school year 1984 – 85 it stood independently and changed to Saint Joseph High School named after the patron in the Barangay Laligan. San Agustin Institute of Technology, the oldest among the six catholic schools in Valencia City, was also founded by Caroselli, in 1960. The school adopted a newly approved technical curriculum, the first of its kind in Northern Mindanao region. In 1971-1973, the college department was opened. The school initially offered Bachelor of Science in Industrial Education (BSIE) and Bachelor of Science in Technology (BST). In 1980, the elementary department was opened and by the next year, a complete elementary education program was offered. After Caroselli's retirement in 1975, the administration of the school was left entirely to the diocese, which in turn appointed competent administrators to carry on the vision. San Jose High School was officially founded on May 1, 1986 and was operated under SJHS of Laligan. Furthermore, the institution was named after Saint Joseph – the patron saint of the parish. At present, San Jose High School of Sinayawan, Inc. is a dynamic learning community in service of the local communities. All schools associated with BUACS are grantees of Education Service Contract (ESC), a program which provides a fixed tuition subsidy to graduates of public elementary schools who opt to enroll in participating private secondary schools. This esc program contracts private schools to secondary education to "would – have – been" public school students.

Table 1. Distribution of the respondents of the study

NAME OF SCHOOLS	SAMPLE
Good Counsel High School	41
Immaculate Concepcion High School	27
Sacred Heart Academy Valencia Inc.	29
Saint Joseph High School	44
San Agustin Institute of Technology	44
San Jose High School	38
TOTAL	223

2.3 Research Procedure

Ethical considerations and data gathering procedures were discussed. A formal request for data collection was secured from the six (6) school member of (BUACS), Valencia City. A permit was also secured to allow the researcher to float the instrument on conceptual understanding in mathematics. The data collection was personally carried out by the researcher. The respondents of the study were given one

hour to answer each questionnaire in three sessions. The questionnaires were checked, scored, organized into tabular form, and subjected to statistical analysis. The researcher passed ethics statement to individuals involved in this study mentioning all the good ethical practices to be observed throughout the study. The distribution of the ethic statement was done personally by the researcher. It was addressed to the principal in each of the respondent schools (refer to appendix a for ethics statement sample). A note approval was attached in a letter, signed by the school principal of the six respondent schools and signed also by the mathematics teacher in each respondent school. Performance in mathematics was based on scores of the standardized mathematics test for grade 7 students which obtained a Cronbach's alpha of 0.78. This kind of test is more on procedural skills adopted from the department of education k-12 curriculum. Researcher developed a mathematics test on conceptual understanding in mathematics which is composed of two sub-topics namely, the skills transferring knowledge in mathematics and the complete understanding in the language of mathematics. It has a Cronbach's alpha of 0.80 which means very good. Attitude towards mathematics was the attitude scale adopted from Fennema and Sherma, as modified by Orongan (2007), which earned an alpha coefficient of 0.91.

2.4 Instrumentation

A demographic profile sheet for the grade 7 students limit to a specific characteristics about their gender either male or female, parents' educational attainment either graduated from college, high school or elementary of the father and mother, and family income which ranges from Php 5,000 to 30,000 and above. Three instruments were used in collecting the data: the 50-item standardized mathematics test was adopted from department of education; the teacher-researcher made test on conceptual understanding in mathematics with two sub-topics in which 20 items for the skills transferring knowledge and 48 items for the complete understanding in the language of mathematics, and 47-item attitudes towards mathematics.

Table 2. Measurement of students' performance in Mathematics to descriptive rating

N	**N**	**N**	N	PERCENTAGE	DESCRIPTIVE	INTERPRETATION
50	**20**	**48**	68		RATING	
0-10	0-4	0-10	0-15	74 % and below	Beginning	Very low
11-20	5-8	11-18	16-30	75% - 79%	Developing	Low
21-30	9-13	19-27	31-45	80% - 84%	Approaching Proficiency	Moderate/Average
31-40	14-16	28-36	46-60	85% - 89%	Proficient	High
41-50	17-20	37-48	61-68	90 % and above	Advanced	Very high

The performance of the students was based on their scores from the standardized mathematics test for grade 7 students. From highest score down to lowest, start a score of 41 – 50 in advanced level which means very high. Next, for the scores of 31 – 40 at 85% - 89% means high or proficient level. Approaching to proficient are students who got scores of 21 – 30 at 80% - 84% which means moderate or in average level of learning. Second to the last level range from 75% - 79% with a score from 11 – 20 is described as developing or low, and 0 – 19 score belongs to 74% and below which means beginning, indicating very low. The score of 0-4 is 74 % and below, rated as beginning which means very low; a score of 5-8 has 75%-79% is rated as developing which means low; approaching proficiency if the score is in the range of 9-13 which indicates moderate or average; proficient if the score ranges from 14 to 16 which means high with the percentage of 85%-89%, while scores from 17–20 describes as advanced which means very high and has a percentage of 90% and above. Above relates the scores for the complete understanding in the language of mathematics, score of 0–10 means beginning or 74% and below is interpreted as very low; developing has a score ranges from 11–18 with a percentage of 75 to 79, implies low; approaching proficiency means moderate or in average level has as percentage range from 80%-89% with scores of 19-27. Proficient implies as high level has a score within 28-36 with 85%-89%; the highest level is described as advanced with a rating of 90% and above, has a score range of 37-48. Key for the overall conceptual understanding was separated from the skills transferring knowledge and the complete understanding in the language of mathematics. This has a range of scores from 0-15, beginning, which means very low and falls at 74% and below. Next to that level is low which implies developing, with the scores within 16-30 and is 75%-79%. While the percent of 80%-84% is rated as approaching proficiency indicating moderate level with a score range from 31-45. For scores fall on 51-60, this means proficient or high with average ranging from 85% - 89%. Very high indicates advanced level and has the score from 61-68, that is 90% and above.

Table 3. The students' attitude towards Mathematics was measured by this key.

RATING	SCALE	QUALITATIVE DESCRIPTION	INTERPRETATION
5	4.50 – 5.00	Strongly agree	Highly positive
4	3.50 – 4.49	Agree	Positive
3	2.50 – 3.49	Uncertain	Neutral
2	1.50 – 2.49	Disagree	Negative
1	1.00 – 1.49	Strongly disagree	Highly negative

The students' attitude towards mathematics containing 47 items was determined based on their answer to a validated and reliable Likert-type questionnaire adopted from a modified Fennema & Sherman attitude scale on mathematics with a Cronbach's alpha of 0.91. It has positive and negative statement and ranges from 5 to 1 describing from strongly agree, agree, undecided, disagree, and strongly disagree which implies further as highly positive, positive, neutral, negative and highly negative respectively. Reverse scoring procedure was done for negative statement. High score represents high positive attitude.

2.5 Statistical Data Analysis

The data were grouped and categorized based on the objectives of the study. Descriptive statistics using means and percentage was used to determine the performance in mathematics of the students. To describe the demographic profile of the grade 7 students per indicator, frequency and percentage were used while mean and standard deviation were used for the conceptual understanding of students (skills transferring knowledge and complete understanding in the language of mathematics). For students' attitudes towards mathematics, mean was used. Pearson product-moment correlation was used to determine the relationships of the variables. Linear regression was used to identify which variable singly or in combination best predicts performance in mathematics.

3 RESULT AND DISCUSSION

3.1 Demographic Profile of Grade 7 Students

Students' demographic profile consists of students' gender, educational attainment of their parents and their family income. Table 4 presents the students' demographic profile which refers to gender, parents' educational attainment, and their family income. It was gathered through a demographic profile sheet that was filled by the grade 7 students. It shows that 144 of 223 respondents or 64.4% were female students and male students were only 72 or 32.3% of the 223 total samples which means that there were more females than males. This statistics coincides with gender statistics reported by UNESCO institute of statistics saying that there is a significant rise of females than males. As to the educational attainment, there were 144 fathers or 64.6 % finished college, only 69 of them or 30.9% were high school graduate, while 4.5% or only ten (10) fathers attained elementary. For mothers' educational attainment, 161 finished college or 72.2%, 54 mothers or 24.2% finished high school and there were only 8 mothers or 3.6 % finished elementary level. This implies that most of the parents graduated in college, about ¼ of the population in the high school level and only few attained the elementary level. It supports to the study of Basang (1997) that one of the general factors in human development is environmental influence. It is undeniable that socio-economic status and educational attainment of parents were determinants in the learning performance of the child.

Table 4. Demographic profile of the Grade 7 students

DEMOGRAPHIC PROFILE	FREQUENCY	PERCENT
Gender		
Female	144	64.4
Male	72	32.3
TOTAL	223	100
Educational Attainment		
Father		
College	144	64.6
High School	69	30.9
Elementary	10	4.5
TOTAL	223	100
Mother	161	72.2
College		
High School	54	24.2
Elementary	8	3.6
TOTAL	223	100.0
Family Income		
5,000 – 10,000	45	20.2
10,001 – 20,000	94	42.2
20,001 – 25,000	26	11.7
25,001 – 30,000	20	9.0
30,001 and above	36	17.0
TOTAL	223	100.0

For their monthly family income, there were 94 families of the 223 respondents or 42.2 % of 223 had an income ranging from 10,001 – 210,000. Forty five (45) families or 20.2% had an income ranging from 5,000 – 10,000. There were 36 families or 17% fell in the range of 30,000 and above. This is followed by the range of 20,001 – 25,000, with only 26 families or 11.7% and there were only 20 families or 9% of the total respondents belonged to the range 25,001 – 30,000. This means that almost half of the respondents had an income that ranges 10,001 – 20,000 because that is the minimal income of the families today which belong to the poverty line. Highest range of income is more than the second to the highest range; maybe because those families have income from the farm. This is supported by Olufemi, (2013) that parents' educational background could affect the children success in school. Therefore there is need for parents to realize the importance of education and the roles they are expected to play in the actualization of better academic achievement or outcome of their children.

3.2 Level of Performance in Mathematics of Grade 7 Students

The level of performance in mathematics of grade 7 students was measured through the scores result of the standardized mathematics test adopted from DepEd k-12 curriculum.

Table 5. Students' performance in mathematics

INDICATOR	MEAN	SD	INTERPRETATION
Students' performance in Mathematics	22.37	6.79	Approaching to proficiency

It shows that the mean of students' performance in mathematics is 22.37 which belongs to the range approaching proficiency which can be interpreted as moderate or in the average level of learning. This is supported by the study of Villaver (2014), which states that mathematics is the second most difficult area in the subject tests both in elementary and secondary as reportedly by the Philippine journal of education. Thus, senator Angara, chairman of the senate committee on education, arts. And culture, points the lack of competence in mathematics, science and technology as the root of the country's poverty.

3.3 Level of Conceptual Understanding of Grade 7 Students

The level of conceptual understanding of the grade 7 students was tested through a teacher-made test on conceptual understanding demonstrating the skills transferring knowledge of the students and the complete understanding in mathematics language. For skills transferring knowledge, the mean is 15.00 with standard deviation 3.143 which means 85% - 89% or proficient. It coincides with the transfer which is positive. Aptly put, transfer facilities all the students' cognitive functions. However, not all transfers are positive for some are negative. If a previous learning hinders the acquisition of new learning, transfer is said to be negative. On the contrary, if the new material is facilitated easily without my hassle, transfer is said to be positive. Transfer is a process of extending knowledge acquired in one context to other contexts (Byrnes, 2001). For the complete understanding in the language of mathematics, the mean score is 18.91 with standard deviation of 5.912, which is described as developing with the average of 75 % to 79 % which means low. But the mean can be rounded off to 19 in which it is very near to approaching proficiency meaning moderate. There are problems of the students in mathematics in the language understanding. This affirms that the language difficulties of the students are stated as follows: have difficulty in vocabulary of mathematics, being confused by language in word problems, do not know when irrelevant. Conceptual understanding as cited by Sandoval (2009), stated that, current recommendation for instruction in mathematics makes the need for strategic reading of mathematics texts even more critical than its part.

Table 6. Conceptual Understanding of Grade 7 Students

INDICATORS	MEAN	SD	INTERPRETATION
Skills Transferring Knowledge	15.00	3.14	Proficient
Language in Mathematics	18.91	5.91	Approaching to proficiency
Overall Conceptual Understanding	33.91	7.81	Approaching to proficiency

For the overall conceptual understanding, the mean is 33.91 with a standard deviation of 7.91 and fall in the range of 80% - 84%, which can be described as approaching proficiency, meaning average or moderate. This coincides with the study of Omrod (2003). According to him, in cognitive psychology; a concept is a group or category of similar event or objects.

The ability to form a concept allows an individual to make sense the vast amount of information processed every day. Students taught to develop a conceptual difficulty of various domains will be more proficient at problem solving abstract reasoning, generalizing their knowledge to new situation and more likely to make connections to related information.

3.4 Attitude of Grade 7 Students towards Mathematics

Students' attitude towards mathematics had an overall mean of 3.39 with a standard deviation of 0.32 which can be described as uncertain, meaning, students were neutral. It implies further that their attitude towards mathematics was fair. The following five indicators described "agree" which means positive. From highest mean, the indicators are "I'll need a good understanding in math for my future work", (4.27). "I need mathematics for my future work" with an average score of 4.14. This is followed by "I am sure that I can learn math" has an average of 4.11. The next is, "I study math because i know how useful it is", with the mean score of 4.03. The last is "knowing mathematics help me earn a living", (4.00). The other five indicators were uncertain, indicating that students' feeling towards mathematics was neutral. From the least, "my teachers think i am a person who could do well in math", 2.68; "I would expect a woman mathematician to be a forceful type of person", (2.78); "math has been my worst subject", (2.79); "most subjects I can handle ok but i just can't do a good job with math", (mean of 2.81) and "i would have more faith in the answers for math problems solved by a man than a woman" with a mean of (2.85). These results agree with the study of Gredler as cited by Nambatac (2001). According to Gredler, attitudes do not determine specific acts; rather, they make class of individual acting more or less likely to be engaged in. The result neither coincides nor contradicts with the study of Villaver (2014) that have shown the relational contributions of attitude to learning. Positive and negative attitude vary their influence towards learning. Achievement may increase or decrease depending on the degree of influence attitude had on the learner. Further the study of Prado (2002) supports on this matter saying, teachers, parents and the education personnel should exert extra effort to improve and enhance the student study habits and thereby develop a favorable attitudes towards Mathematics.

Table 7. Students' attitude towards Mathematics.

INDICATORS	MEAN	DESCRIPTIVE MEANING	QUALITATIVE INTERPRETATION
1. I am sure that I can learn math.	4.11	Agree	Positive
2. I am sure of myself when I do math.	3.70	Agree	Positive
3. I think I can handle more difficult math.	3.27	Uncertain	Neutral
4. I can get good grades in math.	3.63	Agree	Positive
5. I know I can do well in math	3.66	Agree	Positive
6. I am sure I can do advance work in math.	3.35	Uncertain	Neutral
7. I don't think I could do advance in math *	3.00	Uncertain	Neutral
8. Math is hard for me *	2.98	Uncertain	Neutral
9. I'm not the type to do well in math*	2.89	Uncertain	Neutral
10. Math has been my worst subject	2.79	Uncertain	Neutral
11. Most subjects I can handle OK but I just can't do a good job with math *	2.81	Disagree	Negative
12. I'm no good in math*	3.23	Uncertain	Neutral
13. Knowing mathematics will help me earn a living	4.00	Agree	Positive
14. I'll need mathematics for my future work	4.14	Agree	Positive
15. Math is a worthwhile, necessary subject	3.77	Agree	Positive
16. I will use mathematics in many ways as an adult	3.90	Agree	Positive
17. I'll need a good understanding of math for my future work	4.21	Agree	Positive
18. I study math because I know how useful it is	4.03	Agree	Positive
19. Math will not be important to me in my life's work *	3.88	Agree	Positive
20. I don't expect to use math when I get out of school *	3.42	Uncertain	Neutral
21. Taking math is a waste of time*	3.76	Agree	Positive
22. I see mathematics as something I won't use very often when I get out of high school *	3.44	Uncertain	Neutral
23. Doing well in math is not important for my future*	3.80	Agree	Positive
24. Males are naturally better than females in math	2.92	Uncertain	Neutral
25. Women can do just as well as men in math	3.27	Uncertain	Neutral
26. Females are as good as males in Geometry	3.26	Uncertain	Neutral
27. Women certainly are smart enough to do well in math	3.22	Uncertain	Neutral
28. Studying math is just as good for women as for men	3.46	Uncertain	Neutral
29. I would trust a female just as much as I would trust a male to solve math problems	3.31	Uncertain	Neutral
30. It's hard to believe a female could be a genius in math	3.01	Uncertain	Neutral
31. When a women has to solve a math problem , she should ask a man for help *	2.99	Uncertain	Neutral
32. 32.I would have more faith in the answer for math problems solved by a man than a woman*	2.85	Uncertain	Neutral
33. Women who enjoy studying math are little strange*	3.00	Uncertain	Neutral
34. I would expect a woman mathematician to be a forceful type of person *	2.78	Uncertain	Neutral
35. Males are not naturally better than females in math*	3.15	Uncertain	Neutral

INDICATORS	MEAN	DESCRIPTIVE MEANING	QUALITATIVE INTERPRETATION
19. Math will not be important to me in my life's work *	3.88	Agree	Positive
20. I don't expect to use math when I get out of school *	3.42	Uncertain	Neutral
21. Taking math is a waste of time*	3.76	Agree	Positive
22. I see mathematics as something I won't use very often when I get out of high school *	3.44	Uncertain	Neutral
23. Doing well in math is not important for my future*	3.80	Agree	Positive
24. Males are naturally better than females in math	2.92	Uncertain	Neutral
25. Women can do just as well as men in math	3.27	Uncertain	Neutral
26. Females are as good as males in Geometry	3.26	Uncertain	Neutral
27. Women certainly are smart enough to do well in math	3.22	Uncertain	Neutral
28. Studying math is just as good for women as for men	3.46	Uncertain	Neutral
29. I would trust a female just as much as I would trust a male to solve math problems	3.31	Uncertain	Neutral
30. It's hard to believe a female could be a genius in math	3.01	Uncertain	Neutral
31. When a women has to solve a math problem , she should ask a man for help *	2.99	Uncertain	Neutral
32. 32.I would have more faith in the answer for math problems solved by a man than a woman*	2.85	Uncertain	Neutral
33. Women who enjoy studying math are little strange*	3.00	Uncertain	Neutral
34. I would expect a woman mathematician to be a forceful type of person *	2.78	Uncertain	Neutral
35. Males are not naturally better than females in math*	3.15	Uncertain	Neutral
36. My teacher have been interested in my progress in math	3.72	Agree	Positive
37. I would talk to my math teachers about a career on math	3.51	Agree	Positive
38. It's hard to get math teachers to respect me	3.00	Uncertain	Neutral
39. 39. My teacher have encouraged me to study more in math	3.75	Agree	Positive
40. 40. Math teachers have made me feel I have the ability to go on mathematics.	3.87	Agree	Positive
41. 41. My teachers want me to take all the math that I can	3.45	Uncertain	Neutral
42. My teachers think I'm a person who could do well in math *	2.68	Uncertain	Neutral
43. Getting a teacher to teach seriously in math is a problem *	3.24	Uncertain	Neural
44. I have a hard time getting teachers to talk seriously with me about math*	3.00	Uncertain	Neutral
45. My teachers think advance math is a waste of time for me*	3.57	Agree	Positive
46. I feel that math teachers ignore me when I try to talk about something serious*	3.42	Uncertain	Neutral
47. My teachers would not take me seriously if I told them I was interested in a career in math*	3.09	Uncertain	Moderately positive
OVERALL MEAN	3.3898	Uncertain	Moderately positive

*- Negative indicators (Scoring was reversed)

Legend:

RATING	SCALE	QUALITATIVE DESCRIPTION	INTERPRETATION
5	4.50 – 5.00	Strongly agree	Highly positive
4	3.50 – 4.49	Agree	Positive
3	2.50 – 3.49	Uncertain	Moderately positive
2	1.50 – 2.49	Disagree	Negative
1	1.00 – 1.49	Strongly disagree	Highly negative

3.5 Relationship between Mathematics Performance and Students' Attitude towards Mathematics; Conceptual Understanding in Mathematics And The Demographic Profile of the Grade 7 Students

As shown in table 7, correlation analysis indicated that students' attitude towards Mathematics showed statistical significance ($p<0.05$) and the correlation r is 0.251, which means that there is a significant correlation $r = 0.251$ ($p< 0.05$) to students' attitude and their performance in Mathematics. This means that when students' attitude is positive then performance in Mathematics is high or vice versa. Findings also shows that demographic profile (gender, parents' educational attainment and family income) and conceptual understanding in Mathematics were not significantly related to the performance in Mathematics, since the computed correlation coefficient was very small and their corresponding values were greater than the level of significance (0.05). This reveals that there is no association between performance in Mathematics students' demographic profile as well as students' conceptual understanding in Mathematics. It agrees with the findings of Kulm (1996) that if students' attitude towards Mathematics is positive then the students have good performance towards the subject. Therefore, students' attitude towards Mathematics varies their performance in Mathematics. This implies the higher the attitude is, the higher the performance in Mathematics on the other hand the lower the attitude is, the poorer the performance in Mathematics. But the higher the conceptual understanding would decrease the performance in Mathematics. Thus, the null hypothesis stating that there is no significant relationship between the students' performance in mathematics and conceptual understanding in mathematics (skills in transferring knowledge, complete understanding in the language of mathematics) and students' demographic profile (gender, parents' educational attainment both father and mother; and their family income) is not rejected.

Table8. Correlation analysis of performance in Mathematics

INDEPENDENT VARIABLES	COEFFICIENT OF CORRELATION	P-VALUE
Attitude	0.251	0.000**
Conceptual understanding	-0. 113	0.092 ns
Gender	0.105	0.118 ns
Father's educational attainment	0.032	0.633 ns
Mother's educational attainment	0.026	0.701 ns
Family income	0.092	0.173 ns

** Correlation is significant at the 0.01 level (2- tailed).
*Correlation is significant at the 0.05 level (2- tailed) ns not significant
Legend:

± 0.90 to ± 1.00	very high ± correlation
± 0.70 to ± 0.90	high ± correlation
± 0.30 to ± 0.50	low ± correlation
± 0.00 to 0.30	little if any or negligible

3.6 Variables Best Predict Students' Performance in Mathematics

Regression analysis generally allows this study to model, explain and examine the relationship between independent variables or predictor namely: students' demographic profile that includes gender, parents' educational attainment and family income to the dependent variable or the criterion variable, performance in mathematics Table 9 shows the linear regression analysis of the students' demographic profile, students' attitude towards mathematics and conceptual understanding in mathematics towards the students' performance in mathematics. As revealed in table 12, two predictor variables showed significant contribution to students' performance in mathematics. The attitude towards mathematics had the greatest degree of influence with beta weights = 0.263, t (4. 052), ($p<0.01$), which indicates its significance at 0.01 level, and the conceptual understanding of grade 7 students in mathematics with beta weights = -0.136, t (-2.084) and probability of 0.038 ($p< 0.05$).

Table 9. Variables that best predict students' performance in Mathematics

INDICATORS	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	7.568	4.883		1.550	.123
Attitude	5.543	1.368	0 .263	4.052	.000
Conceptual Understanding	-0.117	0.056	-0.136	-2.084	.038

R = 0.285 R^2 = 0.081 F = 9.738 Sig. 0.000

R^2, the measure of total variation of the dependent variable, consists of 8.1% which reflects amount of the variance explained by students' attitude towards mathematics and conceptual understanding in mathematics, while 91.9% can be credited to the other factor variables apart from the regression model. From the foregoing analysis, the equation to be used for the students' performance in mathematics (ý), as indicated by the f-value (9.738) with its corresponding probability (0.001) is significant at level $p<0.01$. This model is illustrated:

$\acute{Y} = 5.543X_1 - 0{,}117X_2 + 7.568$
Where: 7.568 is constant
X_1 = students' attitude towards mathematics
X_2 = students' conceptual understanding in mathematics

This shows that positive attitude would increase performance in mathematics, while students' with lesser conceptual understanding would mean 0.117 unit better performance in mathematics. In agreement to this result, Villaver (2014) found that attitude influence students' learning. In her study, positive and negative attitude vary in their influence to performance in mathematics. It also confirms the study of tan (2008) that conceptual understanding influence performance in mathematics though she found that students who have higher conceptual understanding perform well in mathematics while students who have lower conceptual understanding have poor performance in mathematics, which is a different case in this study since respondents have low conceptual understanding in mathematics it is probably because most of the respondent were located at the barrio where students do not have depth conceptual understanding. Thus the null hypothesis, stating that there are two combination variables that best predict students' performance in mathematics, is rejected.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Based on the findings of the study, the following conclusions were drawn: Grade 7 students are mostly female, their mother and father are college graduates and with a monthly

income of 10,001 to 20,000 on the average. Students' performance in mathematics is in the approaching to proficiency level. It is understood that students are not well performed in the field of mathematics. The students have developing level of conceptual understanding in mathematics. Findings also show that student' conceptual understanding in mathematics has no significant relationship to their performance in mathematics. Among the independent variables, only students' attitude towards mathematics has significant relationship to the performance in mathematics. This means that the higher the attitude towards mathematics the better is the performance in mathematics. Regression analysis shows a students' attitude towards mathematics and their conceptual understanding on the subject are best predictors of their performance.

4.2 Recommendation

Teachers might look into the demographic profile on students so that they will be able to know how to deal with them. School registrars should always kept the record files on every students together with the information regarding with their parents. Mathematics teacher are encouraged to consistently check the students' level of performance in mathematics to see whether scores increase or decrease in conceptual understanding specifically the transferring knowledge and the understanding of mathematics language. The researcher encourages teachers that they might consider to check not only the level of students' performance, but also the conceptual understanding in mathematics. The procedural skills in mathematics especially problem solving can be easier solved if there is a depth understanding in the concept of the context. Advisers in charged are encouraged to inculcate positive attitude towards mathematics as it can increase positively in their performance towards that subject since it was found that attitude was positively correlated to mathematics performance. It also suggested that teachers and parents may check the attitude of students towards mathematics. If possible, they should encourage them to love the subject so that students always have positive attitude to mathematics. Teachers are encouraged to monitor and always give motivation on how to reach the inner concepts in math as it can lead students' deep understanding and improve problem solving in mathematics. With this significant result in attitude towards mathematics, the researcher highly recommends to all concern in this study to maintain positive attitudes towards mathematics. To ensure best performance level in the field of mathematics, conceptual understanding and attitude might be monitored always. Teachers, school administrators, and parents will do collaboration and endeavor to attain great achievements to everyone most especially the students.

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