“Exploring Preservice Teachers’ Academic Emotions in an Online Mathematics Class: Basis for Curricular Enhancement for the New Normal in Education"

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Abstract

The online classroom environments promote several emotions, just like the traditional classroom setting. Students may feel anxious taking online exams, while others may feel more comfortable participating in online learning because they have the technological resources to meet online works. For future educators, positive academic emotions must be fostered among preservice teachers in an online Mathematics classis because learning Mathematics will equip the basic knowledge and mental discipline in teaching their field of specialization, other than Mathematics, such as, Music, Social Sciences, Sciences and technical subjects. Thus, this study explored the academic emotions experienced by the preservice teachers in their online Mathematics classes. Two research questions guided the study. This utilized descriptive survey design, and data were obtained online thru Google Forms. A sample of 141 preservice teachers from a selected higher education institution in Zamboanga City was randomly selected through proportionate and systematic sampling procedures. This study adapted Achievement Emotion Questionnaire by Pekrun et al. (2006). The research instructor and subject matter experts validated these, and both attained acceptable reliability coefficients during the pilot testing based on the computed Cronbach's alpha. Mean, Standard Deviation, Pearson – r correlation were utilized in the analysis of the data. Findings revealed that preservice teachers experienced moderate anxiety, enjoyment, and pride in their online Mathematics class. Results also showed significant positive relationships among positive emotions and significant positive relationships among negative emotions. However, there were significant negative relationships between positive and negative emotions. This

study recommends that math teachers at the tertiary level create an online learning environment that fosters positive academic emotions and minimizes negative ones.

Keywords: Academic Emotions, Mathematics, Pre-service Teachers, Online Class

Introduction

1.1 Background of the Study

Emotion is a natural instinctive state of mind deriving from one circumstance, mood, or relationship with others. Students' emotions towards learning are essential to the learners, levels their emotions, happy, motivated, confused, sad, hopeless, and frustrated during their mathematics online class.

Academic emotions are learner emotions that occur in the context of classroom teaching and accomplishment (Pekrun et al. 2002). Achievement emotions are described as feelings connected to achievement that may be assessed using the achievement emotions questionnaire (Pekrun et al. 2011). This survey includes scales for nine different emotions: pleasure, boredom, anger, hope, anxiety, hopelessness, pride, relief, and shame. According to their object focus, or the center of attention when emotion is formed, these nine emotions may be classified into two types: (1) activity emotions, which are concerned with ongoing achievement-related actions, and (2) outcome emotions, which are concerned with the results of these activities. Activity emotions include pleasure, boredom, and rage. Prospective result feelings like hope, fear, and hopelessness, as well as retrospective outcome emotions like pride, relief, and humiliation, are among the outcome emotions. The control-value theory suggested by Pekrun is used to explain academic emotions (2006). Emotions, according to this idea, are collections of interconnected psychological processes that include emotional, cognitive, motivational, and physiological components (Pekrun et al. 2011). Subjective control and value are evaluated in this philosophy.

Online learning gives the education to reach many students without requiring learners and professors to be in the same environment. Therefore, it allows individuals to attend the courses even in illness, bodily restraint, and catastrophe states. Online learning has become a requirement in the COVID-19 pandemic, as well (Dhawan, 2020). Online education has adopted the learners' flexibility in coping, resounding on, and accomplishing their objectives. However, an individual should have both the required information/skills and emotional possessions such as attitude and enthusiasm to have online learning in the most effective way (Yurdugul & Demir, 2017).

1.2 Statement of the Problem

This study aims to determine the academic emotions of the pre-service teachers of the College of Teacher Education in Zamboanga Peninsula Polytechnic University in mathematics online class during the second semester of the school year 2020-2021. Specifically, the study seeks to answer the following questions.

General Statement: Is there a significant relationship between the academic emotions in mathematics online classes of the pre-service teachers?

STATEMENT 1: To what extent do the following academic emotions experience by pre-service teachers during the mathematics online class?

a) Hopelessness
b) Boredom
c) Anger

d) Anxiety

e) Enjoyment

f) Pride

1.3 Significance of the Study

This study is significant to the following:

Student

Let students know the advantage or disadvantages of conducting mathematics online classes among pre-service teachers during this time in our present situation.

Parents

The parents must give strong support to their children's studies. Let them clarify the situations that happen to us in this pandemic so that they would not just let their emotions be the ones to rule over them.

Teachers

The teachers need to know their students' academic skills and understand every one of their students' knowledge/capabilities in doing the mathematics online class among pre-service teachers.

Future Researcher

They are to choose some details here regarding the academic emotion experience in mathematics online class. It can give them guidance or some stuff that they can relate to.

1.4 Scope and Delimitation

This research focuses on determining the academic emotions experience in mathematics online class among pre-service teachers of Zamboanga Peninsula Polytechnic State University of the school year 2020-2021. The respondents are students of the College of Teacher Education Department who has a mathematics online class for the second semester.

Review of Related Literature and Studies

This chapter contained a review of related literature which consists of different authors with different outcomes of their research studies about the Academic Emotion experience in mathematics online class among pre-service teachers. On the other hand, the research study of each author launched in different years.

2.1 Related Literature

General wisdom has it that emotion is antithetical to thinking; the coolest head prevails (Barbalet, 2002). This may be the reason that, until recently, emotion and learning have received little attention in the development of education and instructional models. We may have Bloom and colleagues to thank for introducing us to the notion of affect as a learning domain (Krathwohl, 2002; Morrison, Ross, & Kemp, 2004)

"In recent years, there has been a growing interest in the role of emotions in academic settings, especially in how emotions shape student engagement and learning" (Linnenbrink-Garcia & Pekrun, 2011, p. 1). Educational psychology has long considered motivation, particularly achievement motivation concerning education performance, to be related to emotion (Weiner, 1985; Artino, 2009; Artino & Stephens, 2006). Callahan (2004) called for educators who espouse critical theory to "manage the emotions in their classrooms actively" (p. 82). He pointed out that "the very praxis of critical theory relies on emotion as its catalyst" (p. 75). Dirkx (personal communication, 2005) questioned the appropriateness of "management" of emotion in learning environments. However, the

impact on particular emotional states in relation to the learning environment is still to be understood.

The underlying issue of emotions connected to mathematics performance has been researched thoroughly through lenses of resilience, anxiety, sense of belonging, motivation, and perception of mathematical ability (Clarke, et al., 2014; Hochanadel & Finamore, 2015; Kulkin, 2016). Overall, emotions are defined through multiple levels of the taxonomy of the affective domain written by Krathwohl, Bloom, and Masia (1973). Learners respond to their emotions through varying levels of effectiveness. In the lowest level, known as receiving, students are aware of their emotions, beliefs, and attitudes. An example of this would be that students are aware that they have a negative attitude towards mathematics. In the second level, responding, students demonstrate a change in emotion, such as expressing a more positive affect in mathematics. In the second level, the students would express a change in emotions, beliefs, and attitudes for a short time like a class period or over the course of a few weeks. In the third level of the affective domain, valuing, students show a commitment by demonstrating a continued focus on the changing emotions, beliefs, and attitudes than what would be considered responding. This could be seen as a student having a more positive outlook in mathematics throughout an entire semester or school year compared to only during a few lessons in the responding level of effect. In the fourth level of the affective domain, organization, the student transitions the emotion, belief, or attitude into a priority or goal. In this fourth level, the effect has become part of who the student is as a person. This level reflects that the student has adopted the emotion, belief, or attitude as part of their "life philosophy."

Frenzel and Goetz (2007) describe three reasons why understanding emotions connected to learning and achievement are important. The first reason is that emotions are crucial to well-being and psychological health. The second is the significant impact emotions play in student learning and achievement. Third, cognitive competencies predict academic ability, but emotional variables predict course enrollment and career pursuits. In this, emotions play a large role in what we as humans -and specifically young adults do and how we do it. In our personal experiences, we can all find times when we chose to do things, we enjoy over things we did not enjoy as much, even if we were good at the task. For example, think of the emotions brought forth when thinking of timed times table quizzes from math. You may be skilled at the times tables, but the thought of having to complete the task and the emotions tied to the task may result in avoidance of the task.

A key emotion considered a time and again in mathematics education is anxiety. Ruff and Boes (2014) indicate that causes of mathematics anxiety include social, cognitive, and academic factors, which are related to mathematics avoidance. Social factors include societal stereotypes of race and gender, as well as parental expectations. Specifically, the negative social factor that has a large effect is the stereotype that suggests girls are not as good at mathematics as boys (Frenzel, et al., 2007; Spencer, Steele, & Quinn, 1999). Another significant social factor is the parents' beliefs and feelings about mathematics (Ruff & Boes, 2014). For example, if a parent believes in the value of mathematics, then this importance is imprinted on their children. In the opposite effect, if parents have negative beliefs and emotions connected to their mathematical experience, then those may be imprinted on their children.

Cognitive factors that impact mathematics anxiety are related to learning disabilities and stress, as well as a level of working memory (Ruff & Boes, 2014). In general, performing mathematics tasks requires higher working memory (Raghubar, Barnes, & Hecht, 2010). Working memory and cognitive factors can be thought of as a desk working space; more open clear space allows for more working room, whereas a small and/or disorganized desk reduces the working space. In considering cognitive factors in this way, it is easier to visualize how more complex tasks like mathematics, which need ample workspace, would cause stress if the desk space was small and/or disorganized. We can also visualize the students on the opposite side of the spectrum who have a more organized and open space to work and how they would be able to accomplish the same task with less stress, anxiety, and other negative emotions. Finally, academic factors include ineffective teaching styles, teachers who are uncomfortable with mathematics, and traditional mathematics curriculum and practices (Ruff & Boes, 2014).

These factors all bring about emotions that can negatively impact a student's desire to complete tasks, specifically mathematics-related, and include hopelessness, shame, and anxiety (Frenzel et al., 2007). Overall, the research directs educators to openly address emotions related to mathematics anxiety and help students work through them (Kulkin, 2016; Ruff & Boes, 2014). This means teachers should discuss how emotions affect the way students perceive and act regarding tasks and teach students how to work through emotions.

Along with these factors, helping students understand that intelligence is not fixed and can be changed encourages students to persevere and work through emotions. Yeager and Dweck (2012) have shown that students who perceive intelligence as fixed

or unchanging lose motivation to learn once tasks become difficult because they feel they have reached the precipice of their natural ability to complete the task and cannot go any further. However, if the students believe that intelligence can change (have a growth mindset), they would persist until they could master the task (Yeager & Dweck, 2012). The concept of fixed intelligence brings in related anxieties and stress as the students reach the point in their learning where they find themselves challenged and are unable to cope with and appropriately address these emotions (Hochanadel & Finamore, 2015; Yeager & Dweck, 2012).

2.2 Related Studies

In past research, studies on achievement emotions typically focused on emotions relating to achievement outcomes (e.g., research on test anxiety, Zeidner, 2007; studies on emotions following success and failure, Weiner, 1985). The perspective used here implies that emotions about achievement-related activities are also considered to be achievement emotions. Examples of outcome-related achievement emotions are the joy and pride experienced by students when academic goals are met, and the frustration and shame when efforts fail. The excitement arising from learning, boredom experienced in classroom instruction, or anger about task demands are but a few examples of activity-related emotions. Activity emotions have traditionally been neglected by research on achievement emotions. The present perspective implies that the scope of existing research should be broadened to include this important class of emotions as well.

The aim of the research study reported in this article was to investigate how adult learners talk about their emotions in the context of a year-long online course, the first

online course these adults take, as part of a distance education program. The theoretical and methodological approach focused on formulating an account of how emotion discourses are used by learners, what role they play in online learning, and how they change over one year (if they do so). The findings of this study provide three insights: (1) they show how adult learners (who also happen to be novice online learners) respond emotionally and talk about their emotions in relation to online learning; (2) they call attention to how emotion talk changes from the beginning of the course to the end, always in response to specific demands and dimensions of online learning; and (3) they reveal the differential emotional responses between men and women in relation to their social and gender roles and responsibilities. The empirical and policy implications of this study are discussed at the end.

Cleveland-Innes, M., & Campbell, P. (2012). Emotional presence, learning, and the online learning environment. In spite of evidence that more and more students are engaging in online learning experiences, details about the transition for teachers and students to a new learning environment are still unconfirmed. While new technologies are often expected to make work easier, they also involve the development of new competencies. This change may, in itself, elicit an emotional response, and, more importantly, emotion may impact the experience of online learning. Knowledge about the impact of emotion on learning broadly is available, but not about emotion and online learning. This study presents evidence of emotions present in online environments, and empirical data which suggests emotional presence may exist as a fundamental element in an online community of inquiry.

Marbán, J.M., Palacios, A. & Maroto, A. Enjoyment of teaching mathematics among pre-service teachers. Teacher training is a key element of any quality education system. In the field of mathematics education, identifying the factors that determine positive attitudes towards the teaching of this discipline in the context of initial teacher training is an inherent challenge. This work approaches the issue from a multivariate point of view through a model based on structural equations, in which beliefs, emotions, and attitudes towards mathematics are intertwined in explaining their enjoyment of teaching. The results show us that anxiety is a factor with a significant influence over the other components of the mathematical affective domain and that it is through this influence that it acts on the enjoyment of teaching mathematics.

2.3 Theoretical Framework

In the control-value theory, achievement emotions are defined as emotions tied directly to achievement activities or achievement outcomes. Achievement can be defined simply as the quality of activities or their outcomes as evaluated by some standard of excellence (Heckhausen, 1991). By implication, most emotions pertaining to students' academic learning and achievement are seen as achievement emotions, since they relate to behaviors and outcomes that are typically judged according to standards of quality-by students themselves and by others. However. not all of the emotions in educational settings are achievement emotions. Specifically, social emotions are frequently experienced in these same settings, as for example, a student's caring for a friend in the classroom. Achievement and social emotions can overlap, as in emotions directed towards the achievement of others contempt. envy, empathy, or admiration instigated by the success or failure of others; see Weiner, 2007).

Academic Emotion and Online Learning

Daniels and Stupnisky (2012) argued that emotion research in online learning has made it “more important than ever to consider the source of the emotion in addition to the emotion itself,” asserting that students are likely to “experience emotions in response to the technology itself.” Accordingly, Regan et al. (2012) suggested that the factors affecting emotions in technology-enriched learning environments are different from those that influence emotions in traditional, on-campus environments. Therefore, domain-specificity, as well as technology acceptance and use are both important determinants for analyzing achievement emotions of university students in an online learning environment.

Numerous studies describe how technology is used in different domains. For example, Schmid et al. (2017) showed that teacher students in Germany are in comparison to students of other disciplines the most skeptical one is when it comes to the use of digital media. Moreover, teacher students are less motivated than other students to use digital media.

Research on technology acceptance tries to find factors that explain user attitudes, behavioral intention, and ultimate usage behavior. Davis (1985) postulated the expected benefits (value) and the expected user-friendliness (control) as important predictors of user acceptance in technology-enriched learning environments. Technology acceptance is not only reflected regarding the frequency of using technology but rather affective experience is closely linked to the concept of acceptance: "Acceptance includes a relatively permanent cognitive and affective perceptual component, coupled with a positive willingness to react to an e-learning system (attitude level), as well as a behavioral component that implies an actual use of the system (behavioral level)" (Olbrecht, 2010; translated from German).

The technology acceptance model (TAM) developed by Davis (1985) and Venkatesh and Davis (2000) theorizes that perceived usefulness influences attitudes and beliefs toward technology usage, and it is an important determinant of individuals' intentions to use the technology. Furthermore, Venkatesh (2000) argued that in addition to perceived usefulness the perceived ease of use is an important determinant for attitudes toward technology. Perceived control, intrinsic motivation (playfulness), and emotion (anxiety) have been tested as influencing users' perceptions about technology's ease of use. The

empirical results indicated that up to 60% of the variability of perceived ease of use as explained in this model (Venkatesh, 2000).

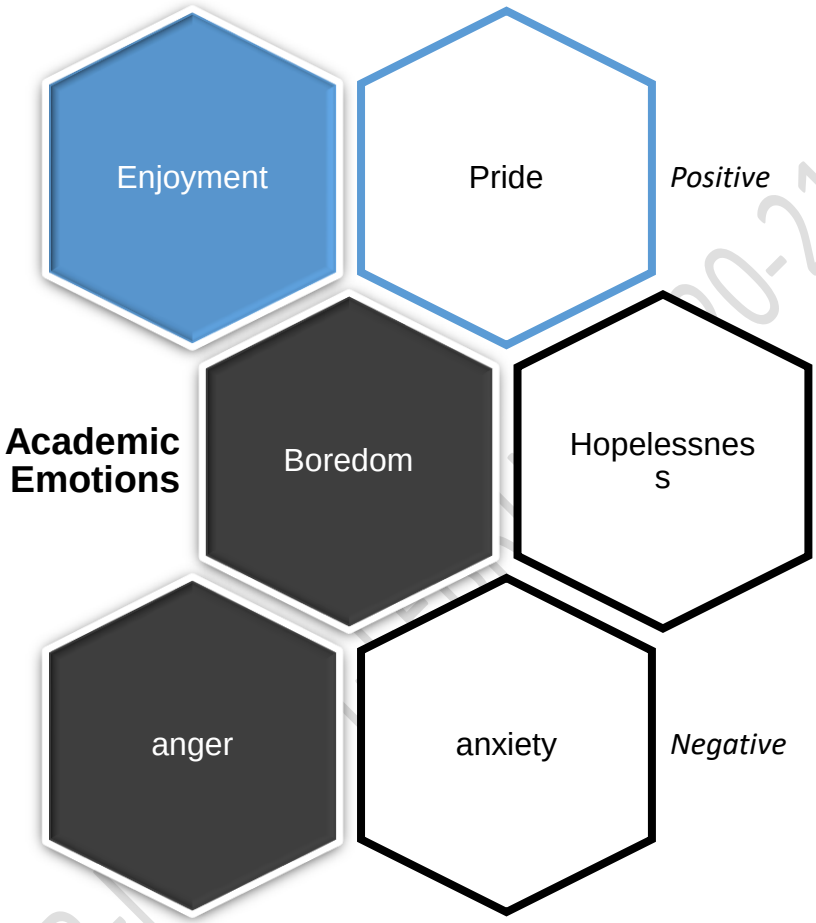
According to TAM, a student's intention to use an online learning system is determined by one's beliefs and attitude toward using the online system and the perceived usefulness of the system. Consequently, when the online learning system is perceived as easy to be used, the higher will be the student's perceived ability to use this online system successfully, and hence the student will experience more positive emotions and perform better in an online course (Venkatesh and Bala, 2008). Individual variables, such as self-efficacy, intrinsic motivation, cognitive absorption (Saadé and Bahli, 2005), and computer anxiety were all confirmed as determinants of the perceived ease of use (Gefen and Straub, 1997; Chang and Cheung, 2001; Gefen et al., 2003). External variables, such as characteristics of the learning environment affect the perceived usefulness directly or indirectly through the perceived ease of use (Compeau et al., 1999).

For example, Wong (2015) showed that teachers in Hong Kong have a positive attitude toward technology, with perceived usefulness having a greater impact on behavioral intention than perceived usability. In Germany, the TAM was used to evaluate the acceptance of the learning management system of the University of Oldenburg by students, lecturers, and administrators (Hamborg et al., 2014). It has to be considered that technology-based learning environments may hinder the learning process if the technology is perceived by students as being too complex and not useful to enhance their performance. Saadé and Kira (2006) showed in a study based on a structured equation modeling simulation that the influence of emotions (anxiety and pleasure) on perceived usefulness is indirectly moderated through the perceived ease of use.

Further studies focused on information systems and investigated the TAM constructs concerning affect and anxiety (Agarwal and Karahanna, 2000; Venkatesh and Davis, 2000; Saadé and Kira, 2009). However, research is missing that applied TAM not only to anxiety and affect but also to different positive and negative achievement emotions, and an online learning environment in teacher education.

2.4 Conceptual Framework

Fig. 1: An overview of the study



*Legend: (blue: positive emotion; black: negative emotion; Filled shape: Activity Focus; Not filled: Outcome focus)

Research Methodology

This chapter the methodology employed in the research. This includes the research design, population and sample, research instrument, and data gathering.

3.1 Research Design

A Quantitative research design with cross-sectional surveys. Cross-sectional surveys are a type of observational research that analyzes data of variables collected at one given point in time across a sample population or pre-defined subset. The goal of these studies is to investigate the current situation; they do not seek to investigate change and the factors that cause the change.

A cross-sectional study involves looking at data from a population at one specific point in time. The participants in this type of study are selected based on particular variables of interest. Cross-sectional studies are observational in nature and are known as descriptive research not casual or relational, meaning that you can't use them to determine the cause of something, such as a disease. Cross-sectional studies, unlike other forms of retrospective studies, do not monitor individuals over time. {Wang & Cheng 2020}. It will be conducted through a google form due to the schools' health protocols due

to the Covid-19 Pandemic. It will be collected through the internet because we can't follow the standard procedure due to our situation.

3.2 Population and Sampling Procedure

The target respondents of this research study are the pre-service teacher of the College of Teacher Education (CTE) who is officially enrolled in mathematics online class during the second semester, the school year 2020-2021 of Zamboanga Peninsula Polytechnic State University (ZPPSU).

Table 1. Course and Year Level with mathematics online class for 2nd semester.

COURSES IN CTE	*1ST YEAR*	*2ND YEAR*	*3RD YEAR*	*TOTAL*
BEED	*36*	*87*	*60*	*183*
BSED MATH	*41*	*41*	*34*	*116*
BTLED HE	*0*	*32*	*0*	*32*
BTLED IA	*0*	*22*	*0*	*22*
BTLED ICT	*0*	*15*	*0*	*15*
BTVTED AUTOMOTIVE	*10*	*14*	*0*	*24*
BTVTED CIVIL TECHNOLOGY	*11*	*0*	*0*	*11*

BTVTED FSM	*0*	*29*	*0*	*0*	*29*
BTVTED GARMENTS	*0*	*19*	*0*	*0*	*19*

Table 2: Stratified Sampling/Systematic Sampling

Course	*N*	*%*	*N*
BEED	*183*	*40.58*	*57*
BSED- MATH	*116*	*25.72*	*36*
BTLED	*69*	*15.13*	*22*
BTVTED	*83*	*18.40*	*26*
TOTAL	*451*	*100*	*141*

3.3 Research Instrument

Based on a Likert scale (1= Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree), students indicated the extent to which they experience academic emotion measured with Pekrun et al.'s (2005) Achievement Emotion Questionnaire (AEQ), and the researchers adopted the tools. The questionnaire is divided into two sections: a class version and a test version. The class version was chosen for the study. A 24 items questionnaire broke up into six (6) academic emotions, each with four questions.

The adopted questionnaire was subjected to a validation process for content validity using Cronbach's alpha: Hopelessness has a Cronbach's alpha of 0.87; Boredom has a Cronbach's alpha of 0.78; Anger has a Cronbach's alpha of 0.80; Anxiety has a Cronbach's alpha of 0.85; Enjoyment has a Cronbach's alpha of 0.85; and Pride has a Cronbach's alpha of 0.73, indicating that the questionnaire is valid.

Following the validation of the questionnaire, a pilot test was conducted on the instrument with 30 students from various courses at Zamboanga Peninsula Polytechnic State University, who are not the target respondents for the real study. This was done to see how the subject will react to the questionnaire; whether the items are clear and easy to understand; whether more items are needed in certain areas; or whether there are any items to which they would prefer not to respond; and to determine the feasibility of the proposed data analysis method for the study.

3.4 Data Gathering

The researchers approached the Dean for permission to conduct the study, and because of the pandemic and quarantine regulations, the researcher utilized messenger to contact the chairman of the Zamboanga Peninsula Polytechnic State University's College of Teacher Education program for a list of responders. Google Forms, a survey administration software, was used to collect data for the study.

Statistical Tools

Mean – is the average or the most common value in a collection of numbers. It is a measure of central tendency of a probability distribution along median and mode.

Standard Deviation – is a statistic that measures the dispersion of data set relative to its mean.

Pearson-r correlation coefficient - is a measure of linear correlation between two sets of data. It is the ratio between the covariance of two variables and the product of their standard deviations; thus, it is essentially a normalized measurement of the covariance, such that the result always has a value between −1 and 1.

Results and Discussion

This chapter will bring in the presentation of the findings and analysis derived from the online survey. A total of 141 respondents were received from the target group of pre-service teachers who had an online math class this second semester of the school year 2020-2021. Tables have been used to facilitate simplistic reading-friendly writing. Finally, the summary of this chapter is provided.

Research Problem 1. To what extent do the following academic emotions experience by pre-service teachers during the online math class?

Table 4.1: Level of Academic Emotions

Academic Emotions	*Mean*	*SD*
Boredom	*2.67*	*0.56*
Hopelessness	*2.53*	*0.63*
Anger	*2.35*	*0.61*
Anxiety	*3.35*	*0.62*
Enjoyment	*3.37*	*0.50*
Pride	*3.59*	*0.51*

The table above indicates that the level of academic emotion experienced by pre-service teachers during the online math class relative to; boredom, hopelessness, anger, anxiety, enjoyment, and pride. Under mean the higher weighted mean down to lowest are pride (3.59), enjoyment (3.37), anxiety (3.35), boredom (2.67), hopelessness (2.53), and anger (2.35). under standard deviation, the higher weighted standard deviation down to the

lowest are; hopelessness (0.63), anxiety (0.62), anger (0.61), boredom (0.56), pride (0.51), and enjoyment (0.50).

Based on the finding, the majority of the pre-service teachers experience more positive emotion than negative emotions in mathematics online classes, specifically pre-service teachers enjoy and is proud in their achievement in mathematics online classes. The table also shows that despite the enjoyment, pre-service teachers experience anxiety in mathematics online classes. According to the control-value theory, partial control on activity will instigate anxiety if the focus is on failure. And among six (6) emotions anger is the least felt emotion.

Research Problem 2. Is there a significant relationship between the academic emotions of the pre-service teachers?

The table below demonstrates how to interpret the size (strength) of a correlation coefficient. (Parvez Ahammad)

Table 4.2: Pearson-r Correlation Coefficient and Coefficient of Determination of each academic emotion.

Size of Correlation	Interpretation
.90 to 1.00 (−.90 to −1.00)	Very high positive (negative) correlation
.70 to .90 (−.70 to −.90)	High positive (negative) correlation
.50 to .70 (−.50 to −.70)	Moderate positive (negative) correlation
.30 to .50 (−.30 to −.50)	Low positive (negative) correlation
.00 to .30 (.00 to −.30)	negligible correlation

Pearson - r Coefficient	*Coefficient of Determination*	*Interpretation*
0.67	*0.445*	*Moderate positive Correlation*

Boredom/Hopelessness (Legend: [s] Significant at alpha = .05 level.)

The table above indicates that there is a moderate significant positive correlation between boredom and hopelessness with a correlation coefficient of 0.67. It also indicates that 44.5% of the variance in the boredom to the hopelessness in the pre-service teacher. Pre-service teachers who are bored in mathematics online class are likely to instigate hopelessness. According to the control-value theory, boredom is created when the activity is neither highly nor negatively regarded. If expectations are too low, such as in repetitive regular tasks, there may be inadequate challenge and intrinsic value, resulting in boredom. If demands exceed capabilities and cannot be satisfied, it may be difficult to discern meaning from the activity, lowering its value. Furthermore, subjectively discounting tough content may aid in coping with the threat posed by high demands. Boredom may be experienced under both low and high demand situations, implying that it is a result of a lack of value. And no attainability of success will induce hopelessness.

Pearson - r Coefficient	*Coefficient of Determination*	*Interpretation*
0.61	*0.375*	*Moderate positive Correlation*

Boredom/anger (Legend: [s] Significant at alpha = .05 level.)

The table above indicates that there is a moderate significant positive correlation between boredom and anger with a correlation coefficient of (0.61). It also indicates a 37.5% variance in the boredom to the anger of the pre-service teacher in ZPPSU. Pre-service teachers who feel bored in mathematics online class instigate anger. Boredom is caused by the repetition and lack of interest in the details of our task. Also, a difficulty in discerning

the activity can be boring and can be irritating. According to Pekrun, if there is controllability, but the activity is negatively valued, anger is posited to be experienced. Examples are activities that can be performed, but are subjectively aversive because they require much mental or physical effort).

Pearson - r Coefficient	*Coefficient of Determination*	*Interpretation*
0.43	*0.186*	*Low positive correlation*

Boredom/anxiety (Legend: [s] Significant at alpha = .05 level.)

The table above shows a low relationship between boredom and anxiety of the pre-service teacher in the control group, with a correlation coefficient of 0.43. It also indicates that 18.6% of the variance in the boredom is attributed to the anxiety of the pre-service teacher in ZPPSU.

Pearson – r Coefficient	*Coefficient of Determination*	*Interpretation*
-0.48	*0.234*	*Low negative Correlation*

Boredom/enjoyment (Legend: [s] Significant at alpha = .05 level.)

The above table revealed a low negative relationship between boredom and enjoyment with a correlation coefficient of -0.48 with 23.4% of the variance. Thus, students who enjoyed the online math class did not feel bored. A study by Schukajlow showed a negative relation between the two emotions: The correlation between enjoyment and boredom was moderate and negative (-.51).

Pearson - r Coefficient	*Coefficient of Determination*	*Interpretation*
-0.30	*0.087*	*Low negative correlation*

Boredom/pride (Legend: [s] Significant at alpha = .05 level.)

The above table revealed a weak negative relationship between boredom and pride with a correlation coefficient of -0.30 and 8.7% of the variance in the boredom to pride in the pre-service teacher in ZPPSU. Pre-service teachers who feel bored are not likely be proud that they have no interest in mathematics online class

Pearson - r Coefficient	*Coefficient of Determination*	*Interpretation*
0.77	*0.592*	*High Positive Correlation*

Hopelessness/Anger (Legend: [s] Significant at alpha = .05 level.)

The above table revealed a high positive relationship between hopelessness and anger with a correlation coefficient of 0.77 with 59.2% of the variance in the hopelessness to anger in the pre-service teacher in ZPPSU. Pre-service teacher who is hopeless in their mathematics online class instigate anger. Hopelessness is posited to occur whenever a positive achievement outcome cannot be attained or a negative outcome is subjectively certain. As such, hopelessness is experienced both when cognitions focus on the nonattainability of success, and when the focus is on the nonavoidability of failure.

Pearson - r Coefficient	*Coefficient of Determination*	*Interpretation*
0.43	*0.190*	*Low positive correlation*

Hopelessness/Anxiety (Legend: [s] Significant at alpha = .05 level.)

The above table revealed a low positive relationship between boredom and enjoyment with a correlation coefficient of 0.43 with a 19% variance in the hopelessness to the anxiety of ZPPSU.

Pearson - r Coefficient	*Coefficient of Determination*	*Interpretation*
-0.54	*0.294*	*Moderate negative correlation*

Hopelessness/Enjoyment (Legend: [s] Significant at alpha = .05 level.)

The above table revealed a moderate negative relationship between hopelessness and enjoyment with a correlation coefficient of -0.54 with 29.4% of the variance in the hopelessness to the enjoyment of the pre-service teacher in ZPPSU. Feeling of hopelessness do not incite enjoyment in mathematics online class among pre-service teachers.

Pearson - r Coefficient	*Coefficient of Determination*	*Interpretation*
-0.44	*0.191*	*Low negative correlation*

Hopelessness/Pride (Legend: [s] Significant at alpha = .05 level.)

The above table revealed a weak negative relationship between hopelessness and pride with a correlation coefficient of -0.44 with 19.1% of the variance in the hopelessness to pride in the pre-service teacher in ZPPSU. Thus, implies that hopelessness has a small effect on the pride of the pre-service teacher in ZPPSU.

Pearson – r Coefficient	*Coefficient of Determination*	*Interpretation*
0.40	*0.156*	*Low positive correlation*

Anger/Anxiety (Legend: [s] Significant at alpha = .05 level.)

The above table revealed a weak positive relationship between anger and anxiety with a correlation coefficient of 0.40 with a 15.6% the variance in the anger to the anxiety of the pre-service teacher in ZPPSU. Thus, implies that anger has a small effect on the anxiety of pre-service teacher in ZPPSU.

Pearson - r Coefficient	*Coefficient of Determination*	*Interpretation*
-0.35	*0.125*	*Low negative correlation*

Anger/Enjoyment (Legend: [s] Significant at alpha = .05 level.)

The above table revealed a weak negative relationship between boredom and enjoyment with a correlation coefficient of -0.35 with a 12.5% the variance in the anger to enjoyment in the pre-service teacher in ZPPSU. Thus, implies that anger has a small effect on the enjoyment of pre-service teacher in ZPPSU.

Pearson - r Coefficient	*Coefficient of Determination*	*Interpretation*
0.65	*0.428*	*Moderate Positive Correlation*

Enjoyment/Pride (Legend: [s] Significant at alpha = .05 level.)

The above table revealed a moderate positive relationship between enjoyment and pride with a correlation coefficient of 0.65 with 42.8% of variance in the enjoyment to the pride of the pre-service teacher in ZPPSU. Implies that pre-service teachers who enjoy mathematics online class are likely to instigate pride. Pre-service teachers that are interested in mathematics online class and feels capable of dealing the teachers demand will enjoy studying. And accompanied by effort or one's ability in mathematics student will instigate pride. According to Pekrun, Emotions relating to achievement activities are assumed to depend on the perceived controllability of the activity and on its value. If the

activity is seen as being controllable and valued positively, enjoyment is instigated. According to Weiner, pride is held to be both ability- and effort-linked

Pearson – r Coefficient	*Coefficient of Determination*	*Interpretation*
-0.21	*0.046*	*Low negative correlation*

Anxiety/Enjoyment (Legend: [s] Significant at alpha = .05 level.)

The above table revealed a low negative relationship between anxiety and enjoyment with a correlation coefficient of -0.21 with a 4.6% of variance in the anxiety to enjoyment of the pre-service teacher in ZPPSU. Anxiety in mathematics online class has nothing to do with the enjoyment student experience in the mathematics online class.

Pearson - r Coefficient	*Coefficient of Determination*	*Interpretation*
-0.11	*0.013*	*negligible correlation*

Anxiety/Pride (Legend: [s] Significant at alpha = .05 level.)

The above table revealed a weak negative relationship between anxiety and pride with a correlation coefficient of -0.11 with 1.3% of variance in the anxiety to pride of the pre-service teacher in ZPPSU. Thus, implies that anxiety does not affect pride of the pre-service teacher in ZPPSU.

Pearson - r Coefficient	*Coefficient of Determination*	*Interpretation*
-0.375	*0.128*	*Low negative correlation*

Pride/Anger (Legend: [s] Significant at alpha = .05 level.)

The above table revealed a weak negative relationship between pride and anger with a correlation coefficient of -0.375 with 12.8 % of the variance in the pride to the anger of

the pre-service teacher in ZPPSU. Thus, implies that pride has a small effect on the anger of the pre-service teacher in ZPPSU.

Findings, Summary, Conclusion, and Recommendation

This chapter concludes the study by dealing with a summary of findings, conclusions, and recommendations on academic emotions experience in online math class among pre-service teachers in the Zamboanga Peninsula Polytechnic State University.

This study was conducted through google forms at Zamboanga Peninsula Polytechnic State University. The respondents were students of the College of Teacher Education Department who are enrolled in the online math class. A quantitative cross-sectional survey was employed in the study. The Statistical tools used were descriptive statistics and correlation/regression.

Descriptive findings revealed a high weighted mean among positive academic emotion: enjoyment 3. 37 and pride 3.59 compared to the negative emotion. Altogether, students experience more positive than negative emotions in online math classes in teacher education.

Second findings also revealed that there were positive associations between all negative emotions and especially high correlations emerged between hopelessness/anger Boredom/anger; and Boredom/hopelessness. Interestingly, these correlations between the negative emotions were higher ($.60 < r < .80$) than those between the positive emotions ($.60 < r < .70$). The other interesting association is the relationship between positive and negative emotion which shows a negative correlation ($-0.10 < r < -0.55$).

In a mathematics online class, teachers and institutions should encourage pleasant activity-related feelings, eliminate competing goal frameworks, and encourage autonomy and self-regulated learning.

Survey Questionnaire

5.1 Boredom

STATEMENT	(5)	(4)	(3)	(2)	(1)	(5) + (4)	(3)	(2) + (1)
I feel like leaving during online math class because it is so boring.	1	18	56	59	7	19	56	66
I still get bored during online math class.	1	21	65	50	4	22	65	54
Attending the online math class bores me.	0	10	64	59	8	10	64	67
I find the online math class fairly dull.	3	13	76	47	2	16	76	49

5.2 Hopelessness

STATEMENT	(5)	(4)	(3)	(2)	(1)	(5) + (4)	(3)	(2) + (1)
It's pointless to prepare for online math class because I don't understand the material anyway.	2	18	47	64	10	20	47	74
Even before entering the given link for online math class, I already know that I won't understand the material.	3	20	52	59	7	23	52	66
I'd rather not attend the online math class because there is no chance of understanding the material anyway.	0	8	38	78	17	8	38	95
I have lost all hope of understanding the math material.	5	15	47	69	5	20	47	74

5.3 Anger

STATEMENT	(5)	(4)	(3)	(2)	(1)	(5) + (4)	(3)	(2) + (1)
I feel anger welling up in me during the online math class	1	15	48	69	8	16	48	77
because I am angry, I get restless in the online math class.	1	11	36	83	10	12	36	93

Thinking about all the useless things I have learned in mathematics makes me irritated.	0	18	42	63	18	18	42	91
after the online math class, I am angry	0	5	3	75	30	5	3	105

5.4 Anxiety

STATEMENT	(5)	(4)	(3)	(2)	(1)	(5) + (4)	(3)	(2) + (1)
I worry about the difficulty of the things I might be asked to do in online math class.	14	59	56	10	2	73	56	12
I feel nervous in the online math class	18	43	57	18	5	61	57	23
I get scared that I might say something wrong in the online math class, I'd rather not say anything.	7	42	65	22	5	49	65	27
When I don't understand something in the online math class, my heart races.	8	50	65	18	0	58	65	18

5.5 Enjoyment

STATEMENT	(5)	(4)	(3)	(2)	(1)	(5) + (4)	(3)	(2) + (1)
I am motivated to attend online math class because it's exciting.	11	47	73	8	2	58	73	10
I enjoy attending the online math class.	5	42	83	11	0	47	83	11
I feel good when I'm in the online math class listening to the teachers talk.	19	56	59	7	0	75	59	7
I'm glad it paid off to go to the online math class.	4	31	89	16	1	35	89	17

5.6 Pride

STATEMENT	(5)	(4)	(3)	(2)	(1)	(5) + (4)	(3)	(2) + (1)
I take pride in being able to keep up with the material in the online math class.	4	47	78	12	0	51	78	12
I am proud of the contribution I have made in the online math class.	12	64	59	6	0	76	59	6

I think I can be proud on what I know about mathematics.	25	64	49	3	0	89	49	3
Because I take pride in my accomplishment in mathematics I am motivated to continue.	16	67	53	5	0	84	53	5

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