



Attitude Towards Teaching, Academic Motivation, Academic Self-Efficacy: Perceived Factors Influencing Pre-Service Science Teachers

Gelene A. Grospe LPT^{a*}, Cynthia C. Divina Ph.D^b, Eden S. David Ph.D^c,
Rhodora I. Dela Rosa^d

^{a,d}College of Education, Central Luzon State University, Muñoz, Nueva Ecija, Philippines

^{b,c}College of Science, Central Luzon State University, Muñoz, Nueva Ecija, Philippines

^aEmail: grospegeleneapanay@gmail.com

^bEmail: ccdivina@clsu2.edu.ph

^cEmail: eden.david@clsu2.edu.ph

^dEmail: ridelarosa@clsu.edu.ph

Abstract

To explore the level of academic motivation and academic self-efficacy of the pre- service science teachers and to investigate the relationships among these variables to the attitude towards teaching, mixed method research design was utilized. Specifically, the researchers employed an explanatory sequential design in which the quantitative data. The study is a quantitative study only and data were gathered through questionnaires administered to 151 pre-service science teachers. Results indicated that the participants had high levels of academic motivation, academic self- efficacy, and positive attitudes toward teaching. According to Pearson -r moment correlation results -academic motivation and academic self-efficacy were significantly correlated to attitude towards teaching.

Keywords: academic motivation; academic self-efficacy; attitude towards teaching; pre-service science teachers.

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* *Corresponding author.*

1. Introduction

Educational and instructional technology have altered and continue to alter the way online courses are conceptualized, designed, developed, and delivered. Some of these compelling and powerful notions, such as massive open online courses, or MOOCs, have the ability to modify our perceptions about the internet's role in reshaping education and training institutions [32]. While online learning expands the ways in which education is provided and accessed by learners, assessment procedures are frequently constrained in their variety and modes of delivery in the online setting [15]. Online learning environments can be classified into three types: synchronous, asynchronous, and hybrid. Online asynchronous learning environment is a text-based discussion that gives benefits associated with the absence of temporal and spatial constraints. The fact that this mode of online communication is time and location-independent improves self-directed learning and encourages greater involvement and flexibility in communication. The absence of physical presence protects against what refers to as "status signaling" and "social games" [34] which means that problems of race, gender, accent, or status have no bearing on the online conversation in the same way that they might in a face-to-face discussion.

Additionally, researchers have identified benefits such as opportunities for meaningful construction and negotiation, engaging students in meaningful online dialogue, promoting critical thinking processes, and achieving higher levels of abstract cognitive processes than with face-to-face communication. Furthermore, thorough, formal, and reflective responses and an enhanced motivation to engage and write well are facilitated by the existence of a real audience and purpose for communication [34]. Asynchronous platforms provide materials like as audio/video lectures, handouts, published papers, and power point presentations. This information is available at any time through a Learning Management System (LMS) or other similar channel. Asynchronous e-learning is the most widely used technique of online education. The possibility of delayed response enables individuals to exercise higher order learning abilities.

Motivation is one of the primary factors that contribute to university students' academic achievement. It is both an end goal and a means to an end. Students must identify with the learning objective in order to be motivated. Self-determination theory addresses intrinsic motivation and numerous forms of extrinsic motivation and discusses how they impact situational reactions across domains, as well as social and cognitive development and personality. Motivation according to [43] is mainly focusing on two types of motivation: intrinsic and extrinsic. Intrinsic motivation occurs when an individual acts for the enjoyment or challenge involved, rather than in response to external items, demands, or incentives. Reduced dependence on memory and notes, as well as increased opportunities for peer group discussions, contribute to the development of critical thinking and deep learning. In [56], self-efficacy refers to an individual's assessment of his or her capacity to perform and succeed at a task. Research in online learning has focused on the technology factor rather than the learning factor. Some studies have looked at multiple dimensions of self-efficiency, such as information seeking and information-seeking behavior. The role of self-efficacy in online learning environments is still in need of more investigations because of the limited information.

Adhering to a clearly defined path of becoming a teacher entails additional practice in addition to university

studies. Attitudes are critical in understanding teacher behavior and attitudes toward teaching, their learners, and the school environment. Attitudes are described as "a collection of views we have about a certain person, thing, event, or topic".

Online asynchronous learning modality, which utilizes communication technologies such as e-mail, discussion forums, and web applications to offer instruction without regard for a set timetable. Although research on the effects of asynchronous or live interaction on student perception, motivation, interaction, and sense of contribution is limited due to the relatively new synchronous web-conferencing tools, studies indicate that the absence or presence of synchronous or live interaction influences student perception, motivation, attitude, interaction, and sense of contribution [32]. This circumstance may influence preservice teachers' perceptions of professional competence, academic motivation and self-efficacy. A study of the literature suggests that examining pre-service teachers' educational beliefs and attitudes is important for at least two reasons: First, pre-service teachers' beliefs and attitudes influence their academic achievement as students. Second, when pre-service teachers begin teaching, their beliefs have a significant impact on their teaching process. Thus, knowing pre-service teachers' motivation, efficacy beliefs, and attitude toward teaching is important for educational quality enhancement [8].

Moreover, utilizing the qualitative methods, the present study aims to determine the factors affecting their academic motivation, factors affecting the academic self-efficacy and factors affecting attitude towards teaching in an online asynchronous learning modality. Dealing the factors affecting the three variables of the study, perceptions may and do vary because of environmental, cognitive, and behavioral effects that a person experiences in the course of daily life [47, 46]. These characteristics are congruent with the sources of self-efficacy outlined by [47], according to whom self-efficacy expectations are based on four key information sources: enactive mastery experience, vicarious experience, verbal persuasion, as well as physiological and emotional states. [22] revealed in a set of research that computer experience affected e-learning system self-efficacy. In addition, these results revealed that personal innovation with information technology (IT) and computer playfulness also affected e-learning system self-efficacy. [40] concluded that attitude and computer literacy had a strong beneficial influence on self-efficacy. [48] investigated the characteristics of self-efficacy in online learning. Motivation may be defined as the amount to which a person exerts consistent effort toward a desired outcome. Motivation may be determined both internally and externally by persons and sources owing to situational and environmental conditions. The cognitive aspect of attitudes consists of perceptions, beliefs, and presumptions about certain facts and occurrences. The affective component describes emotional experiences and emotional reactions to different facts and situations. Regarding the behavioral component, it reveals a person's intents and expectations about how he would respond to an information or occurrence, given his assumptions and beliefs. This is supported by the study of [11] indicated which underscored that the factors which carry impact on the attitude of the teacher include the home environment, family background, socioeconomic background, beliefs and educational institutions among others. School standing, school infrastructure, safety conditions in the school, social and professional standing all these aspects are crucial in casting imprint on the teachers' attitude.

1.1 General Objective of the Study

The general objective of this study was to evaluate the pre-service science teachers' attitude towards teaching as influenced academic motivation and academic self-efficacy in an online asynchronous modality. Moreover, the present study aimed to determine the perceived factors affecting the academic motivation, academic self-efficacy, and attitude towards teaching of the pre-service science teachers utilizing a mixed method research design.

1.2 Conceptual Framework

The framework of the study is anchored to the Self-determination Theory and Socio-Cognitive Theory. This section aims to connect the researcher to current knowledge through the use of these relevant theories. Readers and prospective researchers are provided with a foundation for hypothesis and research method selection.

Self-Determination Theory (SDT) is largely viewed as a sound method for assessing differences in students' learning strategies, perseverance, and performance and for connecting motivation to educational environments such as classroom climate [43]. SDT is a theoretical framework to human motivation and personality development that use conventional empirical techniques while emphasizing the relevance of people' inherent inner resources for personality development and behavioral self-regulation [43]. According to the study of [8] it appears reasonable to anticipate that students' academic motivation would improve as they proceed through their training program, owing to the teaching experience, which presumably provides greater opportunities for autonomy.

Social Cognitive Learning Theory views self-efficacy as a central concept, which he defines as "belief in one's capacity to plan and execute the courses of action necessary to generate specified attainments" [35]. The present study is focused only to a certain component of the SCLT which is the self-efficacy. Self- efficacy studies indicate that those with greater levels of self-efficacy are more likely to pursue tough objectives and maintain a strong commitment even in the face of obstacles. On the contrary, individuals with poor self-efficacy are more likely to avoid challenging jobs, demonstrate a lack of dedication and effort toward personal objectives, and are more susceptible to stress and despair [47,8]. To simply express, when an individual has a great deal of self, he or she may have a favorable attitude toward a certain thing; on the other side, when the individual's self- efficacy is low, the individual is more likely to have a negative attitude toward that matter.

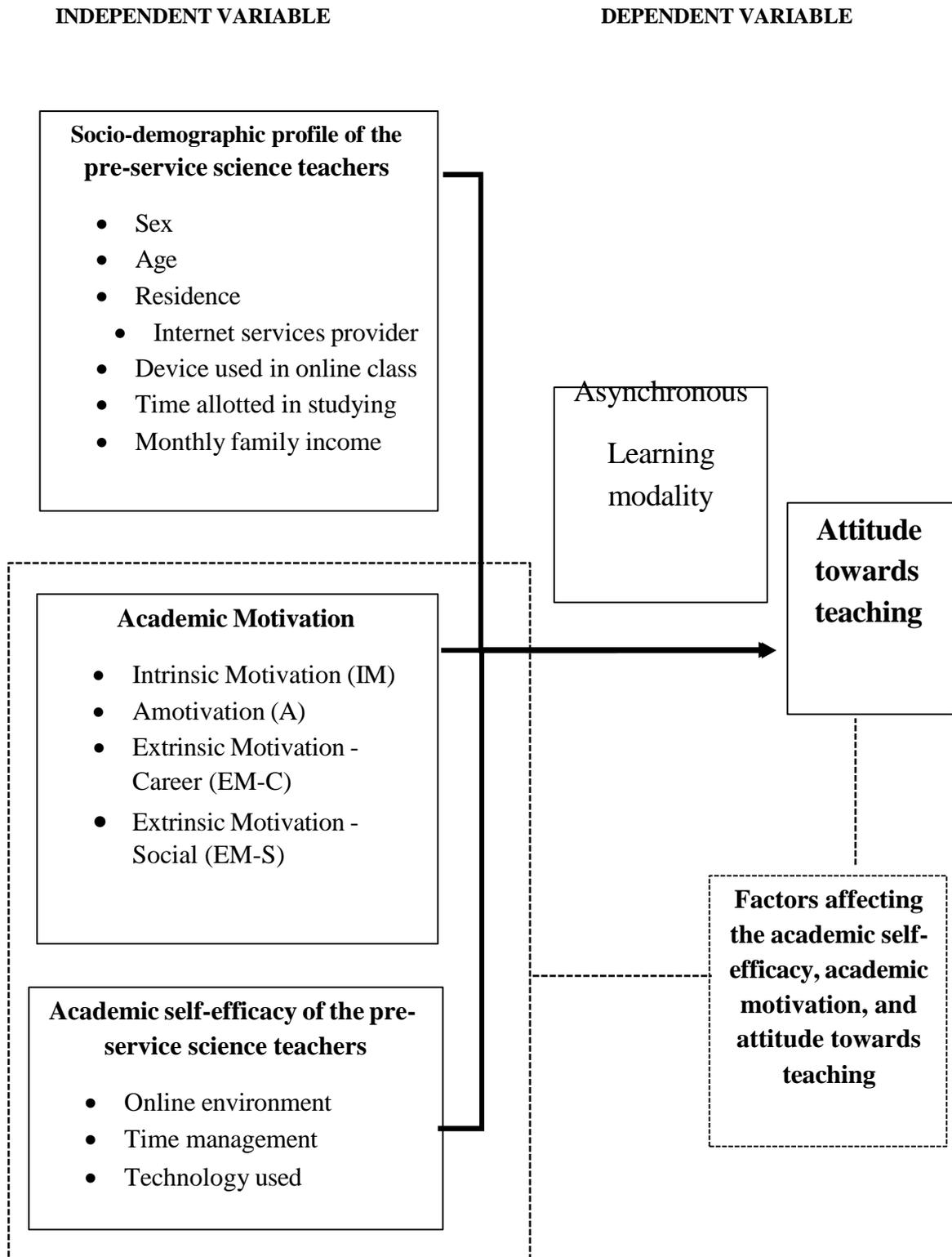


Figure 1: The Conceptual framework of the study showing the relationship between independent and dependent variable.

2. Methodology

2.1 Study sites

This study was conducted at the College of Education, Central Luzon State University (CLSU) at Science City of Munoz and Nueva Ecija University of Science and Technology-Sumacab (NEUST) Campus, Nueva Ecija, 2nd Semester School Year 2021-2022 were purposely selected as study sites (Figure 2). With the given the current situation, the universities offered the students to continue their education through asynchronous online learning modality.



Source: Google

Figure 2: Map showing the locations of the two universities

2.2 Respondents and Data Collection

Data for this study were collected through a survey of 151 secondary education preservice teachers major in Science/ General Science at CLSU and NEUST Sumacab Campus. The selected respondents were under asynchronous online learning modality and determined using purposive sampling method. In gathering the data, a communication letter was given first to the chosen locale of the study.

2.3 Instrument Used

The instrument used was adapted from the literatures which includes: *Academic Motivation Scale for Learning Biology: A Scale Development Study* by [6], the academic self-efficacy of pre-service science teachers from the 2019 study of [53] The scale was developed by [56], and the last part of the questionnaire is about evaluating the pre-service science teachers' overall attitude towards teaching profession from the study of [2] on the attitudes towards teaching profession among education students in Qatar.

2.4 Data Analysis

Socio-demographic profile and responses from questionnaires were tabulated. They were analyzed using appropriate techniques for quantitative data using the Statistical Package for Social Sciences (SPSS) and Pearson r-Moment of Correlation. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize quantitative data.

3. Results and Discussion

3.1 Socio-demographic Characteristics

Table 1 presents the socio-demographic characteristics of the pre-service science teachers. This includes sex, age, residence, internet service provider, device used in asynchronous learning modality, time allotted in studying and monthly income.

3.2 Sex

Table 1 shows that most of the respondents (75.50 %) were female showing that more females were enrolled in education degree than males. The result of the study conforms with the January 2019 report of the Philippine Statistics Authority (PSA), - that more females were enrolled than males. For School Year 2017-2018, PSA recorded a 55.6% of girls enrolled in Higher Education Institutions (HEIs) compared to boys enrolled in HEIs, averaging only 44.4 percent from a total of 2.99 million, schoolgirls outnumbered boys in enrollment. According to Eurostat, in 2015 women were representing 54.1 percent of all higher education students in UE-28. In the distribution of the respondents, the study stated that 77.9% of the respondents are enrolled in education. Overall, women represented almost two thirds of all the students in the arts and humanities area (64.6%) and men almost two thirds of the students in natural science, math, statistics, and ICT (61.3%). It implies that more females chose education course that support the study of [14] that teaching is a feminized profession.

3.3 Age

The age of the pre-service science teachers ranged from the bracket of 17 to 32 years, with the mean of 21 and a standard deviation of 1.59. Majority of the respondents were in the age bracket of 21- 24. The findings adhered that most of the respondents at the age bracket of 21-24 are in their expected graduation age. According to the Commission on Higher Education (CHED), tertiary education in the Philippines lasts between four and six years depending on the degree program. For a four-year degree program, it indicates that age 21 predominates in the fourth year or graduating year.

3.4 Residence

Table 1 presents that majority of the respondents (94 or 62.25%) were from rural areas and the rest from urban areas. This is because the study sites are in cities located in the province. This is supported by the study conducted by Kemp in 2021, where roughly 52.4 percent of the Philippines' population resides in rural regions, while the remaining 47.6% lives in urban areas.

Table 1: Respondents' Socio-demographic profile

PARAMETERS	FREQUENCY n = 151	PERCENTAGE %
Sex		
Male	37	24.50
Female	114	75.50
Age		
17 - 20	27	17.88
21 – 24	122	80.79
25 – 28	1	0.66
29 - 32	1	0.66
Mean = 21.48 ~ 21		
SD = 1.59		
Residence		
Urban	57	37.75
Rural	94	62.25
Internet Service Provider		
Wired/Wireless	93	61.59
Mobile Data	58	38.41
Device Used in Asynchronous Online Modality		
Cellphone/Mobile Phone	117	77.50
Computer (Laptop/Desktop)	34	22.50
Time Allotted for Studying		
1 – 3	31	20.53
4 – 6	100	66.23
7 – 9	17	11.26
10 – 12	2	1.32
13 – 15	1	0.66
Mean = 5.02		
SD = 1.93		
Monthly Family Income		
Less than ₱10,000	58	38.41
₱10,000 - ₱19,999	72	47.68
₱20,000 - ₱29,999	14	9.27
₱30,000 - ₱39,999	3	1.99
₱40,000 - ₱49,999	2	1.32
₱50,000 and above	2	1.32
Mean = ₱11,867.50		
SD = 10,590.70		

3.4 Internet Service Provider

Majority of the respondents (93 or 61.59%) were using Wired/Wireless Internet connection and 58 or 38.41%

were using mobile data. Majority of the respondents were subscribed to a stable and unlimited internet with a higher mbps (megabits per second) as a major tool for online studying during the pandemic. Lack of internet connection may influence in several ways students' academic performance. Without internet, students cannot communicate with professors or classmates or do activities/tasks. In a study conducted of [13] students come from regions with inadequate internet connectivity, with considerable geographical and institution-specific differences and from places with the lowest internet access are more likely to be economically disadvantaged. Specifically, the findings imply that certain HEIs may need to prioritize access to campus amenities and services for disadvantaged students residing in locations with inadequate internet connection.

3.5 Device Used in Asynchronous Online

As shown in Table 1, 117 or 77.50% of the respondents used mobile phones/smart phones in studying while 34 or 22.50% used computer/laptop. Most of the respondents used the available gadgets they have in studying in an online learning modality. This is an indication that teaching, and learning can be done thru a user- owned device which can be placed into the pockets of the students and teachers especially during the new normal. Similar to the result of the study conducted in Botswana, it revealed that an increase in the emergence of smartphones with capabilities comparable to computers [44]. The growth of mobile phones coincides with the education sector's efforts to make learning pervasive through digital technologies which provide accessible and equal access to higher education [42]. Smartphones promote the proliferation of the new learning modality, which facilitates learning through the discussions across numerous settings between students and their teachers by using personal interactive devices [42].

3.6 Time Allotted for Studying

Table 1 shows that the pre-service science teachers' time allotted for studying ranged from 1-3 up to 13-15 hours per day, with the mean of 5 hours and a standard deviation of 1.93 hours. Table shows that majority (100 or 66.23 %) of the respondents were spending 4-6 hours in studying. This shows that the respondents were diligent in studying in a new normal mode of learning. A good study habit is a predictor of academic success. Along with other factors, it is a common belief that effort, is an important indicator of student performance. The students' effort by the number of attempts made in answering an activity and the number of hours spent on repeating the tests and found that student effort is positively connected with students' academic achievement Reference [45]. This is supported by the study of [38] indicating that parameters such as motivation and study time interact strongly with ability to affect academic achievement.

3.7 Monthly Family Income

The monthly family income of the respondents ranged from the bracket of less than ₱10,000 up to ₱50,000 and above, with the mean of ₱11, 867.50 and a standard deviation of ₱10, 590.70. Fewer than half of the respondent's family income earns minimum wage since majority of them were living in rural areas. This was confirmed by the Philippine Statistics Authority (Nueva Ecija QuickStat) that the average income for a family was ₱121,995 pesos annually, which roughly translates to ₱10,166 pesos per month since the major source of

income in the province was still agriculture.

Table 2: Pre-service teachers' academic motivation

PARAMETERS	MEAN	SD	DESCRIPTION
Intrinsic Motivation			
Learning new things on the science subjects that are interested in is enjoyable.	4.47	0.59	Strongly Motivated
Enjoying sharing the new things that learned in science.	4.45	0.67	Strongly Motivated
Enjoying learning science subjects.	4.45	0.60	Strongly Motivated
Interested in science subjects.	4.41	0.67	Strongly Motivated
Enjoying making discussion on science subjects.	4.25	0.73	Strongly Motivated
Enjoying reading magazines and texts related to science.	4.05	0.77	Strongly Motivated
Pooled Mean	4.35	0.67	Strongly Motivated
Amotivation			
Having no idea and do not understand how useful the things I learned will be.	2.62	1.14	Neutral
In fact, I don't like participating the activities in science.	2.50	1.15	Motivated
Thinking that the subjects that I learned will not be useful in the future.	2.42	1.17	Motivated
Not knowing the reason for why I am learning science.	2.27	1.15	Motivated
Not seeing any reason for learning science.	2.09	1.20	Motivated
Pooled Mean	2.38	1.16	Motivated
Extrinsic Motivation-Career			
To get a good job in the field of science.	4.30	0.73	Strongly Motivated
To be able to make better choices for university.	4.21	0.82	Strongly Motivated
Because it is related to the profession that I chose for my future	4.18	0.76	Strongly Motivated
Because it is important in my choice of profession.	4.13	0.82	Strongly Motivated
Pooled Mean	4.21	0.78	Strongly Motivated
Extrinsic Motivation-Social			
To prove myself that I can be successful in science subjects.	3.95	0.92	Highly motivated
To show my family that I'm successful in science.	3.93	0.93	Highly motivated
To be praised by the people around me.	3.62	1.04	Highly motivated
PARAMETERS	MEAN	SD	DESCRIPTION

To show that I'm better than the other students.	2.33	1.22	Highly motivated
Pooled Mean	3.46	1.03	Highly motivated
Over-all Mean	3.60	0.90	Highly motivated

Legend:

1.00 – 1.79	Moderately motivated
1.80 – 2.59	Motivated
2.60 – 3.39	Neutral
3.40 – 4.19	Highly motivated
4.20 – 5.00	Strongly motivated

3.8 Academic Motivation

Table 2 presents the academic motivation of the pre-service science teachers. This includes intrinsic motivation, amotivation, extrinsic motivation-career and extrinsic motivation-social.

3.9 Intrinsic motivation

Table 2 presents the result of the study and it showed that the respondents were perceived to be strongly intrinsically motivated in studying science subject. The respondents were engaged with the program and having a high interest with the area of specialization. They were highly motivated in learning new things on the science subjects that they are interested in, they enjoyed learning science subjects and enjoyed sharing the new things, reading magazines and texts related to science.

Similar to the study of [50] an interest in the field and subject taught, self-improvement, and an ideal way of life as aspects of millennial preservice teachers' intrinsic motivation and identified a significant relationship between preservice teachers' intrinsic motivation and their perceived professional competence. Knowledge of subject matter, pedagogy, and education is acquired through professional development through teacher training program of student teachers. This could possibly enhance their knowledge, skills, and behavior to ensure that they could start their teaching career with the necessary dispositions to be a successful teacher

This implies that the students had favorable perspective in learning science. This claim was supported by the study of [10] indicating that nearly 80 percent of respondents enjoy studying biology and believe that it offers them a feeling of satisfaction. They reported that students put in significant effort to understand biology and that achieving a high grade is essential to them. In addition, 64% have self- confidence in biology courses, biology experiments, and biology examinations, and think that biology is important to their everyday lives and career aspirations, such as choosing a profession and obtaining a decent job. It is well-known that achieving excellent grades and obtaining a decent job are two of the most essential concerns for college students, which justifies these results.

3.10 Extrinsic Motivation- Career

As shown in Table 2, the respondents were perceived to be strongly extrinsically motivated by the rewards that could affect their future careers. Similarly, the respondents strongly agreed that they were extrinsically motivated in learning science when it comes to career considerations. The results showed that it could be a factor to make a better choice for universities, to get a good job and an important factor in their choice of profession in the field of science. Similar to the finding of [24] revealed that the essential elements in achieving success in the teaching profession is having positive characteristics such as motivation, psychological well-being, and life satisfaction

The present study found that the respondents were extrinsically motivated with a high hope of having a good future in their teaching career. This is supported by the study of [33] which revealed that the high influence of resource-based instructions that inspired students to learn biology education as their chosen profession, achieved higher upon becoming professional biology teachers.

3.11 Extrinsic Motivation- Social

The result of the study showed that the respondents were perceived to be extrinsically highly motivated considering their capabilities and the people around them. This finding implies that the influence of socialization, prior teaching and learning experiences are just some of the most significant factors for preservice teachers when studying and making their career choice [27].

The respondents were highly motivated in studying to prove that they can be successful and show to their families that they are successful in science. The present study also showed that the respondents were not into competition with their classmates for disagreeing that they are motivated to show that they are better than the other students. It implies that the respondents were moderately motivated extrinsically to establish themselves in their area of specialization. However, the result of the study also showed that the respondents were not considering their classmates as a competitor in their field. This finding is consistent with earlier studies of scholars [1] who claimed that social utility values is a significant factor influencing pre-service teachers to pick teaching as a career choice.

3.12 Amotivation

On the contrary, the result of the study implies that the respondents shared the same perspectives about learning science subject. So, it can be concluded that learning science subject is essential for the life of the respondents in the future. This could be explained by the study of [23] that the engagement is an act for personal pleasure or satisfaction. This can be concluded that preservice teachers were enjoying their experiences linked with learning, intellectual development and discovery in their training program.

The respondents disagreed that they do not like participating the activities in science and that they do not see any reason for learning science. The present study also revealed that they are undecided about the how useful the things they will learn about science. This showed that the preservice science teachers were considering that

science subject is relevant to their life in the future and are perceived to be engaged in the different activities in science and determined to learn. Similar to the study of where amotivation is defined as the lack of intent to participate in an activity [43] and has been related with student exhaustion, boredom and inactive participant, low effort, intention to quit school, tardiness and absenteeism. As illustrated in this research, amotivation is a primary predictor of academic achievement, which can be attributed to a myriad of factors that may be regarded to be the roots of poor achievement [23]. This is supported by the study of [20] which reveals that academic amotivation was negatively connected with academic success, implying that higher academic amotivation was, in turn, associated with lower academic achievement. The finding revealed that generally, that the respondents were in high motivation level of academic motivation in an asynchronous online learning modality during COVID-19 pandemic. This also implied that the respondents had a favorable level of enthusiasm in their studies. This could be explained by the study results of [4] that pre-service teachers exhibit strong academic motivation and low amotivation in general. According to [11] having strong academic motivation is a key aspect in professional growth. Aspiring teachers could contribute to the importance of being motivated in achieving goals. These findings were found to be similar to the findings of other studies. For instance, [10] which revealed that their enthusiasm towards the program/course will increase if the pre-service teachers have a high level of academic motivation.

3.13 Academic Self-efficacy

This includes online environment, time management, and technology used.

3.14 Online Environment

The result of the study showed that the respondents were technology literate and experienced an online classroom environment conducive to student engagement and motivation. The respondents completely agreed that they can submit assignments to an online mailbox/email or google classroom and do search the online course materials.

Table 3: Academic self-efficacy of pre-service science teachers

PARAMETERS	MEAN	SD	DESCRIPTION
Online Environment			
Submit assignments to an online mailbox/email or google classroom.	4.52	0.56	Highly efficient/effective
Search the online course materials.	4.23	0.56	Highly efficient/effective
Can navigate online course materials efficiently.	4.17	0.63	Very efficient/effective
When a problem arises, can promptly ask questions in the appropriate forum (e-mail, discussion board, etc.)	4.11	0.71	Very efficient/effective
Can navigate the online grade book.	4.11	0.59	Very efficient/effective
Overcome technical difficulties on my own.	4.09	0.75	Very efficient/effective
Complete a group project entirely online.	4.07	0.62	Very efficient/effective
Can learn without being in the same room as other students.	3.91	0.83	Very efficient/effective
Can learn without being in the same room as the instructor.	3.89	0.77	Very efficient/effective
Pooled Mean	4.12	0.67	Very efficient/effective
Time Management			
Complete all assignments on time.	4.15	0.83	Very good
Develop and follow a plan for completing all required work on time.	4.09	0.74	Very good
Can meet deadlines with very few reminders.	4.07	0.72	Very good
Manage my time effectively.	4.05	0.70	Very good
Can focus on schoolwork when faced with distractions.	3.44	1.04	Very good
Pooled Mean	3.96	0.80	Very good
Technology Used			
To communicate with others/classmates using synchronous technology (such as Skype, zoom, google meet etc).	4.33	0.65	Highly efficient/effective
Can communicate using asynchronous technologies (discussion boards, e-mail, etc.)	4.28	0.53	Highly efficient/effective
Can learn to use a new type of technology efficiently.	4.21	0.68	Highly efficient/effective
Can communicate effectively with technical support via e-mail, telephone, or live online chat.	4.19	0.69	Very efficient/effective

Table 3: continued...

PARAMETERS	MEAN	SD	DESCRIPTION
Search the Internet to find the answer to a course-related question.	4.13	0.73	Very efficient/effective
Effectively can communicate with my instructor via e-mail.	4.13	0.67	Very efficient/effective
Efficiently using the library's online resources.	3.64	0.93	Very efficient/effective
Pooled Mean	4.13	0.70	Very efficient/effective
Over-all Mean	4.08	0.71	Agree

Legend:

Online environment:

- 1.00 – 1.79 Not efficient/effective
- 1.80 – 2.59 Moderately efficient/effective
- 2.60 – 3.39 Undecided
- 3.40 – 4.19 Very Efficient/effective
- 4.20 – 5.00 Highly efficient/effective

Time management:

- 1.00 – 1.79 Very poor
- 1.80 – 2.59 Poor
- 2.60 – 3.39 Good
- 3.40 – 4.19 Very good
- 4.20 – 5.00 Excellent

Technology used

- 1.00 – 1.79 Not efficient/effective
- 1.80 – 2.59 Moderately efficient/effective
- 2.60 – 3.39 Undecided
- 3.40 – 4.19 Very Efficient/effective
- 4.20 – 5.00 Highly efficient/effective

However, the respondents agreed they can learn without being in the same room as the instructor. This can be concluded that respondents were perceived to be skilled in initiating online sessions, and familiar with the digital tools for learning.

The preferable classroom environment during the pandemic that foster the importance of learning and communication. This study conformed with the study of [41] that provided empirical support for the claim that, in the context of online learning, students' previous online experience and knowledge are crucial determinants for self-efficacy and their level of acceptance and adoption of e-learning. [25] agreed stating that "computer experience influenced greatly computer self-efficacy for students" (p.75). The students' online preparedness is vital to the success of any online program; this research confirms the importance of students' online readiness.

3.15 Time Management

The result of the study showed that the respondents were very good in managing their time properly and effectively in an online class and indicates that their academically productive. This echoes the findings that proper time management has favorable implications on career and long-term goals due to its significant influence on individual productivity. This can be concluded that strong perception capacity of the individual will contribute to the increased self-efficacy of the individual.

3.16 Technology used

The respondents were moderately efficient/effective using both synchronous and asynchronous technology to communicate with others/classmates (such as Skype, zoom, google meet, discussion boards, e-mail, etc.). However, the respondents are also using the library's online resources efficiently for their studies. The result of the study implies that the respondents were able to use digital technologies comprehensively which enables them to actively participate in online class. Similar to the study of [49] which reveals that the strong level of digital literacy, knowledge and skills to utilize digital technologies are essential for online learning objectives, for interaction and communication in online learning environments. It can be concluded that the respondents find it moderately efficient/effective to navigate the various technologies used in an online learning environment both in learning and in communicating. This could be explained that the perceptions of internet technologies self-efficacy were above average. This development may be connected to the participants' substantial use of internet technology, as well as their enhanced experience [40]. Moreover, learners must have a thorough understanding of the usage of online technologies in order to engage in online learning, including internet usage, sending and receiving emails, engaging in online discussions, navigating course materials, and submitting assignments [27].

Generally, the results of the study showed that the respondents have favorable level of academic self-efficacy in asynchronous learning modality. It implies that the respondents have a strong belief in their ability to perform and succeed a learning task in the education program under online learning. Similar to the findings of [47,46] that mastery of the lesson also has a strong impact on the efficacy, which may increase perseverance and favorably influence academic success.

3.17 Attitude Towards Teaching Profession

Table 4 presents the attitude towards teaching profession of the pre-service science teachers. This refers to the favorable attitude or feeling of the respondents towards the teaching. Some literature reported that the teachers' proficiency relies on the attitude they possess for the profession.

The respondents had a positive attitude for they believe they will be a professional teacher and the idea of becoming a teacher attracts them. However, they disagreed in dealing about the fear that they will have troubles in the teaching profession.

Table 4: Attitude of pre-service science teachers towards teaching profession

PARAMETERS	MEAN	SD	DESCRIPTION
1. I will be a professional teacher.	4.39	0.72	Strong positive attitude
2. The idea of becoming a teacher attracts me.	4.37	0.72	Strong positive attitude
3. It is honorable to guide people's lives by working as a teacher.	4.33	0.61	Strong positive attitude
4. Thinking that teaching will provide me with opportunities to be productive and creative.	4.32	0.68	Strong positive attitude
5. It makes me happy to think that I will become a teacher.	4.31	0.73	Strong positive attitude
6. I can overcome the difficulties inclined with the teaching profession.	4.29	0.67	Positive attitude
7. Consider success in the courses on professional teaching knowledge as important.	4.28	0.63	Strong positive attitude
8. Thinking that I will be a learned and qualified teacher.	4.28	0.63	Strong positive attitude
9. To be successful in the teaching profession.	4.22	0.80	Strong positive attitude
10. Thinking that I will have much to do when I become a teacher.	4.19	0.71	Positive attitude
11. I would like to work as a teacher even under difficult conditions.	4.18	0.80	Positive attitude
12. Pleased with having chosen this department related to the teaching profession.	4.17	0.75	Positive attitude
13. Enjoy conversing with people working as teachers.	4.14	0.71	Positive attitude
14. The continuous nature of the teaching profession makes me feel secure.	4.13	0.76	Positive attitude

Table 4 continued...

PARAMETERS	MEAN	SD	DESCRIPTION
15. Talking about and discussing the issues of education, learning, teaching, and the teaching profession.	4.13	0.66	Positive attitude
16. Attracted to people working as teachers.	4.07	0.85	Positive attitude

17. The working conditions of the teaching profession attract me.	4.05	0.81	Positive attitude
18. Feels so sure of the requirements of the teaching profession.	4.05	0.80	Positive attitude
19. Teaching is a suitable profession for me.	4.03	0.77	Positive attitude
20. I have a special talent for teaching.	4.02	0.80	Positive attitude
21. When I become a teacher, I will be sufficiently esteemed by society.	4.02	0.72	Positive attitude
22. Voluntarily, I chose the teaching program I am currently attending.	4.01	0.95	Positive attitude
23. The teaching profession is appropriate for me.	4.01	0.82	Positive attitude
24. The teaching profession is boring for me.	3.98	1.03	Positive attitude
25. Teaching makes me regret to have chosen it as a profession.	3.92	1.01	Positive attitude
26. The idea of teaching people things they do not know pleases me.	3.85	1.05	Positive attitude
27. Teaching will bring me a prestigious status in society.	3.76	0.96	Positive attitude
28. Do not like talking about and discussing the issues of education, learning, teaching, and the teaching profession.	3.74	1.12	Positive attitude
29. If I had to choose a profession again, I would prefer becoming a teacher.	3.72	1.00	Positive attitude
30. Would not recommend teaching to those who are to choose a profession.	3.71	1.20	Positive attitude
31. Teaching is not a suitable profession for me.	3.66	1.13	Positive attitude
32. Teaching does not suit my lifestyle.	3.65	1.10	Positive attitude
33. Teaching does not suit my personality.	3.58	1.07	Positive attitude
34. I fear about the troubles in the teaching profession.	2.59	1.08	Moderately positive attitude
Pooled Mean	4.00	0.51	Positive attitude

Legend:

1.00 – 1.79	Negative attitude
1.80 – 2.59	Moderately positive attitude
2.60 – 3.39	Undecided
3.40 – 4.19	Positive attitude
4.20 – 5.00	Strong positive attitude

The finding revealed that generally, the respondents have a positive attitude towards teaching profession. This favorable attitude towards the teaching profession will have a significant effect not only on students' academic achievement in college but also during their professional careers as teachers [55].

3.15 Relationship Between Respondents' Socio-demographic Characteristics, Academic Motivation, Academic Self-efficacy, and Attitude Towards Teaching

The study was conducted to find out the relationship between socio- demographic characteristics of the respondents, their academic motivation, academic self-efficacy, and attitude towards teaching. Table 5 presents

the data gathered. Pearson's product moment coefficient (Pearson r) was calculated.

Table 5: Relationship between respondents' socio-demographic characteristics, academic self-efficacy, academic motivation, and attitude towards teaching profession

SOCIO-DEMOGRAPHIC CHARACTERISTICS	Academic Motivation	Academic efficacy	Self- Attitude towards teaching
Sex	-.147	-.188*	.029
Age	-.108	.001	-.028
Residence	-.237**	-.053	.092
Internet Service Provider	.015	-.015	.012
Device Used	-.039	.092	.104
Time Allotted	.140	.132	.140*
Monthly Family Income	-.038	.593**	-.044

* correlation is significant at 0.05 level (2-tailed)

** correlation is significant at 0.01 level (2-tailed)

3.16 Residence to Academic Motivation

The findings on the relationship of residence and academic motivation ($r = -0.237, p < 0.01$) is shown in Table 5. Results show that respondents from urban areas have higher academic motivation compared to those in rural. This finding may be attributed to the fact that the residents of the rural places were more likely to encounter technical and internet connection difficulties, resulting in the decrease of their motivation for online learning. This supports the study of [40] which indicated that psychological counselor candidates' online learning motivation scores were above average.

3.17 Sex to Academic Self-efficacy

The findings on the relationship of sex and academic self-efficacy ($r = -0.188, p < 0.05$) supports the study of Reference [12] reported that compared to females, males have higher online academic self-efficacy while females have higher online discussion participation and final exam scores compared to males. These findings were consistent with the result of the study of [54] found that university students enrolled in a distance education have high self-efficacy perceptions towards online technologies. Moreover, they concluded that males have greater self- efficacy perceptions for online technologies than females. This is supported by the study of Reference [8] that according to the meta-analysis of 247 research, it indicates that males had slightly higher academic self-efficacy beliefs compared to females. Furthermore, self-efficacy beliefs varied by the subject area with males having greater efficacy beliefs in mathematics, social sciences, while females have higher efficacy beliefs in language arts [19]. In addition, it was observed that the academic self- efficacy of preservice teachers with higher career expectations was strong and positive compared to those with low self-efficacy [4].

3.18 Monthly Family Income to Academic Self-efficacy

Table 5 shows relationship of monthly family income and academic self- efficacy ($r=0.593, p<0.01$). This

indicated that unprivileged households with less access to learning materials could negatively affect students' academic progress and outcomes. According to research, children from low-socioeconomic status (SES) homes and communities acquire intellectual achievements more slowly than children from higher- SES households and communities [29] This supports the study of [52], which reveals that the higher family socioeconomic status was attributed with improved access to education and learning, higher academic self-efficacy, lower parental psychological control, and lower test anxiety. This is supported by the study of [21] which confirmed that academic success is favorably impacted by family income and the amount of time parents spent with their children on weekends, according to the findings, perceived self-efficacy, parental moral support, and parental career advice have a beneficial impact on students' professional goals.

3.19 Time Allotted for Studying to Attitude Towards Teaching

Results on the relationship of time allotted for studying and attitude towards teaching ($r = 0.140$, $p < 0.05$), revealed that the higher the time spent for reviewing the lesson, the higher their attitude towards teaching profession. This implies that the amount of time that preservice science teachers dedicate to reviewing their lessons, indicates that they have a favorable attitude on teaching. It seems reasonable to expect that students will have positive attitude towards teaching as they progress through their training program because of time they devote for learning and studying. Similar to the findings of [36] that the preservice teachers' level of perception of teaching as a profession has a significant impact on the motivation to perform well in their teacher training program (TTP), their attitude towards their teacher training program (AtTTP), the value they ascribed to the program (VaTTP), and their perception of the program's effectiveness (ETTP). Similarly, their perception of teaching as a profession has a strong favorable effect on their desire to teach (WtT), attitude toward teaching (AtT), and perception of teaching as a good career (STC). In general, the more an individual's perspective of teaching as a vocation, the greater their attitude toward their teacher training program and toward teaching.

3.20 Relationship Between Academic Motivation, Academic Self-Efficacy and Attitude Towards Teaching of the Pre-Service Science Teachers

Table 6.1 presents the relationship between academic motivation, and attitude towards teaching profession. The table shows the result of Pearson-r Moment Correlation between academic motivation, and attitude towards teaching profession. The study revealed that intrinsic motivation, extrinsic motivation-career, extrinsic motivation-social were significant to the attitude towards teaching.

Table 6.1: Relationship between academic motivation and attitude towards teaching profession

ACADEMIC MOTIVATION	ATTITUDE TOWARDS TEACHING	
	r	p-value
Intrinsic Motivation	.559**	.000
Amotivation	-.158	.051
Extrinsic Motivation-Career	.549**	.000
Extrinsic Motivation-Social	.202*	.012

* correlation is significant at 0.05 level (2-tailed)

** correlation is significant at 0.01 level (2-tailed)

The results showed that intrinsic motivation ($r= 0.559, p<0.01$), extrinsic motivation- career ($r=0.549, p<0.01$), and extrinsic motivation- social ($r=0.202, p<0.05$), were significantly correlated to the attitude towards teaching. This indicated that the respondents were positively driven studying science having a favorable attitude towards teaching profession. The preservice teachers' attitudes toward the teaching profession and their academic motivation have a positive significant relationship. They concluded that when preservice teachers' attitudes toward the teaching profession are positive, intrinsic and extrinsic motivation increases. It appears logical to recognize that preservice teachers' levels of academic motivation will grow as they move through the education program due to teaching experience, which presumably provides greater opportunities for self-determination. These findings also indicate that the higher the extrinsic motivation-career, the higher their attitude towards teaching. The result in the present study is similar to the findings of [26] focusing on the effects of education-themed movies to the to the academic motivation of preservice teachers and to their attitude towards teaching which reveals that education-themed movie is effective on the intrinsic academic motivation and extrinsic academic motivation external regulation sub-scale scores of teacher candidates. To simply express, the conditions under which extrinsic motivation can help to motivate the preservice science teachers.

According to [16], students with high motivation levels have high level of satisfaction and self-esteem about their life, and they are content with their interpersonal relationships. In choosing a teaching profession there are important factors which influence life contentment, such as the individual's professional goals, the profession's point of view, and the teaching profession's values [31] It has been stated that a lack of motivation causes tension and anxiety. Individuals should have a feeling of personal control [28], which is an essential source of life happiness. This can be concluded that the preservice science teachers were encouraged to strive in their studies with a favorable attitude to their profession in the future.

3.21 Relationship of Academic Self-efficacy and Attitude Towards Teaching

Table 6.2 presents the relationship between academic self-efficacy, and attitude towards teaching profession. The table shows the result of Pearson-r Moment Correlation between academic self-efficacy, and attitude towards teaching profession. The study revealed that online environment, time management, and technology used were significant to the attitude towards teaching.

Table 6.2: Relationship between academic self-efficacy and attitude towards teaching profession

ACADEMIC SELF-EFFICACY-	ATTITUDE TOWARDS TEACHING	
	r	p-value
Online Environment	.571**	.000
Time Management	.442**	.000
Technology Used	.523**	.000

** correlation is significant at 0.01 level (2-tailed)

As presented in Table 6.2, online environment time, time management, and technology used were significantly correlated to attitude towards teaching. This implies that as the academic self-efficacy of the respondents increases, their attitude towards teaching also increases. The circumstance might be seen as an indicator of an individual's professional success. Teaching is also a career in which pre-service teachers should commence with

extensive professional knowledge and equipment. When the notion of self-efficacy is seen through the perspective of a teacher, it highlights the knowledge, abilities, and attitudes necessary to carry out the tasks and obligations of the teaching profession [17].

The results of the study revealed that online environment is correlated to attitude towards teaching ($r=0.571$, $p<0.01$). The respondents have a high belief in their capabilities to achieve academic success, as well as belief in their ability to fulfill academic tasks and the successful learning of the materials in an online asynchronous learning modality. In learning environments, the notion of self-efficacy, which is connected to learning and performance in online education, is often correlated with accomplishment, perseverance, and effort [18]. Self-efficacy is essential in learning environments. Because inadequacies in knowledge and abilities will restrict online learning, students' online learning self-efficacy is an important factor in determining student preparation for online learning [49]. This is evident in the study of [12] that self-efficacy, motivation, and self-monitoring were proven to contribute on learning engagement in online learning environments.

Table 6.2 shows the relationship of time management to attitude towards teaching ($r=0.442$, $p<0.01$). Similar to the study of [39], that as students' ability to manage their time increases, they become more self-sufficient in making career choices. As a result, it seems that providing education in a manner that enables students to plan and spend time more efficiently by overcoming time loss and sleep issues is more beneficial to students of educational institutions. This is supported by the study of [5] which emphasizes that when time is well managed, it has positive effects on career and future planning with its direct impact on personal productivity.

The results showed that technology used is also correlated to the attitude towards teaching ($r= 0.523$, $p<0.01$). This implies that the respondents were able to effectively navigate the different technologies used in online classes, specifically asynchronous classes. Literatures revealed that learners must be able to utilize online technologies fully in order to engage in online learning, such as how to use the internet, send and receive messages, participate in online forums, access course materials, and return assignments [27]. Online learning activities need a high degree of digital literacy as well as knowledge and abilities in the usage of different digital technologies required for engagement and communication in online learning environments [49].

4. Conclusion

The findings reveal that despite the conditions, the pre-service teachers demonstrate a high level of academic motivation and self-efficacy in an asynchronous online learning modality, reflected in their strong enthusiasm for learning and low levels of amotivation. They also exhibit a positive attitude toward the teaching profession. Furthermore, the results indicate that higher family income is associated with greater self-efficacy, while increased study time contributes to a more positive teaching attitude. Notably, higher academic motivation and self-efficacy both correspond to a more favorable attitude toward teaching, suggesting that these factors play a significant role in shaping pre-service teachers' professional outlook.

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