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RELATIONSHIP BETWEEN MATHEMATICS BELIEFS AND STUDENT ENGAGEMENT IN MATHEMATICS AS MEDIATED BY CREATIVE SELF-EFFICACY

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ABSTRACT

In this study, there are three factors that affect the Mathematics performance of the students: Mathematics Beliefs, Student Engagement in Mathematics, and Creative Self-Efficacy. These factors may have significant direct effect on how a student transfers knowledge. Moreover, this study was conducted to determine that Creative Self-Efficacy can be a mediator of Mathematics Beliefs and Student Engagement in Mathematics.

Descriptive-correlational research method was used to describe the relationship of Student Engagement in Mathematics and Mathematics Beliefs, mediated by Creative Self-Efficacy. The study included the 237 first year students who were randomly selected. These students completed the Student Engagement in Mathematics Questionnaire (SEMQ), Mathematics Beliefs Scale (MBS) and Creative self-efficacy Questionnaire (CSEQ). The test of hypothesis and significance were done using the program Statistical Package for the Social Sciences (SPSS) version 21 and Microsoft Excel.

This study concluded that there is no significant relationship between Student Engagement in Mathematics and creative Self-efficacy, Student Engagement in Mathematics and Mathematics Beliefs, and Creative Self-efficacy and Mathematics Beliefs. Hence, Creative Self-efficacy is not a mediator between the relationship of Student Engagement in Mathematics and Mathematics Beliefs.

KEYWORDS: ***mathematics beliefs, student engagement and creative self-efficacy.***

INTRODUCTION

Mathematics is an abstract science. Most students hold beliefs about their own capabilities and competence in accomplishing academic task. These beliefs may increase the engagement of the students in Mathematics and can uplift the Creative Self-Efficacy of students.

Students' feelings about mathematics, features of the classroom, or themselves as math learners are referred to as mathematics beliefs. These beliefs, which include beliefs about mathematics education, beliefs about the self, and beliefs about the social context, can influence students' math learning and problem solving in class, as well as their beliefs about mathematics education and beliefs about the self in relation to doing mathematics (Lavenia et.al., 2019).

Furthermore, student involvement is another aspect that influences their learning and has a significant impact on their academic achievement. In reality, learner engagement is defined as the level of attention, interest, passion, and positivity that students display while learning. It's being sensitive and willing to deal with setbacks and problems in order to achieve specified objectives. Because motivated students always regard a problem as a challenge and look for methods to solve it, engagement is a critical aspect in their motivation. (Gunuc, 2014).

Creative self-efficacy, or the belief in one's potential to produce creative outputs, has attracted a lot of study attention from a wide range of subjects and operational domains, as well as from a wide range of sample types. Lorsbach and Jinks (1999) creative self-efficacy plays a crucial role in developing learning environment and more importantly students outcomes. They also proposed that, creative self-efficacy is a driving force which alerts students toward their learning situation.

This study aims to determine the relationship between Mathematics Beliefs and Student Engagement in Mathematics as mediated by Creative Self-efficacy. Also, it provides the importance of Creative Self-efficacy and Mathematics Belief in Student's Engagement in Mathematics. When the level of Creative Self –Efficacy and Mathematics Beliefs of the students is higher, there are also higher chances of student to Engage in Mathematics. Hence, the learnability of students in mathematics will be higher as it serves as the motivation.

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Statement of the Problem

The study attempted to investigate the relationship between Mathematics Beliefs and Student Engagement in Mathematics as mediated by Creativ Self-Efficacy of first year students of College of Education of the Nueva Ecija University of Science and Technology during the Second Semester of the Academic Year 2020-2021.

Specifically, the study sought answers to the following questions:

1. How may the Education Students be described in terms of their:
   - 1.1 Student Engagement in Mathematics
   - 1.2 Creative Self-Efficacy
   - 1.3 Mathematics Beliefs
2. Are there significant relationship between
   - 2.1 Student Engagement in Mathematics & Creative Self-Efficacy
   - 2.2 Student Engagement in Mathematics & Mathematics Beliefs
   - 2.3 Creative Self-Efficacy & Mathematics beliefs
3. Are Creative Self-Efficacy and Mathematics Beliefs predictors of Student Engagement?
4. Is Creative Self-Efficacy a mediator between the relationships of Student Engagement & Mathematics Beliefs?

Hypothesis

This study tested these hypotheses:

1. There is no significant relationship between Student Engagement and Creative Self-Efficacy.
2. There is no significant relationship between Student Engagement and Mathematics Beliefs.
3. There is no significant relationship between Creative Self-Efficacy and Mathematics Beliefs.
4. Is Creative Self-Efficacy is not a mediator between the relationship of Student Engagement and Mathematics Beliefs.

Conceptual Framework

Students Mathematics beliefs and Student's Engagement in Mathematics had their own predictors. This study conducted to test if Creative Self-Efficacy can be a mediator of Student Engagement in Mathematics and Creative Self-Efficacy.

Research Paradigm

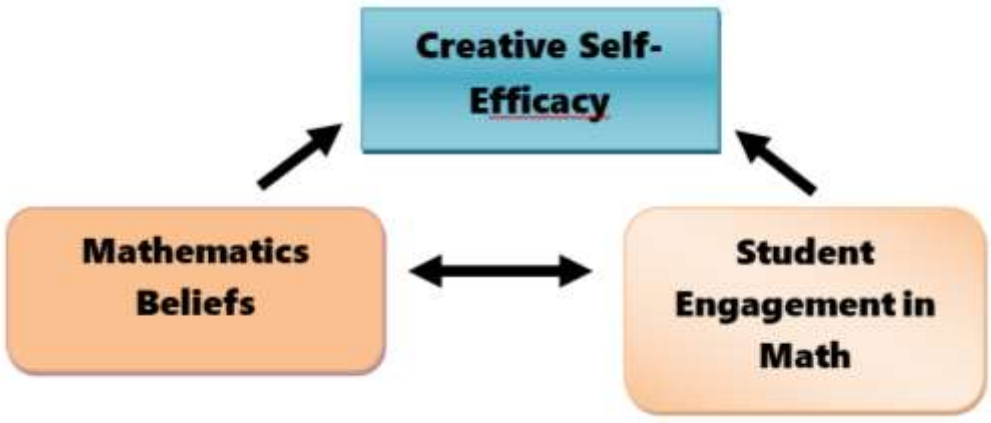

Figure 1

The figure represents the Creative Self-Efficacy as mediator of two variables. Mathematics Belief shows that it is possible that Creative Self-Efficacy can be their mediator. Also, Student Engagement can be possible to Creative Self-Efficacy as their mediator. The two variables which are Mathematics Belief and Students Engagement in Mathematics had their own predictors.

RESEARCH METHODOLOGY

Research Design

The research study used descriptive-correlational research method that described the relationship between the Student Engagement in Mathematics and Mathematics Beliefs, mediated by Creative Self-Efficacy. Creswell (2002) defined correlation as a statistical test to establish patterns in the relationship of the variables under study.

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Research Delimitation

This study is delimited only for the Student Mathematics Beliefs, Student Engagement in Mathematics and Student Creative Self-Efficacy of first year students of the College of Education of Nueva Ecija University of Science and Technology.

Research Locale

This study was conducted at College of Education, Nueva Ecija University of Science and Technology, Sumacab Campus. Nueva Ecija University of Science and Technology is located at Barangay Sumacab Este, Cabanatuan City, Nueva Ecija, Philippines (as shown in the left image below). College of Education, NEUST (as shown in the right image below) is the implementing college to offer Bachelor of Secondary Education major in Social Science, English, General Science, Physics, Filipino, Chemistry and Mathematics.

Figure 2
Research Locale

The Respondents

The participants of this study are only the 237 first year students from the program of BSE, BEED, BTLE and BPE of College of Education of Nueva Ecija University of Science and Technology.

Sampling Technique

A random sampling procedure was used for selecting the participants in this study. This was achieved by requesting the total number of first year students per section in the administration office and randomly selecting students in each section until the desired number of respondents was obtained.

Research Instrument

The researcher used the following adopted questionnaires: (i) Student Engagement in Mathematics (MESQ); (ii) Mathematics Belief Scale (MBS); and (iii) Creative Self-Efficacy (CSEQ).

(i) Students Engagement in Mathematics Questionnaire (SEMQ)

Description. This instrument is designed to assess Student's Engagement in Mathematics. Students are asked to complete the measure provided in this study. The scale measures three dimensions of engagement: social, cognitive, and emotional.

Internal Consistency Reliability. The reliability indices were .78, .91, and .74 for cognitive engagement, emotional engagement, and social engagement, respectively. A psychometric analysis of the measure using Item Response Theory resulted in the deletion of additional items, resulting a 13-item measure. In this modified measure, the five-item emotional engagement dimension, the four-item social engagement dimension, and the four-item cognitive engagement dimension had internal reliabilities of .91, .98, and .89 respectively.

Response Mode. The respondents answered the Mathematical Engagement in Schools Questionnaire (MESQ) according to a Likert-type scale of 1 to 5 (e.g., 1 = never, 5 = always) and typically require approximately 35-minutes to complete.

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(ii) Mathematics Beliefs Scale (MBS)

Description. This instrument which is a 25-item scale has three factors: relevance of Mathematics, changeability of Mathematical knowledge, and speed of learning and Mathematics solutions. Thirteen items should be reverse scored. These items were 10, 11, 12, 14, 15, 18, 19, 20, 21, 22, 23, 24, and 25.

(iii) Creative Self-Efficacy Questionnaire (CSEQ)

Description. The Creative Self-Efficacy Questionnaire refers to the Creative Self-Efficacy which is defined as "the belief one has the ability to produce creative outcomes. It is composed of 23 items answerable by rating how confident they are to perform each. They will be asked to rate their degree of confidence by recording a number from 0 to 100. 0 means Not at All Confident. 100 Means Highly Certain that they can do the task.

Procedure of the Study

The researchers were conducted a survey questionnaire in the College of Education. The questionnaires were administered directly to the randomly selected first year students for the study. The data collected from the field were carefully analyzed.

Statistical Analysis of Data

1. To describe Students' Mathematical Belief, Student Engagement in Mathematics, Creative Self-Efficacy, the weighted mean, standard deviation, and percentage were used and interpreted the following:

The test interpretation guide for the Mathematics Beliefs on Relevance to Mathematics was provided in Table I. It describes the respondents' beliefs that mathematics is valuable in one's life, and that it can improve one's status in life. Mathematics Beliefs on Relevance of Mathematics was divided into five interpretative scales: Low Relevance of Mathematics (1.00-1.79); Low Relevance of Mathematics (1.80-2.59); Moderate Relevance of Mathematics (2.60-3.39); High Relevance of Mathematics (3.39-4.19); and Very High Relevance of Mathematics (4.20-5.00).

The test interpretation guide for Mathematics Beliefs on Changeability of Mathematics Knowledge was provided in Table II. It describes the respondents' beliefs that by studying hard and practicing regularly can significantly improve one's mathematics knowledge and skills. Mathematics Beliefs on Changeability of Mathematics Knowledge was divided into five interpretative scales: Low Changeability of Mathematics Knowledge (1.00-1.79); Low Changeability of Mathematics Knowledge (1.80-2.59); Moderate Changeability of Mathematics Knowledge (2.60-3.39); High Changeability of Mathematics Knowledge (3.40-4.19); and Very High Changeability of Mathematics Knowledge (4.20-5.00).

The test interpretation guide for the Mathematics Beliefs on Speed of Learning and Mathematics Solution was provided in Table III. It describes the respondents' beliefs that Mathematics is about being persistent and getting the correct answer in a short period of time. Mathematics Beliefs on Speed of Learning and Mathematics Solution was divided into five interpretative scales: Low Speed of Learning and Mathematics Solution (1.00-1.79); Low Speed of Learning and Mathematics Solution (1.80-2.59); Moderate Speed of Learning and Mathematics Solution (2.60-3.39); High Speed of Learning and Mathematics Solution (3.40-4.19); and Very High Speed of Learning and Mathematics Solution (4.20-5.00).

The test interpretation guide for the Mathematics Emotional Engagement was provided in Table IV. It describes how the respondents can be very persistent in Mathematics endeavour or whether he/she shows high interest and enjoyment in Mathematics. Mathematics emotional engagement was divided into five interpretative scales: Low Mathematics Emotional Engagement (0.00-0.99); Low Mathematics Emotional Engagement (1.00-1.99); Moderate Mathematics Emotional Engagement (2.00-2.99); High Mathematics Emotional Engagement (3.00-3.99); and Very High Mathematics Emotional Engagement (4.00-5.00).

The test interpretation guide for the Mathematics Social Engagement was provided in Table V. It describes how the respondent participates actively in Mathematics related activities or whether the respondent volunteers in Mathematics activities in the school. Mathematics Social Engagement was divided into five interpretative scales: Low Mathematics Social Engagement (0.00-0.99); Low Mathematics Social Engagement (1.00-1.99); Moderate Mathematics Social Engagement (2.00-2.99); High Mathematics Social Engagement (3.00-3.99); and Very High Mathematics Social Engagement (4.00-5.00).

The test interpretation guide for the Mathematics Cognitive Engagement was provided in Table VI. It describes how the respondent can provide several related examples or whether he/she can easily learn from the past problems, and connect all learning experiences. Mathematics Cognitive Engagement was divided into five interpretative scales: Low Mathematics Cognitive Engagement (0.00-0.99); Low Mathematics Cognitive Engagement (1.00-1.99); Moderate Mathematics Cognitive Engagement (2.00-2.99); High Mathematics Cognitive Engagement (3.00-3.99); and Very High Mathematics Cognitive Engagement (4.00-5.00)

The test interpretation guide for the Creative Self-Efficacy was provided in table VII. To describe Creative Self-Efficacy, mean was used and interpreted using the following scale and verbal interpretation:

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4.20 – 5.00 Very High Creative Self-Efficacy
3.40 – 4.19 High Creative Self-Efficacy
2.60 – 3.39 Moderate Creative Self-Efficacy
1.80 – 2.59 Low Creative Self-Efficacy
1.00 – 1.79 Very Low Creative Self-Efficacy

2. To determine significant relationships among student engagement in Mathematics, Mathematics Beliefs, among education students exist; *Pearson r* moment correlation was used.

All statistical computations were carried out using MS Excel and SPSS version 21 to tabulate and analyse the results of the tests administered to the respondents. For preliminary analysis, the researcher checked the normality and collinearity on the Mathematical Engagement, Resiliency, Mathematics Success, and Mathematics Beliefs.

3. To determine if engagement was predicted by Student Engagement in Mathematics and Mathematics Beliefs, multiple regression analysis was applied.

4. To determine if Creative Self-Efficacy mediates on the relationship of Student Engagement in Mathematics and Mathematics Beliefs success among College of Education Students, causal steps approach outlined in the classic work of Baron & Kenny (1986; also Kenny et al. 1998) and Judd & Kenny (1981a, 1981b) was used.

RESULTS AND DISCUSSION

1. Observable manner of the students in their Mathematics Beliefs, Student Engagement in Mathematics and Creative Self-Efficacy.

1.1 Mathematics Beliefs

The Mathematics Beliefs were described in terms of Relevance of Mathematics, Changeability of Mathematics Knowledge and Speed of Learning.

Table 1 presents Mathematics Belief in terms of Relevance of Mathematics

Table 1: Mathematics Beliefs in Terms of Relevance of Mathematics

Statement	$\bar{x}$	Verbal Interpretation
Relevance of Mathematics		
Mathematics is a worthwhile and necessary subject.	3.93	High Relevance of Mathematics
I study mathematics because I know how useful it is.	3.74	High Relevance of Mathematics
Studying mathematics is a waste of time. (reverse scored)	3.33	High Relevance of Mathematics
Mathematics has no relevance to my life. (reverse scored)	3.31	High Relevance of Mathematics
Mathematics will not be important to me in my life's work. (reverse scored)	3.25	High Relevance of Mathematics
Knowing mathematics will help me earn a living.	3.65	High Relevance of Mathematics
Word problems are not a very important part of mathematics. (reverse scored)	3.19	High Relevance of Mathematics
Math classes should not emphasize word problems. (reverse scored)	3.17	High Relevance of Mathematics
General weighted mean	3.45	High Relevance of Mathematics

Table above shows that the majority of the answers of respondents regarding the Mathematics Beliefs (Relevance of Mathematics) are "High Relevance of Mathematics" with an average weighted mean of 3.45.

The table revealed that "Mathematics is a worthwhile and necessary subject" with a mean of 3.93 followed by "I study Mathematics because I know how useful it is" with a mean of 3.74 both verbally interpreted as "High Relevance of Mathematics". The least is "math classes should not emphasize word problems (reverse scored)" with a mean of 3.17 verbally interpreted of "High Relevance of Mathematics".

Table 2 present the Mathematics beliefs in terms of Changeability of Mathematics Knowledge of the respondents.

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Table 2: Mathematics Beliefs in Terms of Changeability of Mathematics Knowledge

Statement	$\bar{x}$	Verbal Interpretation
Changeability of Mathematics Knowledge		
Ability in math increases when one studies hard.	4.20	Very High Changeability of Mathematics Knowledge
By trying harder, one can become smarter in math.	4.21	Very High Changeability of Mathematics Knowledge
I can get smarter in math if I try hard.	4.09	High Changeability of Mathematics Knowledge
Working can improve one's ability in mathematics.	4.14	High Changeability of Mathematics Knowledge
I can get smarter in math by trying harder.	4.02	High Changeability of Mathematics Knowledge
Hard work can increase one's ability to do math.	4.11	High Changeability of Mathematics Knowledge
General weighted mean	4.13	High Changeability of Mathematics Knowledge

Table above shows that the majority of the answers of respondents regarding the Mathematics Beliefs (Changeability of Mathematics Knowledge) are "High Relevance of Mathematics" with an average weighted mean of 4.13.

The table revealed that "by trying harder, one can become smarter in Math" with a mean of 4.21 followed by "ability in Math increases when one studies hard" with a mean of 4.20 both verbally interpreted as "High Changeability of Mathematics Knowledge". The least is "I can get smarter in math by trying harder" with a mean of 4.02 that verbally interpreted of "High Changeability of Mathematics Knowledge".

According K. Abdul Gafoor and A. Kurukkan (2015), the study of Mathematics require staying away from many careers that is not related to it and better if they try hard studying the subject.

Table 3 present the Mathematics Beliefs in terms of Speed of Learning of the respondents.

Table 3: Mathematics Beliefs in Terms of Speed of Learning

Statement	$\bar{x}$	Verbal Interpretation
Speed of Learning		
I find I can do hard math problems if I just hang in there.	3.63	High Speed of Learning and Math Solution
If I can't do a math problem in a few minutes, I can't do it at all. (reverse scored)	2.85	Moderate Speed of Learning and Math Solution
If I can't solve a math problem quickly, I quit trying. (reverse scored)	2.96	Moderate Speed of Learning and Math Solution
I feel I can do math problems that take a long time to complete.	2.58	Moderate Speed of Learning and Math Solution
Math problems that take a long time don't bother me.	2.82	Moderate Speed of Learning and Math Solution
I'm not very good at solving math problems that take a while to figure out. (reverse scored)	2.51	Moderate Speed of Learning and Math Solution
It's not important to understand why a mathematical procedure works as long as it gives a correct answer. (reverse scored)	3.06	High Speed of Learning and Math Solution
Getting the right answer in math is more important than understanding why the answer works. (reverse scored)	2.93	Moderate Speed of Learning and Math Solution
It doesn't really matter if you understand a math problem, if you can get the right answer. (reverse scored)	2.93	Moderate Speed of Learning and Math Solution
Any word problem can be solved if you know the right steps to follow. (reverse scored)	2.41	Moderate Speed of Learning and Math Solution
Any word problem can be solved by using the correct step-by-step procedure. (reverse scored)	2.25	Moderate Speed of Learning and Math Solution
General weighted mean	2.81	Moderate Speed of Learning and Math Solution

The table above shows that the majority of the answers of respondents regarding the Mathematics Beliefs (Speed of Learning and Math Solution) are "Moderate Speed of Learning and Math Solution" with an average weighted mean of 2.81.

The table revealed that "I find I can do hard math problems if I just hang in there" with a mean of 3.63 followed by "It's not important to understand why a Mathematical procedure works as long as it gives a correct answer (reverse scored)" with a mean of 3.06 that both verbally interpreted as "High Changeability of Mathematics Knowledge". The least is "Any word problem can be solved by using the correct step-by-step procedure (reverse scored)" with a mean of 4.02 that verbally interpreted of "Moderate Speed of Learning and Math Solution".

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1.2 Student Engagement in Mathematics

The Student Engagement in Mathematics was described in terms of emotional, cognitive, and social engagement.

Table 4 presents Student Engagement in terms of Emotional Engagement.

Table 4: Student Engagement in Mathematics in Terms of Emotional Engagement

Statement EMOTIONAL ENGAGEMENT	$\bar{x}$	Verbal Interpretation
Math class was fun today.	2.48	Moderate Mathematics Emotional Engagement
Today I felt bored in math class.	2.40	Moderate Mathematics Emotional Engagement
I enjoyed thinking about math today.	2.36	Moderate Mathematics Emotional Engagement
Learning math was interesting to me today.	2.55	Moderate Mathematics Emotional Engagement
I liked the feeling of solving problems in math today.	2.40	Moderate Mathematics Emotional Engagement
General weighted mean	2.44	Moderate Mathematics Emotional Engagement

The table above shows that the majority of the answers of respondents regarding Mathematics Emotional Engagement are "Moderate Mathematics Emotional Engagement" with an average weighted mean of 2.44.

The table revealed that "Learning math was interesting to me today" with a mean of 2.55 followed by "Math class was fun today" with a mean of 2.48 that both verbally interpreted as "Moderate Mathematics Emotional Engagement". The least is "I enjoyed thinking about math today" with a mean of 2.36 that verbally interpreted of "Moderate Mathematics Emotional Engagement".

Silvia (2022) stated that students who are emotionally engaged enjoy the feeling of solving problems and find the material interesting.

Table 5 shows Student Engagement in Mathematics in terms of Social Engagement.

Table 5: Student Engagement in Mathematics in Terms of Social Engagement

Statement SOCIAL ENGAGEMENT	$\bar{x}$	Verbal Interpretation
Today I talked about math to other kids in class.	2.22	Moderate Mathematics Social Engagement
Today I helped other kids with math when they didn't know what to do.	2.40	Moderate Mathematics Social Engagement
Today I shared ideas and materials with other kids in math class.	2.29	Moderate Mathematics Social Engagement
Students in my math class helped each other learn today.	2.82	Moderate Mathematics Social Engagement
Total weighted mean	2.43	Moderate Mathematics Social Engagement

Table above shows that the majority of the answers of respondents regarding the Mathematics Social Engagement are "Moderate Mathematics Social Engagement" with an average weighted mean of 2.43.

The table revealed that "Students in my math class helped each other learn today" with a mean of 2.82 followed by "Today I helped other kids with math when they didn't know what to do" with a mean of 2.40 that both verbally interpreted as "Moderate Mathematics Social Engagement". The least is "Today I talked about Math to other kids in class" with a mean of 2.22 that verbally interpreted of "Moderate Mathematics Social Engagement".

Patrick et al. (2007) showed that social engagement (I.e., task-related interaction) in fifth grade math class related to higher math grades, even after controlling for achievement in the previous year.

Table 6 presents Student Engagement in Mathematics in terms of Cognitive Engagement

Table 6: Student Engagement in Mathematics in Terms of Cognitive Engagement

Statement COGNITIVE ENGAGEMENT	$\bar{x}$	Verbal Interpretation
Today in Math class, I worked hard as I could.	2.71	Moderate Mathematics Cognitive Engagement
Today it was important to me that I understood the math really well.	2.80	Moderate Mathematics Cognitive Engagement
I tried to learn as much as I could in math class today.	2.77	Moderate Mathematics Cognitive Engagement
I did a lot of thinking in math class today.	2.42	Moderate Mathematics Cognitive Engagement
General weighted mean	2.68	Moderate Mathematics Cognitive Engagement

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Table above shows that the majority of the answers of respondents regarding Mathematics Cognitive Engagement are "Moderate Mathematics Cognitive Engagement" with an average weighted mean of 2.68.

The table above revealed that "Today it was important to me that I understood the Math really well" with a mean of 2.80 and "I tried to learn as much as I could in Math class today" with a mean of 2.77 are both verbally interpreted as "Moderate Mathematics Cognitive Engagement". The least is "I did a lot of thinking in Math class today" with a mean of 2.42 that verbally interpreted of "Moderate Mathematics Cognitive Engagement".

1.3 Creative Self-Efficacy

Table 7 presents the Creative Self-Efficacy of the Students.

Table 7: Creative Self-efficacy

Statement	$\bar{x}$	Verbal Interpretation
Come up with many possible solutions to a problem.	4.23	Very High Creative Self-Efficacy
Arrive at a variety of conclusions given a difficult situation.	3.93	High Creative Self-Efficacy
Think of many answers to a difficult problem or situation.	4.02	High Creative Self-Efficacy
Come up with different kinds of responses, not just different responses.	3.98	High Creative Self-Efficacy
Answer problems in different ways, each of which is unique and special.	3.82	High Creative Self-Efficacy
Think of many types of ideas while considering a problem.	3.96	High Creative Self-Efficacy
Think of ways to defend a "crazy" thought, by thinking back on what you already know.	3.79	High Creative Self-Efficacy
Talk to your friends about wild ideas, and make them sound reasonable.	3.71	High Creative Self-Efficacy
Tell stories based on dreams you had, even if you need to fill in answers.	3.70	High Creative Self-Efficacy
Be the first in a group to come up with an original suggestion.	3.63	High Creative Self-Efficacy
Arrive at a novel solution before other people.	3.59	High Creative Self-Efficacy
Beat other people in imagining brand new ideas first.	3.29	Moderate Creative Self-Efficacy
Make sense of something you want to learn to do.	4.02	High Creative Self-Efficacy
Start to learn to do something, even if there are obstacles to doing so.	4.07	High Creative Self-Efficacy
Teach yourself how to do something new.	4.18	Very High Creative Self-Efficacy
Create a novelty that people will choose, over other novelties available.	3.77	High Creative Self-Efficacy
Find an audience that is well-connected to others in society.	3.87	High Creative Self-Efficacy
Network with people to convince them that what you made is the best.	3.77	High Creative Self-Efficacy
Be motivated to come up with new ideas.	4.30	Very High Creative Self-Efficacy
Have fun coming up with new ideas, after having learned from others.	4.20	Very High Creative Self-Efficacy
Sustain wonder about something, even after working with it for years or decades.	4.00	High Creative Self-Efficacy
General Weighted Mean	3.90	High Creative Self-Efficacy

The table above shows the total weighted mean of 3.90 as regards to the Creative Self-Efficacy as verbally interpreted "High Creative Self-Efficacy".

The table revealed that "the students motivated to come up with new ideas" with a mean of 4.30 and the students come up with many possible solutions to a problem with a mean of 4.23 are both verbally interpreted as "Very High Creative Self-Efficacy". Meanwhile, the least is "students beat other people in imagining a brand new idea first with a mean of 3.29 that verbally interpreted as "Moderate Creative Self-Efficacy".

Oldham (2018) found that although ability level was linked to performance, children with strong self-efficacy finished more problems correctly and reworked more of the ones they missed. Garcia and Pintrich (1996) discovered that high positive motivational beliefs are linked to higher grades and performance in a sample of community college students, private 4-year college students, and public 4-year university students.

2. Significant Relationships among *Student engagement in Mathematics, Mathematics Beliefs, Creative Self-Efficacy.*

2.1 Student Engagement and Creative Self-efficacy

Table 8 shows the significant relationship between Student Engagement in Mathematics and Creative Self-Efficacy.

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Table 8: Significant Relationship between Student Engagement in Mathematics and Creative Self-efficacy

	r*(p-value)*
Student engagement in mathematics (Emotional)	.002 *(p=.978)*
Student engagement in mathematics (Social)	-.033 *(p=.698)*
Student engagement in mathematics (Cognitive)	-.003 *(p=.975)*

The table above shows that none of the relationships is significant at 0.05 level since all p values are greater than 0.05.

2.2 Student Engagement in Mathematics and Mathematics Beliefs

Table 9 shows the significant relationship between Creative Self-Efficacy and Mathematics Beliefs.

Table 9: Significant Relationship between Student Engagement in Mathematics and Mathematics Beliefs

	Student Engagement in Mathematics (Emotional)	**Student Engagement in Mathematics (Social)**	**Student Engagement in Mathematics (Cognitive)**
Mathematics Beliefs (Relevance of Mathematics)	0.75 *(p=.385)*	-0.057 *(p=.510)*	0.098 *(p=.252)*
Mathematics Beliefs (Changeability of Mathematics Knowledge)	0.020 *(p=.818)*	0.030 *(p=.729)*	0.158 *(p=.065)*
Mathematics Beliefs (Speed of Learning)	0.102 *(p=.237)*	0.056 *(p=.516)*	0.083 *(p=.335)*

The table above shows that none of the relationships is significant at 0.05 level since all p values are greater than 0.05.

2.3 Creative Self-efficacy and Mathematics Beliefs

Table 10 shows the significant relationship between Creative Self-efficacy and Mathematics Beliefs.

Table 10: Significant Relationship between Creative Self-efficacy and Mathematics Beliefs

	(p-value)
Relevance of Mathematics	.061 *(p=.478)*
Changeability of Mathematics Knowledge	.031 (.000)
Speed of learning	-.151 *(.078)*

The table above shows that only the Changeability of Mathematics Knowledge is significant at 0.05 level since p values is less than 0.05. However, both Relevance of Mathematics and Speed of Learning are not significant since *p* values is greater than 0.05.

3. Are Creative Self-Efficacy and Math Beliefs predictors of Student Engagement?

Table 11 presents ANOVA of the Predictor Variables with Mediating Variable, Creative Self-Efficacy.

Table 11: ANOVA of the Predictor Variables with Mediating Variable, Creative Self-Efficacy

ANOVA[a]						
		SS	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	.008	3	.008	.019	.089[b]
	Residual	57.411	133	.425		
	Total	57.419	136			
2	Regression	.880	6	.220	.513	.726[c]
	Residual	56.539	130	.428		
	Total	57.419	136			
a. Dependent Variable: Student engagement in mathematics						

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b.	Predictors: Constant: creative self-efficacy
c.	Predictors: Constant: creative-self efficacy, relevance of mathematics, changeability of mathematics knowledge, speed of learning math

The table above shows two regression models are not significant for regression and mediation analyses. Model 1 which includes all predictors, Math Engagement and Math Beliefs is not significant, F= .019, p = .089. Model 2 which includes the mediating variable together with the predictors is significant, F = .513, p = .726. Hence, Creative Self-Efficacy and Mathematics Engagement are not significant predictors of Mathematics Beliefs.

4. Is Creative Self-Efficacy a mediator between the relationships of Student Engagement in Mathematics & Mathematics Beliefs?

None of Creative Self-Efficacy and Mathematics Beliefs was found to be significant predictors of Student Engagement. Hence, none of the two can be a mediator between the relationship of the independent and dependent variables.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The researchers concluded that there is no significant relationship between Student Engagement in Mathematics and Creative Self-Efficacy, Student Engagement in Mathematics and Mathematics Beliefs, and Creative Self-Efficacy and Mathematics Belief. Hence, Creative Self-Efficacy is not a mediator between the relationship of Students Engagement in Mathematics and Mathematics Belief.

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