ORIGINAL RESEARCH PAPER

Education

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STUDENTS' ENGAGEMENT AND THEIR PERFORMANCES IN MATHEMATICS 6

Sonny Bhoy L. Flores	Malaban Elementary School (Mathematics Coordinator)
Victoria E. Tamban*	Ed.D. Laguna State Polytechnic University (ITSO-Manager)*Corresponding Author.
Nenette M. Lacuarin	Malaban Elementary School (Principal)
Marcial M. Bandoy	Ed.D. Laguna State Polytechnic University (Associate Dean-CBMA)
Glen P. Cortezano	Laguna State Polytechnic University (Unit-Head CTE-ETS)

ABSTRACT

This study aimed at determining the relationship between students' engagement (behavioral, emotional and cognitive engagement) and their performance in Mathematics of grade 6 pupils of Malaban Elementary School. Descriptive correlational method research design was employed in this study. In this study, the instruments used are survey questionnaire of Bivariate Analysis and Chi-square The results show that the students gave a unifying perception on their level of behavioral engagement (2.90-engage), emotional engagement (2.74-engage), cognitive engagement (2.98-engage) in Mathematics. The mean performance of students in Mathematics was satisfactory with an average of 80.42 median of 80 mode of 76 and standard deviation of 3.77. The researchers concluded that there is significant evidence to reject the null hypothesis and conclude that there was a moderate, positive relationship between academic performance and behavioral engagement. For the emotional and academic performance there was a significant evidence to accept the null hypothesis and conclude that was no relationship between academic performance and emotional engagement, while there was a moderate, positive relationship between cognitive engagement and academic performance. The researchers recommended to initiate activities that can help boost the students' engagement in Mathematics for it was shown some significant relationship to their mathematics performance.

INTRODUCTION

Teachers had been completely satisfied knowing their students participated wholeheartedly in their studies. The mere fact that students carried out the objective of the lesson was once a feeling of accomplishment for every teacher. Marks (2000), student engagement with academic work of learning a significant goal for education, leads to achievement and contribute to students' social and cognitive development."

The K12 educational system that mandated in public school focused on students rather than teachers' factor. They were the one who discover what they need to learn. In a traditional approach, students have been positively obtained all the information got here from their teacher. But today, students have free will to discover and bring the excellent as they could. Policymakers believed that the engaged student could bring desirable output. The primary focused was to enhance student's participation and find out their very own strengths. Teachers were solely facilitator from the process of learning. This is supported by several theories of student engagement. A theory of student academic engagement has been articulated by Newmann (1989). The researcher proposed three dimensions of student engagement: (1) students' need to develop and express competence, (2) students' full participation in school activities, and (3) students being immersed in authentic academic work. It is believed that most students commence their school life being inherently motivated but for many of them this motivation diminishes or entirely disappears, because the students are involved in routine and boring activities and they try to get by with as little effort as possible.

School of Malaban is one of the largest primary school in Binan City, Laguna and located close to the shoreline. Most pupils' parents were under minimal wage earners. School used to be experiencing a kind of disengagement in terms of pupils' participation in the activities related to math.

A school coordinator recanted their ratings in NAT in the previous year. According to her each year their rating drastically went down. Students become more disengagement from elementary to middle school, with some estimates that 25-40% of youth are showing signs of disengagement (i.e., uninvolved, apathetic, not trying very hard, and not paying attention) (Steigberg, Brow, & Dornbush, 1996; Yazzie-Mintz, 2007). The consequences of disengagement for middle and high school youth from disadvantaged backgrounds are especially severe; these youth are less likely to graduate from high school and face limited employment prospects, increasing their risk to poverty, poorer health, and involvement in criminal justice system (Nationational Research Council and the Institute of Medicine, 2004).

The researcher believed that they need to address the issue on student engagement because it linked to the problems of school in terms of low achievement in math, tardiness of students, alienation and even dropouts (Fredericks, Blumenfeld, & Paris, 2004).

Student engagement defined as a degree of attention which students possess. The curiosity in the activity, level of interest, being optimism and passion when they learned or taught that leads to motivation to learn and self-sufficient in education. To Fredricks, 2004 defined student engagement as a meta-construct that includes behavioral, emotional and cognitive engagement. In her study about engagement, it is unique because it has potential as a multi-dimensional or "meta" construct that includes three dimensions: cognitive engagement, emotional engagement, and behavioral

engagement.

According to Schereiber(2000) those who have positive attitudes toward mathematics have a better performance in this subject.

Student engagement in mathematics refers to students' motivation to learn mathematics, their confidence in their ability to succeed in mathematics and their emotional feelings about mathematics.

Student engagement in mathematics plays a key role in the acquisition of math skills and knowledge – students who are engaged in the learning process will tend to learn more and be more receptive to further learning. Student engagement also has an impact upon course selection, educational pathways and later career choices.

Malaban Elementary School is located close to shoreline. Most parents' job was vendors or tricycle driver. They are disadvantaged in terms of their economic status. Pupils are depriving of some privilege and lack of assistance coming from their parents and community. Since they are exposed to different vices in their community like video games, peers, and street crimes they are encouraged to withdrawing classes. These are the challenge to the teachers and policymakers to retain these pupils inside the school premises.

This research study involved the primary students (grade 6) with 549 presently enrolled from the school year 2019-2020. They are the target of the study because they are in the transition period were disengagement is likely to progress. The school implemented a k-12 curriculum system of education that was designed 3years ago. The present curriculum affects dramatically the old system, because of the student-centered approach.

Mathematics performance has improved, again, through expecting students to achieve, providing instruction based on individual student needs and using a variety of methods to reach all learners. One factor has been aligning the math curriculum to ensure that the delivery of instruction is consistent with the assessment frequency.

Theoretical/conceptual Framework

This research paper was parallel to Mido Chang and Sunha Kim (2012) study about student engagement. They sparked the attention of the researcher because of the necessity of this study to the school community. Since it has an existing study, the researchers felt confident to explore some evidences to prove the study. Student Engagement was anchored to the theory of Fredricks, Blumenfeld, and Paris (2004) emphasized three subcomponents of academic engagement in addition to overall engagement: behavioral, emotional and cognitive. Fredricks and McColskey (2012) highlighted the differences and interactions of the three domains of engagement. The multifaceted concept of engagement of Fredricks, Blumenfeld, and Paris (2004) has been shared by other researchers such as Kong, Wong and Lam (2003) and Darr (2012), all of whom adopted three sub domains to define academic engagement.

The three sub-components of engagement defined as:

Behavioral Engagement refers to participating in work, doing required work, and following the rules.

Emotional Engagement having negative and positive poles, covers interest, happiness, anxiety, and belonging and

Cognitive Engagement reflects mindfulness and willingness to exercise effort to understand complicated ideas and mater high-level skill.

Engagement for K-12 Students, the work for sub-components of engagement in school:

Behavioral engagement: Students' demonstrations of concentrating and showing persistence for learning , adopting different strategies to solve the mathematics problems, and trying to answer mathematics questions(Barkatsasa, Kasimatisb, and Gialamas, 2009).

Emotional engagement: Students' feelings about learning, such as joy, interest and satisfaction (Barkatsasa, Kasimatisb, and Gialamas, 2009).

Cognitive engagement: Students' motivation, effort, and strategy use (Fredricks et al., 2004); this includes psychological investment for learning, a desire to go beyond the requirements, and preference for challenge (Newmann, 1992).

The conceptual framework demonstrated is organized information. This study was made to find the relationship between students' engagement (behavioral, emotional and cognitive) and their performance in mathematics. The researcher developed a mathematics engagement Instrument for middle grade students and collected data from 6th grade students during School Year 2017-2018

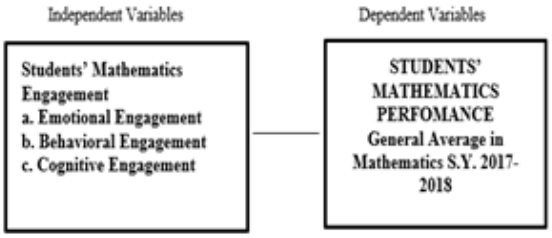

Figure 1. Research Paradigm

MATERIALS AND METHODS

Descriptive correlational method research design was employed in this study.

In this study, the instruments used are survey questionnaire of Bivariate Analysis and Chi-square Test of Association it is most commonly used in social research to test relationship of the two variables. The instrument consists of 33 items. A Likert-type scoring format is used for each of the subscales: behavioral (11 items), emotional (10 items) and cognitive engagement (12 items). Students were asked to indicate the extent of their agreement with each statement, on a four-point scale from highly engage (strongly agree) to highly not engage (strongly disagree) (scored from 4 to 1).

This study aims to determine the relationship between students' engagement (behavioral, emotional and cognitive engagement) and their performance in Mathematics of grade 6 pupils of Malaban Elementary School. Specifically, this study sought to answer the following sub problems:

1. Where are the respondents' level of engagements in Mathematics:
   a. Behavioral Engagement
   b. Emotional Engagement
   c. Cognitive Engagement
2. What is the level of students' mathematics performance?
3. Is there a significant relationship between mathematics and behavioral engagement?
4. Is there a significant relationship between mathematics and emotional engagement?
5. Is there a significant relationship between mathematics and cognitive engagement?

RESULTS AND DISCUSSION

Table 1 shows the weighted mean of students' engagement in Mathematics. Students' level of behavioral engagement in Mathematics was rated based on the students' self-perceived level of preparation for the Mathematics subject, attention

given to teacher's lectures, active participation in class, their desire to get good grades and their desire to listen to discussions or attention class.

TABLE – 1 LEVEL OF BEHAVIORAL ENGAGEMENT IN MATHEMATICS

Behavioral Engagement	Weighted Mean	Rank	Verbal Interpretation
1. I listen to my teacher in my math class.	3.47	1	Engage
2. I participate in the discussion in math class	3.14	6	Engage
3. I get easily distracted in math class	2.61	9	Engage
4. I work hard in math class	3.23	4	Engage
5. At home I review math problems that I did not understand in school	2.29	7	Not Engage
6. When I see difficult math problems, I stop working on them.	2.68	8	Engage
7. Sometimes I skip difficult math questions	2.45	11	Not Engage
8. When I make mistakes in math, I work until I correct them.	3.21	5	Engage
9. I follow my teacher's directions in math class.	3.32	2	Engage
10. I sometimes act out as if I am studying in math class.	2.38	10	Not Engage
11. I ask my friends or teachers for a help when I can't solve math problems.	3.24	3	Engage
Average Weighted Mean	2.91		Engage

Legend:1.00 – 1.49 = Highly Not Engage; 1.50 – 2.49 = Not Engage;2.50 – 3.49 = Engage and 3.50 – 4.00 = Highly Engage.

The students gave a unifying perception on their level of interest in Mathematics. The item, I listen to my teacher in my math class." ranked first with an average weighted mean of 3.47. The item "Sometimes I skip difficult math questions." got the lowest rating with an average mean of 2.45.

Table 2 shows the weighted mean of students' engagement in Mathematics. Students' level of emotional engagement in Mathematics was rated based on the students' self-perceived level of preparation for the Mathematics subject, attention given to teacher's lectures, active participation in class, their desire to get good grades and their desire to listen to discussions or attention class.

Table – 2 Level Of Emotional Engagement In Mathematics

Emotional Engagement	Weighted Mean	Rank	Verbal Interpretation
1. I am interested in learning new things in math.	3.17	2	Engage
2. I do not like attending math classes.	1.90	9	Not Engage
3. Learning math is fun.	3.33	1	Engage
4. I feel excited when I study in math class.	2.03	8	Not Engage
5. I feel bored when I study in math.	3.17	2	Engage
6. I am excited about solving difficult math problems.	2.93	4	Engage
7. I like to study other subject s rather than math.	2.46	7	Not Engage
8. Time passes very quickly when I study math.	2.92	5	Engage
9. I forget where I am when I study math	2.52	6	Engage
10. I want to spend more time solving math problems.	2.96	3	Engage
Weighted Mean	2.74		Engage

Legend:1.00 – 1.49 = Highly Not Engage; 1.50 – 2.49 = Not Engage;2.50 – 3.49 = Engage and 3.50 – 4.00 = Highly Engage.

The overall weighted mean of emotional Engagement in Mathematics is 2.74. This means students are engage emotionally in this subject. Among questionnaire items, the learning math is fun got the highest engagement to students, but I do not like attending math class receive the lowest engagement.

Table 3 shows the weighted mean of students' engagement in Mathematics. Students' level of cognitive engagement in Mathematics was rated based on the students' self-perceived level of preparation for the Mathematics subject, attention given to teacher's lectures, active participation in class, their desire to get good grades and their desire to listen to discussions or attention class.

The overall weighted mean of cognitive engagement in Mathematics is 2.98. This means students are engage cognitively in this subject. Among questionnaire items, I want to get good grades got the highest engagement to students, but I try to think different ways to solve math problems received lowest engagement.

TABLE – 3 LEVEL OF COGNITIVE ENGAGEMENT IN MATHEMATICS

Cognitive Engagement	Weighted Mean	Rank	Verbal Interpretation
1. I want to get good grade in math class.	3.74	1	Highly Engage
2. Sometimes I follow my best guess when I do not the answer	2.66	9	Engage
3. When I study math, I ask myself questions to make sure I understand it correctly	3.19	4	Engage
4. I try to connect math to real life situations.	3.02	7	Engage
5. I try to think different ways to solve math problems.	1.92	11	Not Engage
6. I try to develop my own strategy when I solve math problems	3.09	6	Engage
7. I set goal for myself when I study math.	3.21	3	Engage
8. When I can't solve a math problem, I try to change my strategy.	2.79	8	Engage
9. I often think about something else when I study math.	2.51	10	Engage
10. At home I think about what I learned in math class.	3.15	5	Engage
11. I am focused when I study math.	3.25	2	Engage
12. I memorize important facts to understand math better.	3.27		Engage
Weighted Mean	2.98		Engage

Legend:1.00 – 1.49 = Highly Not Engage; 1.50 – 2.49 = Not Engage; 2.50 – 3.49 = Engage and 3.50 – 4.00 = Highly Engage.

Table 4 Reveals That The Mean Performance Of Students In Mathematics.

TABLE – 4 STUDENTS' ACADEMIC PERFORMANCE IN MATHEMATICS

Statistics	Value	Verbal Interpretation
Mean	80.42	**Satisfactory**
Median	80.00	
Mode	76.00	
Std. Deviation	3.77	
Skewness	0.58	
Kurtosis	-0.76	

The mean performance of students in Mathematics was - satisfactory with an average of 80.42 median of 80 mode of 76 and standard deviation of 3.77. The skewness of the level of students is 0.58 which, which skewed to the left/negatively skewed while kurtosis is -0.76, which is leptokurtic or has a relatively peaked distribution. It reveals that several of the students really wanted the subject of Mathematics. Only few of the students got low and the rest got the high grades.

Table – 5 Bivariate Analysis

	Mean	SD	Math	behavior	emotional
	80.42	3.77			
behavior	32.03	2.99	.395**		
emotional	27.39	2.71	0.076	.228**	
cognitive	35.80	4.13	.230**	.397**	.342**

*<0.05 ;**< 0.01

A Pearson product-moment correlation coefficient was conducted to evaluate the null hypothesis that there is no significant relationship between student's engagement (behavioral, emotional and cognitive) and their mathematics performance of grade 6 pupils (N=541). There was significant evidence to reject the null hypothesis and conclude that there was a moderate, positive relationship between academic performance (M = 80.42, SD = 3.77) and behavioral engagement (M = 32.03, SD = 2.99), r (541) = .395, p < .01. For the emotional and academic performance there was a significant evidence to accept the null hypothesis and conclude that was no relationship between academic performance (M = 80.42, SD = 3.77) and emotional engagement (M = 27.39, SD = 2.71), r (541) = 0.076, p < .01. While there was a moderate, positive relationship between cognitive engagement (M = 35.80, SD = 4.13) and academic performance (M = 80.42, SD = 3.77), r (541) = 0.230, p < .01.

CONCLUSIONS

The researchers concluded that there is significant evidence to reject the null hypothesis and conclude that there was a moderate, positive relationship between academic performance and behavioral engagement. For the emotional and academic performance there was a significant evidence to accept the null hypothesis and conclude that was no relationship between academic performance and emotional engagement, while there was a moderate, positive relationship between cognitive engagement and academic performance. The researchers recommended to initiate activities that can help boost the students' engagement in Mathematics for it was shown some significant relationship to their mathematics performance.

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