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Exploring Preservice Teachers' Attitude Towards Learning Mathematics: Basis for Curricular Enrichment.

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Abstract

Mathematics has always been perceived as one of the most challenging subjects to study at the tertiary level. However, as future educators, a positive attitude towards mathematics is encouraged among preservice teachers because learning it would equip them with the basic knowledge and mental discipline in teaching math and other school subjects like Science, Music, Arts and technical subjects. Hence, this study sought to explore preservice teachers' attitudes towards learning Mathematics. There were two research questions and one hypothesis guided the study. This study utilized descriptive survey design and data were gathered online thru Google forms. A sample of 200 preservice teachers from a selected higher education institution in Zamboanga City was chosen randomly through proportionate and systematic sampling procedures. This study adapted the Attitude Towards Mathematics Inventory (ATMI) by Martha Tapia and George E. Marsh. The research instructor and subject matter experts validated this, and the subscales attained acceptable reliability coefficients during the pilot testing based on the computed Cronbach's alpha. Mean, standard deviation and Pearson – r correlation were utilized in the analysis of the data. Findings revealed that preservice teachers had moderately positive attitudes towards learning Mathematics. Results also showed that there are significant positive correlations among the subscales. This study recommends that math teachers in higher education create learning activities that can alter or minimize negative attitudes towards Mathematics.

Keywords: Math attitude, Mathematics, Pre-service Teachers

INTRODUCTION

Background of The Study

Mathematics has always been perceived as one of the most challenging subject to study in the tertiary level. However, as future educators, a positive attitude towards mathematics is encouraged among preservice teachers because learning it would equip them with the basic knowledge and mental discipline in teaching math and other school subjects like Science, Music, Arts and technical subjects. Hence, this study sought to explore preservice teachers' attitude towards learning Mathematics. There were 30 questions and with 1 hypotheses guided the study. This utilized descriptive survey design and data were gathered online thru Google forms. A sample of 200 preservice teachers from a selected higher education institution in Zamboanga City were randomly selected through proportionate and systematic sampling procedures. This study adapted one research instruments, namely (Tapia, M. and MARsh, G.E. (2002). These were validated by the research instructor and subject matter experts and both attained acceptable reliability coefficients during the pilot testing based on the computed Cronbach's alpha. These correlation coefficients were utilized in the analysis of the data. Findings revealed that the standard mean was 3.248 and a standard deviation of 0.4016 which signifies that the preservice students of Zamboanga Peninsula Polytechnic State University has a positive learning attitude towards mathematics. This study recommends that math teachers in the higher education must create learning activities that can alter or minimized negative attitude towards Mathematics.

Statement of the Problem

This study aimed to determine what learning attitude towards learning mathematics does the preservice teacher of Zamboanga Peninsula State University students in have developed.

Specifically, it sought to answer the following questions:

1. What is the profile of the respondents in terms of;
 - a. Sex;
 - b. Age;
 - c. Course; and
 - d. Year Level

2. What are the attitude of preservice teacher towards learning mathematics?

3. Is there a significant relationship in mathematics learning attitude in terms of;
 - a. Self-Confidence
 - b. Value
 - c. Enjoyment
 - d. Motivation

Significance of the Study;

The findings of the study will benefit to:

Dean. This research study will serve as guide and basis to the programs that aims to minimize the case of negative attitude towards learning mathematics.

Guidance Counselor. This research study provides the information that can help to take an action for the existing of negative attitude towards learning mathematics.

Teachers. This research study will help the teachers to guide and how to manage negative attitude towards learning mathematics in the classroom.

Students. Towards learning mathematics in school as well as to society by having a positive attitude in decisions before judging the outcomes.

Researchers. This research study will help the researchers to understand more their research study towards attitude in learning mathematics subject.

Scope and Limitation

This study was conducted to a specific number of Zamboanga Peninsula Polytechnic State University preservice teacher, specifically to those preservice teachers who has mathematics subject. This study focused on why there is liking and disliking attitude and its effect to the preservice teachers' performance in math. Lastly, this study focused to the possible his research study will help the students to minimize negative attitude solution on how to avoid or exterminate the students' negative attitude towards learning mathematics.

Definition of Terms

Attitude- a settled way of thinking or feeling about someone or something, typically one that is reflected in a person's behavior. (Dictionary)

Pre-service Teacher- The pre-service teacher is defined as **the student enrolled in a teacher preparation program** who must successfully complete degree requirements including course work and field experience before being awarded a teaching license. (<https://www.igi-global.com/dictionary/a-safe-space/23201#:~:text=The%20pre%2Dservice%20teacher%20is,being%20awarded%20a%20teaching%20license.>)

ZPPSU- stand for Zamboanga Peninsula Polytechnic State University where the researchers are studying

Self-confidence- a feeling of trust in one's abilities, qualities, and judgment. (Dictionary)

Value- he worth of something in terms of the amount of other things for which it can be exchanged or in terms of some medium of exchange. (Dictionary.com)

Enjoyment- the action of possessing and benefiting from something.
(Dictionary)

Motivation- the feeling of wanting to do something, especially something that involves hard work and effort. (Oxford dictionary)

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CHAPTER III METHODOLOGY

Research Design

The research design used in conducting this study was quantitative research. The researcher used constructed survey method and the study participants were Zamboanga Peninsula Polytechnic State University preservice teachers.

Participants of the study

The participants for this study were 200 preservice teacher of Zamboanga Peninsula Polytechnic State University.

Population and Sample Procedure

Population: Pre-service teacher of CTE, ZPPSU

Courses in CTE	1 st	2 nd	3 rd	4 th	N	%	n
BPED/BSED MAPEH	46	82	89	37	254	22.3	45
BTLED/BSED TLE	65	68	50	32	215	18.9	38
BSED-Math	41	41	34	0	116	10.2	20
BEED	75	87	60	42	264	23.2	46
BTVTED/BTTE	125	83	77	5	290	25.4	51
TOTAL	352	361	310	116	1139	100	200

In this case the researchers used stratified random sampling, it's a method of sampling from a population which can be partitioned into sub-populations.

Research instrument

The research instruments used to conduct this research was an online form surveying containing series of questions related to the learning attitude towards mathematics to answers the research objective and paper and pen to analyze and summarize the gathered data.

Mathematics Learning Attitude Questionnaire. The Learning Attitude towards Mathematics Inventory (ALTMI) which has five point Likert scale (1= Strongly Disagree; 5= Strongly Agree). It was consisted of 30 items questions with four subscales namely, Self – Confidence, Value, Enjoyment and Motivation.

There were 30 questions in total. The questionnaires will be validated by College of Teacher Education professors, including our Research 2 professor.

A pilot test had been performed, and the link had been forwarded to at least 50 pre-service teachers who would be among the participants in the pilot testing to assess the questionnaire's validity. The researchers interviewed them to ensure that the questionnaires were clear and accurate. If they have any suggestions or comments for improving the research questionnaire. The cronbach's alpha mathematics learning attitude questionnaire is 0.86. The questionnaire for example is reliable.

Research Problem 1. What is the profile of the respondents in terms of;

- ❖ Sex;
- ❖ Age;
- ❖ Course; and
- ❖ Year Level

Table 1: Frequency Distribution of Respondents in terms of Sex and Age

Variable	F	%
Sex		
Male	62	31
Female	138	69
Total	200	100
Age		
18-23	167	83.5
24-29	23	11.5

30-35	7	3.5
36-41	3	1.5
Total	200	100

Base in the table 1, the frequency distribution of respondents in terms of sex and age. The highest frequency from two variables in terms of Sex are female that have 138 respondents equivalent of 69% and age of 18-23 and lowest frequency respondents are male and age of 36-41. The percent target of 100% female has 69% and 31% of the male. In that frequency distribution the female is greater than the male respondents also the age 18 above is greater than age of 36 to 41.

Table 2: Frequency Distribution of Respondents in terms of year level

Year Level	F	%
First Year	37	18.5
Second Year	71	35.5
Third Year	73	36.5
Fourth Year	19	9.5
Total	200	100

In this table 2, the frequency distribution of respondents in terms of year level. The highest frequency respondents are third year, second year and lowest frequency respondents is fourth year and first year then the total respondents are 200. In that frequency distribution of 100% the third year is greater than 1% than second year because third year has 36.5% and second year has 35.5%. And also the lowest frequency distribution is fourth year has 9.5% and the first year has 18.5%. I there to included that third year responded are more than second year, first year and fourth year.

Table 3: Frequency Distribution of Respondents in terms of Course

Courses in CTE	F	%
BPED/BSED MAPEH	62	31
BTLED/BSED TLE	19	9.5
BSED-Math	45	22.5
BEED	42	21
BTVTED/BTTE	32	16
TOTAL	200	100

Table 3 shows the frequency distribution of respondents in terms of course. The highest respondents in terms of course are BPED /BSED MAPEH which has 31% and lowest frequency distribution is in BTLED /BED TLE which has a 9.5%.

Research Procedure

1. Constructing Research Online Research Questioner
2. Identifying Research Respondent Trough Random Sampling
3. Data Gathering
4. Data Analysis
5. Identifying Conclusion

Data Analysis

The data in this study will be collected in a form of survey. The researcher will provide questions and conduct an online survey to the participants to gather the data from the participants' response to the survey.

Ethical consideration

This study will be conducted with the freewill of the participants to participate and has the right to decline if they can sense any harm that could be used against them. The researcher will also guarantee that the information that will be shared by the participants will not leak and cause harm to them.

Chapter IV

Presentation, Analysis, and Interpretation

RESULTS AND DISCUSSION

This chapter deals with the presentation of results and discussion of the data gathering based on the respondents' profile, research problem and hypotheses posited for this study. The presentation of data is in order, arranged according to the statement of the problem.

Research Problem 2. What are the attitude of preservice teacher towards learning attitude in mathematics?

Table 1: Self Confidence

	(5)	(4)	(3)	(2)	(1)	(5)+(4)	(3)	(2)+(1)
1. I look forward to mathematics classes	25	91	76	8	0	116	76	8
2. I hate mathematics	8	19	61	79	33	27	61	112
3. I do badly in tests of mathematics	10	39	103	46	2	49	103	48
4. I often need help in mathematics	41	85	68	5	1	126	68	6
5. Mathematics is one of my best subjects	22	42	94	35	7	64	94	42
6. I never want to take another mathematics course.	8	42	91	51	8	50	91	59
7. I get good marks in mathematics	15	61	102	19	3	76	102	22

8. I have always done well in Mathematics	5	54	112	25	4	59	112	29
9. I have trouble understanding anything with mathematics in it	16	47	108	25	4	63	108	29
10. It's important to me to do well in mathematics classes	41	110	46	3	0	151	46	3

Table 2: Value

MA11. Mathematics is one of the most important subjects for people to study.	88	76	32	4	0	152	32	4
MA12. Mathematics helps develop the mind and teaches a person to think.	85	97	18	0	0	182	18	0
MA13. I want to develop my mathematics skills.	119	69	11	1	0	188	11	1
MA14. Mathematics is important in everyday life.	120	63	16	1	0	183	16	1
MA15. I get a great deal of satisfaction out of mathematics experiments.	29	84	79	8	0	113	79	8

MA16. High school mathematics courses would be very helpful no matter what I decide to study.	55	108	33	4	0	163	33	4
MA17. I can think of many ways that I use mathematics outside of school.	39	113	43	5	0	152	43	5
MA18. Mathematics is a very worthwhile and necessary subject.	67	98	33	2	0	165	33	2
MA19. I think studying advanced mathematics is useful.	94	83	20	3	0	177	20	3
MA20. I believe I am good at mathematics experiments	13	36	106	39	6	49	106	45

Table 3: Enjoyment

MA21. I expect to do fairly well in any mathematics class I take.	23	91	77	8	1	114	77	9
MA22. I am able to do mathematics experiments without too much difficulty.	8	47	99	40	6	55	99	46
MA23. I have a lot of self-confidence when it comes to mathematics	11	49	93	39	8	60	93	47
MA24. I like to do new experiments in mathematics.	21	63	83	28	5	84	83	33
MA25. I learn mathematics easily.	8	50	95	39	8	58	95	47

Table 4: Motivation

MA26. I would like to avoid using mathematics in college.	4	23	77	71	25	27	77	96
MA27. I really like mathematics.	28	47	101	19	5	75	101	24
MA28. It makes me nervous to even think about having to do a mathematics experiment.	18	85	82	12	3	103	82	15
MA29. Mathematics makes me feel uncomfortable.	11	37	73	67	12	48	73	79
MA30. Studying mathematics makes me feel nervous.	19	64	82	26	9	83	82	35

Table 1.5**Level of Math Attitude**

Math Attitude Subscale	Mean	SD
Self - Confidence	3.1324	0.4712
Values	3.2048	0.2835
Enjoyment	3.1092	0.451
Motivation	3.5457	0.5635
Overall	3.248	0.4016

The average results of math attitude sub-scales have a positive outcome that runs the skews towards positive quadrant, the students' attitude towards math is most likely not as hated as we've thought of. The overall conclusion of

math attitudes of the pre-service teachers of ZPPSU shown that the average has a good attitude towards math.

Teachers frequently utilize attitudes to explain their students' success or failure, as well as to provide an excuse for not being able to assist a student (Martino & Zan, 2010, 2009; Polo & Zan, 2006). However, due to uncertainty in the concept of attitude and a lack of suitable methods to evaluate attitude, no significant correlation between attitude and achievement has been established (Ma & Kishor, 1997).

The students' perceptions of themselves as learners are inextricably linked to their general attitudes regarding the discipline in question. Because mathematics is a highly valued subject in school, students who achieve proficiency in this subject are rewarded. It has been discovered that students' attitudes about mathematics and about themselves as math students play a critical impact in their mathematics learning and success (e.g. Schoenfeld 1992)

Perhaps the most important factor which influences mathematics success levels of students is the students' attitude towards mathematics classes. It has been widely known for a very long time that there is a high-level relationship between mathematical success levels and attitudes towards mathematics. In the studies conducted so far, it has been suggested that students with higher positive attitudes towards mathematics also have higher levels of success (Aiken, 1970 Erktin, 1993; Peker & Mirasyedioğlu, 2003; Çanakçı & Özdemir, 2011).

Research Problem 3. Is there a significant relationship in mathematics learning attitude in terms of;

- a. Self-Confidence**
- b. Value**
- c. Enjoyment**
- d. Motivation**

Table 3.1

Enjoyment and Motivation

Pearson - r Coefficient	Coefficient of Determination	Interpretation
0.05 ^s	0.10	Low Positive Correlation

Legend: ^s Significant at alpha = .05 level.

The table above indicates that there is a low significant positive correlation between mathematics enjoyment and motivation of the college students in the control group, with a correlation coefficient of .05. It also indicates that .10% of the variance in the mathematics self-confidence is attributed to the enjoyment of the college students; leaving -.10% of the variance in the mathematics enjoyment is attributed to other factors or due to sampling error. This implies that mathematics enjoyment has a huge effect on the motivation of the pre-service teachers.

Table 3.2

Self-Confidence and Enjoyment

Pearson - r Coefficient	Coefficient of Determination	Interpretation
0.73 ^s	1.46	Very High Positive Correlation

Legend: ^s Significant at alpha = .05 level.

The table above indicates that there is a very high significant positive correlation between mathematics self-confidence and enjoyment of the college students in the control group, with a correlation coefficient of .73. It also

indicates that 1.46% of the variance in the mathematics self-confidence is attributed to the enjoyment of the college students; leaving -1.46% of the variance in the mathematics self-confidence is attributed to other factors or due to sampling error. This implies that mathematics self-confidence has a small effect on the enjoyment of the pre-service teachers.

Table 3.3

Value and Motivation

Pearson - r Coefficient	Coefficient of Determination	Interpretation
-0.15 ^s	-0.3	Low Negative Correlation

Legend: ^s Significant at alpha = .05 level.

The table above indicates that there is a low significant negative correlation between mathematics value and motivation of the college students in the control group, with a correlation coefficient of -0.15. It also indicates that -.30% of the variance in the mathematics self-confidence is attributed to the enjoyment of the college students; leaving -.30% of the variance in the mathematics value is attributed to other factors or due to sampling error. This implies that the value of mathematics has a small effect on the motivation of the pre-service teachers.

Table 3.4

Self-Confidence and Motivation

Pearson - r Coefficient	Coefficient of Determination	Interpretation
-0.13 ^s	-0.26	Negligible Correlation

Legend: ^s Significant at alpha = .05 level.

The table above indicates that there is a negligible correlation between mathematics self-confidence and motivation of the college students in the control group, with a correlation coefficient of -.13. It also indicates that -.26%

of the variance in the mathematics self-confidence is attributed to the enjoyment of the college students; leaving -26% of the variance in the mathematics self-confidence is attributed to other factors or due to sampling error. This implies that mathematics self-confidence has a small effect on the motivation of the pre-service teachers.

Table 3.5

Self-Confidence and Value

Pearson - r Coefficient	Coefficient of Determination	Interpretation
0.53 ^s	1.06	Very High Positive Correlation

Legend: ^s Significant at alpha = .05 level.

The table above indicates that there is a very high significant positive correlation between mathematics self-confidence and value of the college students in the control group, with a correlation coefficient of .53. It also indicates that 1.06% of the variance in the mathematics self-confidence is attributed to the enjoyment of the college students; leaving -1.06% of the variance in the mathematics self-confidence is attributed to other factors or due to sampling error. This implies that mathematics self-confidence has a minimum effect on the value of mathematics to the pre-service teachers.

Table 3.6

Value and Enjoyment

Pearson - r Coefficient	Coefficient of Determination	Interpretation
0.50 ^s	1.0	High Positive Correlation

Legend: ^s Significant at alpha = .05 level.

The table above indicates that there is a high significant positive correlation between mathematics value and enjoyment of the college students

in the control group, with a correlation coefficient of .50. It also indicates that 1.0% of the variance in the mathematics self-confidence is attributed to the enjoyment of the college students; leaving -1.0% of the variance in the mathematics value is attributed to other factors or due to sampling error. This implies that mathematics value has a small effect on the enjoyment of the pre-service teachers.

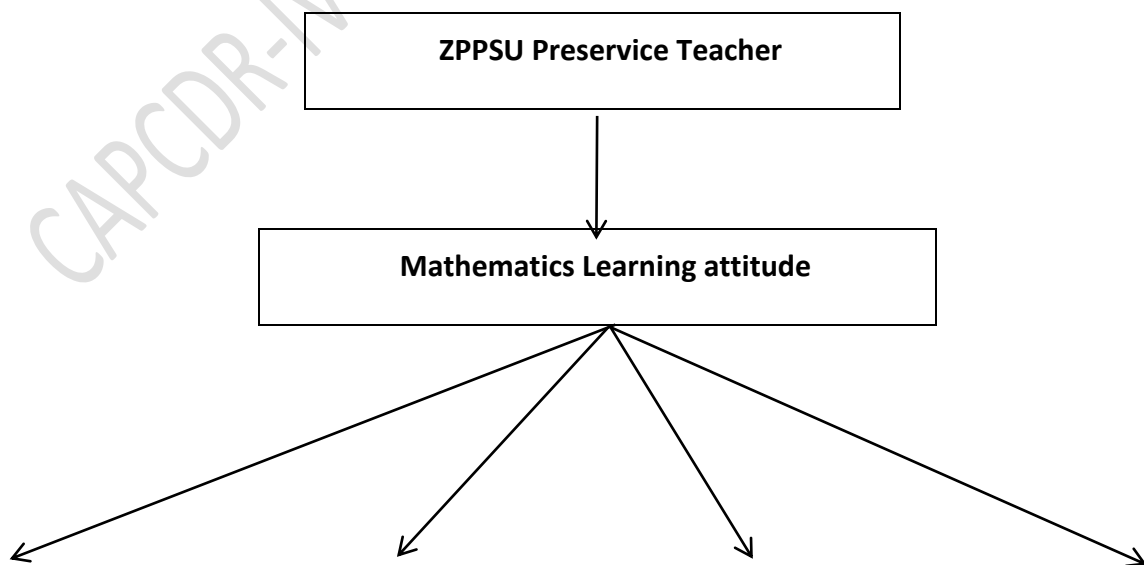
THEORETICAL FRAMEWORK

Attitude theories have a wide range of dimensions, variables, processes, and impacts, and numerous models have been constructed based on this. As a result, the theoretical framework for this study was Shavelson's (1976) model of Learning attitude. According to the paradigm, an individual's attitude is influenced by how he or she thinks and acts. The Shavelson's model is made up of two parts: an academic and a non-academic self-concept. A school child's good attitude must be developed in order to achieve academic success. According to Hansford and Hattie (1982), a meta-analysis of hundreds of studies found that while some studies found a substantial positive link between

self-concept and performance, others found a negative relationship, particularly those that used more rigorous research designs. Similarly, it has been reported in other studies in Nigeria and other parts of the world that there is a positive correlation between math attitude and math achievement.

Students who have a negative attitude toward mathematics are more likely to have a low self-concept and a sense of ineptitude, which manifests itself in disparaging statements and a complete lack of achievement in mathematics (Tobias, 1999).

Theoretical Framework



Motivation

Self-Confidence

Value

Enjoyment

CHAPTER V

This final chapter presents the Restatement of the Problem, Summary of Findings, Conclusions and Recommendations for further studies.

Restatement of the study

This study aimed to determine what learning attitude towards learning mathematics does the preservice teacher of Zamboanga Peninsula State University students in have developed.

The researcher used quantitative research in conducting the study, the researcher used constructed survey method and the study participants were Zamboanga Peninsula Polytechnic State University preservice teachers

It sought to determine:

1. The attitude of preservice teacher towards learning attitude mathematics
2. The attitude of pre-service teacher towards learning mathematics in terms of;

- a. Self-Confidence
- b. Value
- c. Enjoyment
- d. Motivation

Summary of Findings

Table 1 indicates the total mean of the preservice teachers' Self-confidence towards learning mathematics. It shows that the total mean obtained from the survey is 3.1324 which means that preservice teacher is in mediocre level when it comes to having self-confidence towards learning mathematics.

Table 2 indicates the total mean of how preservice teachers apply the value of learning mathematics in their real life. It shows that the total mean obtained from the survey is 3.2048 which means that preservice teacher positively applies the value of learning mathematics in their real life.

Table 3 indicates the preservice teacher's learning enjoyment in taking mathematics classes. It shows that the total mean obtained from the survey is 3.1092 which means that preservice teacher has the effective learning mindsets in taking mathematics classes.

Table 4 indicates the preservice teacher's learning motivation in mathematics classes. It shows that the total mean obtained from the survey is 3.5457 which means that preservice teacher has the effective learning mindsets in taking mathematics classes.

The Pearson – r correlation result found out that the self-confidence, value, enjoyment has a positive effect to the learning attitude of the preservice teachers towards mathematics.

Conclusions

The overall result on the survey about Learning Attitude Towards mathematics of the preservice teachers was obtained after solving the gathered data. The overall mean is 3.248 and the overall standard deviation is 0.4016 which only means that the preservice teachers have the positive and productive learning attitudes toward mathematics in correlation to their self-confidence, value, motivation, and enjoyment. The overall result of the gathered data rejects the null hypothesis of this study which is the observation of the researchers that the preservice teachers have negative attitude towards learning mathematics in Zamboanga Peninsula Polytechnic State University.

Recommendations

1. The researchers recommend to conduct a further investigation with a wider scope and greater participants to improve this study.
2. Gather information about teaching strategies that will be used by preservice teacher to make an effective learning process in mathematics.
3. Seek reasons and factors why preservice teachers tend to dislike learning mathematics and find solution to address these problems.

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