

# Early Predictors Of High School Mathematics Achievements For Grade 9 Students In A Public High School

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**Abstract:** Recognizing the sorts of mathematical content that are most prescient of students' long haul learning is fundamental for enhancing mathematical development for students in the developing countries. The study used a descriptive correlational method of research using a modified division-issued individual student profile questionnaire, a standardized mathematical attitudinal scale, and a secondary data from the High School Registrar were utilized to gather the data. The Grade 8 high school students of Apas National High School, Cebu City, Philippines were the respondents of the study. Frequency, simple percentage, weighted mean, Chi-square test of independence, and t-test were used to treat the gathered data. The findings revealed that there were significant relationships between age of the respondents and their grades in Grade-7 mathematics as well as their attitudes towards mathematics. It was concluded that students' performance in mathematics in a public high school is influenced by their age, previous grades in math, and attitudes towards mathematics. The researchers recommend that the proposed action be implemented and monitored. Further, they suggest that another investigation is conducted to confirm its preliminary findings.

**Keywords:** Early predictors, mathematics achievement, mathematics education, Philippines

## 1. Introduction

Mathematics is essential to us. It is a part of our daily activities. By the time we wake in the morning until the time we go to sleep mathematics is involved (Levine, 2012; LaBerge, 2009). When we ask, "what's the time," "how long," "how much," "how many," etc., arithmetic is applied. Mathematics is everywhere. But sad to say, everybody is not funned of mathematics, though many are appreciative of it, lots are fearsome of it. The society's technological advancement requires professionals with strong mathematical ability. Many limit their chosen career with less mathematics involved. Some students with academic potential decide not to enroll courses with more math, though it has been known that most successes in life have something to do with being right in Mathematics. According to the study of Aunola et al. (2006), and Simpkins et al. (2006), performance expectancies predict subsequent math grades, whereas the perceived importance of mathematics predicts course enrollment intentions. Globally, mathematics is perceived as the most challenging subject. Can we do something about it? If students acquire and master cognitive skills, they develop a greater sense of self-efficacy, which leads to increased persistence, higher levels of performance, and more intrinsic interest in the activity. Trends in International Mathematics and Science Study (TIMSS) revealed that Philippine education is among with the lowest performance in Mathematics. The Manila Times (2014) reported that the Philippines participation in international surveys like the 2003 TIMSS, the country ranked 34th out of 38 countries in high school

mathematics and 43rd out of 46 countries. In 2008, even with only the science high schools participating in the Advanced Mathematics category, Philippines ranked lowest among ten participated countries. For many years, Mathematics is consistently ranked last among the eight subjects in public schools according to the National Achievement Test (NAT) result, with scores not reaching the 75% passing rate. On account of this, the researchers needed to enhance the arithmetic execution of Grade-8 students in the public school under study hoping that they could determine the factors that hinder students' achievement in mathematics.

## 2. Framework

This study is anchored on Self-Determination Theory (SDT) developed by Edward L. Deci and Richard M. Ryan (2000). SDT is an approached human motivation and personality that uses traditional empirical methods while employing an organismic metatheory that highlights the importance of humans evolved inner resources for personality development and behavioral self-regulation. There are three innate psychological needs--competence, autonomy, and relatedness which when satisfied yield enhanced self-motivation and mental health and when thwarted lead to diminished motivation and well-being. Thus, excessive control, non-optimal challenges and lack of connectedness can disrupt the inherent actualization and organizational tendency endowed by nature, and therefore such factors result not only in the absence of initiative and responsibility but also in distress and psychopathology. The fullest portrayals of humankind indicate individuals to

be interested, essential and self-persuaded. Taking care of business, they are agentic and roused, endeavoring to learn; broaden themselves; ace new abilities, and apply their gifts capably (Wong, 2007). It is additionally evident that the human soul can be decreased or smashed and that people once in a while dismiss development and duty (Aguilera et al., 2011). Inborn inspiration, the natural inclination to search out curiosity and difficulties, to broaden and practice one's abilities, to investigate, and to learn. The upkeep and upgrade of this natural affinity require stable conditions, as it can be reasonably promptly upset by different nonsupportive conditions (Sun et al., 2010; Kashdan & Finchman, 2004; Baard, 2002). Social-contextual events such as feedback, communications, and rewards that conduct towards the feeling of competence during action can enhance intrinsic motivation for that action. That feeling of expertise will not strengthen basic motivation unless accompanied by a sense of autonomy. Choice, acknowledgment of beliefs, and opportunities for self-direction were found to enhance intrinsic motivation because they allow people a greater feeling of independence. Field studies have shown that teachers, who are autonomy supportive, in contrast to controlling, catalyze in their student's higher intrinsic motivation, curiosity, and desire for challenge. Students taught with a more controlling approach not only lose initiative but also learn less efficiently. Autonomy-supportive parents have children who are more intrinsically motivated. Intrinsic motivation is more likely to flourish in contexts characterized by a sense of security and relatedness. Ryan and Deci (2000), observed lower intrinsic motivation in students who experienced their teachers as cold and uncaring. Extrinsic motivation refers to the performance of the activity to attain some separable outcome and, thus contrast with intrinsic motivation, which refers to doing business for the inherent satisfaction of the event itself. Extrinsic rewards can undermine intrinsic motivation. Prizes were dependably found to improve the probability that the conduct would be transmitted once more, an impact that held on as long as the reward possibility was agent, when rewards were ended, the probability that the conduct would be produced in the end came back to the remunerated benchmark (intrinsically motivated behaviors, the prototype of self-determined actions, stem from self. SDT recognizes that extrinsically motivated actions can become self-determined as individuals identify with and fully assimilate their regulation. It is through internalization and integration that individuals can be extrinsically motivated and still be committed and authentic. Internalization refers to people's "taking in" value or regulation, and integration refers to the further transformation of that regulation into their own so that, subsequently it will emanate from their sense of self. Expectancy-Value Theory of Achievement Motivation and Behavior supports SDT. Person's hopes for progress and the esteem they have for succeeding are essential determinants of their inspiration to perform diverse accomplishments errands and their decisions of which undertakings to seek after. Their expectancies most directly predict Children's achievement performance, persistence, and choice of achievement tasks for success on those tasks and the subjective value they attach to progress on those tasks. Children's expectancies and costs themselves are most directly determined by other

achievement-related beliefs, including children's achievement goals and self-schemata, and their task-specific beliefs. Children's interpretations of their past performance and their perceptions of socializers' attitudes and expectations influence their goals and task-specific beliefs. Expectancies for success are defined as children's beliefs about how well they will do on an upcoming task. Beliefs about ability refer to children's evaluations of their competence in different areas. Competence beliefs were posted to predict both expectancies for success and achievement values. Children's competence and expectancy beliefs relate positively to their subjective values. Achievement Motivation Theory, which is formulated by John Atkinson, as cited by Maehr and Sjogren (1971), has provided a productive approach to a variety of behavioral phenomena. A person not only sees himself as responsible for a somewhat uncertain outcome but also knows that the issue for which he is responsible will be evaluated against a standard of excellence. Achievement situations require skill and competence. In such achievement situations, two different predisposition will be energized; a motive to approach success and an incentive to avoid failure, the relative strength of these two motives will vary from person to person. A personality or individual difference factor is considered along with situational factors. The achievement-oriented person will be more motivated toward moderately tricky tasks than failure threatened person. In educational terms, the achievement-oriented person will be more inclined toward the challenge. Inspiration expands the measure of exertion and vitality that students consume in exercises identified explicitly with their requirements and objectives. Persuaded students will probably proceed with an assignment until they've finished it, regardless of whether they are sometimes hindered or disappointed simultaneously. In the study of Gutman and Midgley (2000), they stated that early adolescence not only encompasses the biological and physiological changes associated with puberty but also for many children, includes the social and learning environment changes that characterized the transition from elementary to high schools. They found out that students experienced a significant decline in grade point average across the transition from elementary to middle school. Another contributing element is the understudies' financial status, those living in neediness will probably encounter scholastic challenges, finish fewer years of tutoring, and drop out of school than kids from comparative families living in more princely neighborhoods. They also found out that students who were more academically efficacious had higher grade point average across middle school transition than did their peers. This supports the study of Darling-Hammond (2000), it is the students' interpretations of their achievement outcomes and not the outcomes themselves that have the strongest effects on students' affective reactions to performance. Students who assigned more importance to achievement in mathematics reported less math anxiety (Carmichael & Taylor, 2005; Wolters, 2004; Baker et al., 2002). In the study of Cantin and Boivin (2004), children's self-esteem did not change during elementary school but decreased following the junior high transition. Younger children appear to be overly optimistic in their competence beliefs and older children more realistic because they have more experience

with evaluative feedback from different achievement tasks, because they can integrate information better over time, and because they are better able to use social comparison information to obtain a more accurate sense of their relative standing (Wigfield et al., 2009; Wigfield & Eccles, 2002). Adolescent's valuing of math is the most reliable predictor of their intentions to take more math and real decisions about whether or not to continue enrolling in math class (Chiu & Wang, 2008; Battle & Wigfield, 2003). According to the study of Carr et al. (2008), girls have lower self-confidence, and it reflects a better awareness of their mathematical skills, and this tended to predict mathematics competency positively. Boys have higher confidence, but this tended to predict mathematics competency negatively. Their study suggests that girls may be better at evaluating their mathematical skills and accurately reporting that knowledge. Boys, in contrast, may be overconfident. Math anxiety relates negatively to students' performance on standardized tests of mathematics achievement, grades in mathematics, plans to enroll in advanced high school mathematics courses, and selection of math-related college majors (Wang, 2012). They found that students' current performance expectancies in math and the perceived performance of mathematics have the strongest direct effects on their anxiety. Performance expectancies predict subsequent math grades, whereas the perceived importance of mathematics predicts course enrollment intentions (Hulleman & Harackiewicz, 2009; Pajares, 2005). Expectancy and importance ratings are stronger determinants of subsequent performance and intentions than is math anxiety (Abu-Hilal, 2000). Identifying the types of mathematics content knowledge that are most predictive of students' long-term learning is essential for improving both theories of mathematical development and mathematics education (Siegler et al., 2012). The study of Durik et al. (2006) examines how competence beliefs and task values predict high school achievement choices related to mathematical literacy. Students' task beliefs (self-concept of ability, intrinsic value, and importance) about mathematics were tracked over time. Youths who faced the proximal risk of low achievement during the transition to high school were vulnerable to continued low success or failure; yet, a small number improved reading proficiency from failing the basic level to passing the intermediate or advanced levels. The way between locus of control and strength was incompletely interceded by secondary school educational programs; the way between eighth-grade instructive desires and versatility was wholly intervened by the educational modules. Beal et al. (2008) investigated the relationship between high school students' mathematics motivation and achievement to their appropriate help-seeking and inappropriate guessing behavior. Results indicated that students with low math self-concept were most likely to engage in inappropriate guessing behavior. Students with low math achievement were most likely to engage. Prior studies report a variety of demographic, school, individual, and family characteristics that are related to high school drop out. Jimerson et al. (2000) demonstrate the association of the early home environment, the quality of early caregiving, socioeconomic status, IQ, behavior problems, academic achievement, peer relations, and parent involvement with dropping out of high school at age 19. These outcomes are

predictable with the perspective of dropping out as a dynamic formative process that starts previously kids enters grade school. Psychosocial variables before school entry predicted dropping out with power equal to later IQ and school achievement test scores. The study of Simon (2001) revealed that regardless of students' background and prior achievement, various parenting, volunteering, and home learning activities positively influenced student grades, course credits completed, attendance, behavior, and school preparedness. When educators guided parents and solicited their participation, parents responded with increased involvement to support student success. The study of path analysis by Greene et al. (2004) was used to test predictions of a model explaining the impact of students' perceptions of classroom structures on their self-efficacy, perceptions of the instrumentality of class work, and their achievement goals in a particular classroom setting. Additionally, the impact of self-efficacy, instrumentality, and goals on students' cognitive engagement and achievement was tested. Information unequivocally bolstered the model showing that understudy view of classroom structures are imperative for their inspiration. Likewise bolstered was the significance of seeing the present class fill in as being instrumental for future achievement. McCaffrey et al. (2001) investigated the degree to which teachers' use of instructional practices aligned with these reforms is related to improved student achievement, after controlling for student background characteristics and prior achievement. The use of standards-based practices was positively related to achievement on both tests for students in math courses, through utilization of change hones was inconsequential to accomplishment in the more conventional polynomial math and geometry courses. These outcomes recommend that progressions to instructional practices may be combined with changes in educational programs to acknowledge consequences for understudy accomplishment. The study of Gutman (2006) examined the effects of student and parent goal orientations and perceived classroom goal structures on grades and self-efficacy in mathematics during the high school transition. Results indicate that mastery goals may be more influential in determining achievement and motivation in mathematics than performance goals during the high school transition. The study of Werblow and Duesbery (2009) explores how school size influences two important student outcomes commonly used in school effects growth in mathematics achievement and dropout rate. Results bolster the advantages of littler schools: understudies in littler schools were less inclined to drop out than large secondary schools. In the study of Bernardo and colleagues (2002), they have found that within the Philippine Educational System there seems to be an emphasis on educational goals related to the attainment and mastery of prescribed and pre-defined knowledge, skills, and approaches to cognitive tasks. This emphasis is evident in the curricular prescriptions of such official documents as the Philippine Elementary Learning Competencies and the Philippine Secondary School Learning Competencies. The education system stresses the executive thinking style, as the theory of mental self-government defined, people who have executive thinking style are more concerned with the proper implementation of tasks within a set of guidelines. In the study of Adao

and colleagues (2015) at Lyceum of the Philippines University-Batangas, they found out that the highest academic motivation of college students with math anxiety is extrinsic motivation external regulation, its behavior is regulated through external means such as rewards and constraint, and females are highly motivated than males. In the study of Rodrigo (2011) to Filipino students as they used the pre-algebra game, she focused on their cognitive-affective states of boredom, confusion, delight, engagement, frustration, neutrality and surprise. The study determines which of these states tended to persist or transition into other states over time. It was found that boredom was the only state that tended to continue. Apathy managed not to lead to engagement. Students who were confused were not likely to stay confused but were expected to transition into engagement. Students who were delighted were not expected to become confused. According to Neal as cited by Ngurah and Lynch (2013), attitude plays a crucial role in learning mathematics and positive attitude toward mathematics is thought to play an essential role in causing students to learn math. Neale defined mathematical approach as a liking or disliking of mathematics, a tendency to engage in or avoid mathematical activity, a belief that one is good or bad at math, and an idea that mathematics is useful or useless. As stated by Rademacher and Toeplitz (1990), enjoyment of mathematics is limited to small circle who are mathematically gifted. The number of people who can understand simple mathematical ideas is not relatively smaller; their advantage will be fortified if no one but we can wipe out the abhorrence toward arithmetic that such a large number of having obtained from youth encounters. The aversion toward mathematics vanishes if only genuinely essential mathematical ideas are presented. Albert Bandura as referred to by Parsons et al. (2011), characterized apparent self-adequacy as not a measure of the abilities one has, but rather a conviction about what one can do under various arrangements of conditions with whatever aptitudes one has. Self-confidence and self-efficacy are broadly similar. Tulis and Ainley (2011) stated, researchers found that high-achieving students were more likely to report enjoyment when measured as habitualized emotions but found no differences between high and low achievers in their reports of specific emotional states in mathematics. According to Frenzel et al. (2009), educators' delight and understudies' happiness are decidedly connected because of the continuous social cooperation amongst instructors and understudies in the classroom. One important mechanism mediating the transmission of enjoyment from teachers to students is teachers' enthusiasm during classroom instruction. The teacher's individual emotional experience during teaching should translate into the degree of enthusiasm expressed in teaching style, which in turn should influence students' experiences of enjoyment while being instructed. Students can learn that a topic or learning task is valuable by teachers' comments, as well as by observing their teacher's enjoyment of the topic or learning task. D'Ambrosio (2001) expressed, as our understudies encounter multicultural, scientific exercises that mirror the information and practices of individuals from various social conditions, they may figure out how to esteem the arithmetic as well as, similarly as vital, may build up a more noteworthy regard for the individuals who are

unique in relation to themselves. The researchers gained more insights from these theorists and researchers from seven continents across disciplines. These ideas included the factors that influence high school mathematics achievement. For these reasons, the researchers are motivated to conduct the study and propose an action plan to help the faculty and school administrators solve this pressing problem.

### 3. Objectives of the Study

This study determined the factors influencing the mathematics performance of Grade-8 students in a public high school in Cebu City, Philippines as the basis for the proposed action plan. It answered the: 1) Profile of the respondents; 2) Respondents' previous grades; 3) Respondents' attitude towards mathematics; 4) Significant relationship between the respondents' profile and their previous grades in math, and attitude towards math; and 5) Significant relationship between the respondents' previous grades in math and their attitude towards math.

### 4. Methodology

This study used a descriptive correlational method of research to determine the influencing factors of students' mathematics achievement in Grade-8 mathematics in Apas National High School, Cebu City, Philippines. This study utilized a modified division-issued individual student profile sheet, a standardized mathematical attitudinal scale, and a secondary data from the High School Registrar. The research respondents were the 5-class sections of Grade-8 students. The total respondents were 196 male and female students. The researcher used a revised Individual Student Profile Sheet, which is one of the forms supplied by the Department of Education, to get the profile of the respondents. To obtain the previous grades of the respondents, the Form-137 from the school registrar was utilized. A modified Attitude Towards Mathematics Inventory (ATMI), which was adopted from Tapia and Marsh (Ngurah & Lynch, 2013), was used to measure the attitude of the respondents towards mathematics. The gathered data were statistically treated using frequency, simple percentage, Chi-square test of independence, and t-test.

### 5. Results and Discussions

*Table 1: Age and Gender of the Respondents (n = 196)*

	f	%
<b>A. Age (in years)</b>		
13	31	15.82
14	123	62.76
15	33	16.84
16	6	3.06
17	2	1.02
19	1	0.51
<b>B. Gender</b>		
Male	87	44.39
Female	109	55.61

As shown in the table, more than 50% of the respondents have the age of 14 years old. This is the right age of Grade 8 students, as mandated by the Department of Education that the age entry for junior high school is 12 years old and that they turn 13 years old during their Grade 7 level.

Some students had turned 12 years old before enrollment, their birthdays could be either April or May, and that could be the reason that there are 31 respondents whose age are 13 years old when the profile questionnaire was administered to them. These students were born in the year 2002 and 2003. These 41 respondents whose age were 15,16 and 17 years old, had been a repeater, or a dropout during their elementary education. This only one student with the age of 19, had entered Grade 1 at the age of 9, a repeater in his Grade 3 level, and a dropout in his Grade 4 and Grade 6. Table 1 also shows that there were more female respondents than male. The Philippine Statistics Authority (PSA) in their 2013 survey result manifested that there were more male children and youth who were out of school. The top reasons for not attending school are lack of personal interest and insufficient family income; this may be the reason that there were more female students.

**Table 2: Educational Qualifications of the Parents**

Educational Qualifications	Father		Mother	
	f	%	f	%
Elementary Level	11	5.61	6	3.06
Elementary Graduate	10	5.10	23	11.73
High School Level	38	19.38	32	16.33
High School Graduate	83	42.35	79	40.31
College Level	28	14.29	26	13.27
College Graduate	26	13.27	30	15.31

Most of the parents were high school graduate; they were able to complete up to the level of free education only as provided by Republic Act 6655 (Free Public Secondary Education Act of 1988). Most of them were coming from low-income families, and their parents also were not able to send them to college, and they opted to find jobs. According to PSA 2013 survey report, out of school youth has entered into new union or marriage. Those parents who were not able to graduate or reach high school may belong to having lack of interest in going to school or poverty push them to stop coming to school.

**Table 3: Number of Children and Birth Order**

	f	%
<b>A. Number of Children</b>		
1	14	7.14
2	29	14.80
3	41	20.92
4	37	18.88
5	34	17.35
6	20	10.20
7	8	4.08
8	3	1.53
9	5	2.55
10	2	1.02
11	3	1.53
<b>B. Birth Order</b>		
1	69	35.20
2	47	23.98
3	37	18.88
4	17	8.67
5	14	7.14
6	4	2.04
7	4	2.04
8	0	0.00
9	3	1.53
10	0	0.00
11	1	0.51

As shown in Table 3, most of the families have three children, but families of 4 and five children closely follow this. Filipinos though poor are not preferable to having few children. As part of Filipino culture, having more children means a merrier family. According to the survey results of the 1998 National Demographic and Health Survey, as cited by PSA, Philippines has the highest fertility rate in the southeast and central Asia. Table 3 also shows that most of the respondents were first-born. This could also mean that their parents were young, their parents' age could be on their 30's.

**Table 4: Parents' Combined Monthly Income**

Status	Description	f	%
Poor	Less than P 7,890	78	39.80
Low Income	P 7,891 to P 15,780	80	40.82
Lower Middle	P 15,781 to P 31, 560	32	16.33
Middle Class	P 31, 561 to P 78,900	6	3.06

Table 4 shows that majority of the families belong to low income and closely followed by poor income class. Most of the respondents' fathers were motorcycle (habal-habal) drivers while their mothers are homemakers. The Philippines is a third world country that has 22.2% of the families living below poverty line based on 2015 PSA report.

**Table 5: Previous Grades of the Respondents**

Grade	Description	Grade 7 Math		Grade 8 Math	
		f	%	f	%
90 – 100	Outstanding	10	5.10	2	1.02
85 – 89	Very Satisfactory	21	10.71	14	7.14
80 – 84	Satisfactory	56	28.57	44	22.45
75 – 79	Fairly Satisfactory	109	55.61	126	64.29
Below 75	Poor	0	0.00	10	5.10

Table 5 reveals that majority of the respondents' grades fell in the reasonably satisfactory range of 75 to 79, both in their Grade 7 and Grade 8. This could mean that their mathematics background is less during their primary years. According to the study of Watts et al. (2014), they found out that preschool mathematics ability predicts mathematics achievement through age 15, even after accounting for early reading, cognitive skills, and family and child characteristics. Additionally, they discovered that development in scientific capacity between age 54 months and first grade is a much more grounded indicator of youthful arithmetic accomplishment. These outcomes exhibit the significance of prekindergarten arithmetic information and early math learning for later achievement. There were no students who had a failed final grade in math while they were in Grade 7. There were ten students in Grade 8 who failed in math, and they have to attend remedial classes for them to get a recomputed grade and passed the subject, and be admitted as a regular Grade 9 students in the next enrollment.

**Table 6: Students' Attitude Towards Mathematics**

Score Ranges	Interpretation	f	%
<b>A. Self-Confidence</b>			
52 - 60	Very High	7	3.57
42 - 51	High	34	17.35
32 - 41	Moderately High	106	54.08
22 - 31	Low	47	23.98
12 - 21	Very Low	2	1.02
<b>B. Value</b>			
31 - 35	Very High	87	44.39
25 - 30	High	88	44.90
19 - 24	Moderately High	21	10.71
13 - 18	Low	0	0.00
7 - 12	Very Low	0	0.00
<b>C. Enjoyment</b>			
37 - 45	Very High	12	6.12
30 - 36	High	70	35.71
23 - 29	Moderately High	87	44.39
16 - 22	Low	25	12.76
9- 15	Very Low	2	1.02
<b>D. Motivation</b>			
16 - 20	Very High	38	19.39
13 - 15	High	86	43.88
10 - 12	Moderately High	62	31.63
7 - 9	Low	8	4.08
4 - 6	Very Low	2	1.02

Table 6 shows that most of the respondents have scored moderately high. Thus, we can say that the respondents had still self-confidence in them in studying mathematics, but that self-confidence is not enough to make them perform better. According to the study of Parsons, et al. (2011), students with the lowest grades were the least confident and least successful in mathematics. Since most respondents had a reasonably satisfactory degree, Parson's study explains why the respondents have a little of self-confidence towards math. This also proves on the statement of Wigfield and Eccles (2002), that competence beliefs were posited to predict both expectancies for success and achievement values. Also, the table reveals how much value the students put on mathematics. Majority of the respondents have scored very high and high on their attitude towards the value of mathematics. Thus, the respondents understand the importance of studying math, but their valuing does not transform to achievement because most of them have a reasonably satisfactory grade only. This proves the expectancy-value theory by Wigfield and Eccles (2002), children's competence and expectancy beliefs relate positively to their subjective values. Individuals value the tasks at which they think they can succeed. Further, the table shows that most of the respondents have scored moderately high and closely followed by a high score. These mean that the respondents do enjoy mathematics, but their enjoyment does not transform into performance because they only have relatively satisfactory grades. According to Middleton and Spanias (1999), children tend to enjoy mathematics in the primary grades, but this level of enjoyment tends to fall dramatically when children progress into and through high school. Also, although students feel that mathematics is important, the number of students who want to take more math in school is declining steadily. Also, the table reveals that the respondents have scored high on their attitude towards mathematics as to motivation. This means that the respondents have the interest to study mathematics because of its importance in today's information age, but

they did not mind if they could handle the subject well enough to get high grades. The study of Chouinard and Roy (2008) reveals that motivation in mathematics declined, as the students grew older. As Ryan and Deci (2000) stated, intrinsic motivation must be maintained.

**Table 7: Relationship Between Profile and Previous Grades in Mathematics**

Paired Variables	P-Value	Decision
<b>A. Age and</b>		
Grade in Grade 7	0.000023	Ho rejected
Grade in Grade 8	0.308901	Ho accepted
<b>B. Gender and</b>		
Grade in Grade 7	0.743444	Ho accepted
Grade in Grade 8	0.201049	Ho accepted
<b>C. Fathers' EQ and</b>		
Grade in Grade 7	0.466479	Ho accepted
Grade in Grade 8	0.256994	Ho accepted
<b>D. Mothers' EQ and</b>		
Grade in Grade 7	0.142942	Ho accepted
Grade in Grade 8	0.825153	Ho accepted
<b>E. No. of Children and</b>		
Grade in Grade 7	0.243462	Ho accepted
Grade in Grade 8	0.935904	Ho accepted
<b>F. Birth Order and</b>		
Grade in Grade 7	0.083597	Ho accepted
Grade in Grade 8	0.987867	Ho accepted
<b>G. Combined Family Income and</b>		
Grade in Grade 7	0.061534	Ho accepted
Grade in Grade 8	0.921651	Ho accepted

As shown in the table, there is a significant relationship between the respondents' age and their grades in Grade 7; the p-value is 0.000023, which makes the null hypothesis rejected. This implies that age is a factor that influences the achievement of the grade 8 students in math. In the study of Eccles et al. (1989) and Wigfield et al. (1991) as cited by Wigfield and Eccles (2000), they found out that across the transition to junior high school, children's rating of the importance and their liking of school subjects decreased. During high school, adolescents valuing of some activities become more positive. In late elementary school children valued math more highly than did high school students.

**Table 8: Relationship Between Profile and Attitudes towards Mathematics**

Paired Variables	P-Value	Decision
<b>A. Age and</b>		
Positive Score	0.013332	Ho rejected
Negative Score	0.129727	Ho accepted
<b>B. Gender and</b>		
Positive Score	0.671161	Ho accepted
Negative Score	0.512643	Ho accepted
<b>C. Fathers' EQ and</b>		
Positive Score	0.516925	Ho accepted
Negative Score	0.337946	Ho accepted
<b>D. Mothers' EQ and</b>		
Positive Score	0.659219	Ho accepted
Negative Score	0.629998	Ho accepted
<b>E. No. of Children and</b>		
Positive Score	0.715396	Ho accepted
Negative Score	0.315569	Ho accepted
<b>F. Birth Order and</b>		
Positive Score	0.550111	Ho accepted
Negative Score	0.916575	Ho accepted
<b>G. Combined Family Income and</b>		
Positive Score	0.603533	Ho accepted
Negative Score	0.989367	Ho accepted

The table reveals that the respondents' ages against their positive attitude towards math are significant. The p-value is 0.013332, which makes the null hypothesis rejected. Ages of students affect their attitude towards mathematics. Wigfield and Eccles (2002) reported that even during the very early elementary grades children appear to have distinct beliefs about what they are good at and what they value in different domains. The different components of task value are less differentiated during the elementary school years, becoming differentiated during early adolescence.

**Table 9: Relationship Between Previous Grades in Mathematics and Attitude towards Mathematics**

Paired Variables	r	Strength	t-value	Results
<b>A. Grade in Math 7</b>				
Positive Score	0.2683	Weak	3.8785	Reject Ho
Negative Score	0.3761	Moderate	5.6529	Reject Ho
<b>B. Grades in Math 8</b>				
Positive Score	0.3211	Moderate	4.7224	Reject Ho
Negative Score	0.3988	Moderate	6.0575	Reject Ho

Table 9 shows that the previous grades in math have significant relationships with their attitudes towards math, but their relationships are not healthy. Both grades in Grade7 and Grade8 against their respective positive score and a negative score for attitudes have t-values more significant than their critical values, which make the null hypothesis, rejected. This means that the respondents' attitudes towards math have little effect on their grades. Neale (1969) as cited by Ma and Kishor(1997), wrote that positive and negative attitudes towards mathematics appear to have only a slight causal influence on how math is learned, remembered, and used. In the study of Ma and Kishor, they found out that the effect of attitude towards mathematics on achievement in mathematics is not strong and has no critical practical implications.

## 6. Conclusions

Mathematics performance of the Grade 8 students in Apas National High School is influenced by their profile as to age, previous grades in mathematics and attitudes towards mathematics.

## 7. Recommendations

Suggestions for future research topics: 1) The effectiveness of spiraling competencies in mathematics in the K-12 Curriculum; 2) Factors that motivate students to study math, and 3) The effectiveness of using the technology/multi-media in teaching mathematics. Adopt the proposed action plan.

## 8. Translational Research

The yield of the investigation was exhibited to class heads for additionally activities. It was integrated into Grade 9 mathematics lesson plan, which is used by public school teachers in the Department of Education, Cebu City, Philippines.

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