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THE MEDIATING EFFECTS OF STUDENT ATTITUDES ON THE LEARNING PREFERENCES AND PERCEIVED ACADEMIC STRESS TOWARDS ONLINE EDUCATION

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ABSTRACT

The study investigates the association of the learners' preferences of students and perceived academic stress and the mediating impact of students' attitudes towards online education. The study participants were the students of the seven major universities and colleges in Ilocos Norte, and they were chosen using a convenience sampling technique. The study employed a quantitative research design and a casual research approach to measure the relationship between learning preferences and perceived academic stress and the mediating effect of students' attitudes towards online education. Using linear regression, the findings revealed a low positive relationship between learning preferences and perceived academic stress. Moreover, concerning the mediating effect of the students' attitudes towards online education, using structural equation modelling, the results were that there was an established effect. Implications, conclusions, and recommendations were also provided in the study.

Keywords: Online education, student attitudes, learning preferences.

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1. INTRODUCTION

The outbreak of COVID-19 had a global impact on all elements of human activity, including education, research, sports, entertainment, transportation, religion, social gatherings and interactions, the economy, companies, and politics. Because with COVID-19 threats, the entire globe was in turmoil, and the reality of the situation was challenging to face. The outbreak has particularly hard impacted the education sector, and it continues to be one of the most damaged sectors (Onyema et al.,2020). The disruption of education is a problem in an ever-changing world. To provide better assistance for students in need, universities and colleges should learn how to adapt to these shifts in the educational landscape (Bozkurt et al., 2020). As a result of UNESCO monitoring, 191 nations have implemented national closures, which have affected about 98.4 percent of the world's student population. University closures have far-reaching economic and sociological consequences, affecting students, staff members, families, and the entire community. Schools were closed due to the epidemic, which provided insight into various aspects of online education, including student learning preferences and attitudes, the degree of stress students was experiencing, and the efficacy of online education. The effect was more

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severe for kids from impoverished backgrounds and their families, resulting in episodic learning. Following the closure of universities and colleges, schools recommended using distance learning schooling and open educational systems and policies that universities and faculty members may utilize to touch base with learners remotely and reduce the disruption of education (Lindzon, 2020).

The Coronavirus pandemic has a detrimental impact on educational activities all across the world. The coronavirus pandemic had a devastating impact on educational systems worldwide, resulting in widespread school closures. In terms of academic activity as well as future professional aspirations, it caused significant upheaval. Many nations shuttered their schools as part of the worldwide campaign to battle COVID-19 to control the coronavirus epidemic. Following the United Nations Educational, Scientific, and Cultural Organization (UNESCO) monitoring, over 100 nations enacted national closures, affecting more than half of the world's student population (UNESCO, 2020). The Philippines followed suit that universities and colleges all over the country had temporary closed down shifted to online learning. Learners in all levels were forced to embrace the online education despite the unpreparedness and lack of resources. Major problem of this new scheme is the unstable internet connection and power interruptions. These problems were even more evident in provinces like Ilocos Norte where a major chunk of student population do not have access to decent internet connection. School closures have significant social, educational, and economic consequences, and the disruptions they produce affect individuals from all walks of life. However, their impact is most severe for poor students and their families, who are disproportionately affected (UNESCO, 2020), like the learners in the province of Ilocos Norte.

Because of the threat of COVID-19, colleges and universities are faced with the difficult decision of how to continue teaching and learning while also keeping their faculty, staff, and students safe from a public health emergency that is moving quickly and is not well understood by the public health community. To aid in the prevention of the spread of the virus that causes COVID-19, several educational institutions have decided to cancel all face-to-face sessions, including laboratories and other learning activities. They have ordered that faculty members transfer their courses to the internet. The number of institutions of higher education that have made this decision is increasing daily. The move to online learning is happening at schools of all sizes and sorts, including state colleges and universities, Ivy League institutions as well as community colleges and others (Hodges et al., 2020).

Taking into consideration all of the variations and modifications brought about by this pandemic, such as self-quarantine and asserting social distancing, the use of online education by all higher learning institutions in the province of Ilocos Norte, and the change in the educational landscape, the purpose of this study is to investigate academic stress among students in the province of Ilocos Norte. Because of COVID-19, online education has become increasingly popular among students in Ilocos Norte. The purpose of this study is to determine the learning preferences of students in Ilocos Norte, their attitudes toward online education, and the level of academic stress they experience when participating in online education during a pandemic. It is necessary to evaluate the learning preferences of students in order to decide whether online education is appropriate. This study also demonstrates the importance of learning preferences in determining the degree of academic stress students experience due to their online education. The last component of this study assessed the mediating influence of students' attitudes about learning

preferences and the degree of stress that students were experiencing as a result of online education.

2. RESEARCH FRAMEWORK

2.1. Learning Preferences of Students and Online Education

The desired learning method depicts students' capacities, upbringing, and previous learning involvements (Rau, 2012). In some circumstances, learners may agree on a diverse learning style but tend to uphold a partiality for a specific learning style. There is no learning style, but learning styles have different characteristics and properties. Learners relate with information contrarily, hence their assortment of learning styles. According to Biggs (2001), identifying the dissimilarities in the way students learn is the first phase in fostering students' awareness and mindfulness of their learning styles and the presence of different learning styles. When learners are conscious of their learning styles, they discover rapidly and efficiently and eventually prosper in their educations. Their recognition of learning styles helps them gain problem-solving capabilities. As learners thrive at problem-solving, the more they take possession of their learning. Many research types have been directed on learning styles to comprehend how students learn (Gould & Caswell, 2006; Boström, 2011). As an outcome, several learning style concepts and models have emerged (Bacon, 2004). Coffield et al. (2004) have recognized 71 learning style theories. The learning style theories stipulate a foundation for diverse learning styles, make self-awareness among learners, help professors and learners become introspective, assist students in finding their learning styles, and improve teaching (Healey & Jenkins, 2000).

The absence of a distinct meaning of learning styles has been panned widely, as this triggers misperception as to what learning styles are (Gould & Caswell, 2006). Cassidy (2004) ascribes the difference in the definitions of learning styles because studies in the field have extended from psychology, where it began, to other subject matter. This inter-disciplinarity of learning styles has permitted different perceiving and comprehending learning styles to thrive (Hall & Moseley, 2005). Another critique is the use of the words 'learning style', which is, in some circumstances, used as a substitute with 'cognitive style' and 'learning strategy' (Cassidy, 2004). Although the theory of learning styles has been argued, there is agreement on the actuality of learning styles and that learners absorb differently (Van Rensburg, 2009). Building awareness regarding the different learning styles of learners could be vital in teaching and learning. Students who are conscious of their learning styles can recognize their fortes and limitation in learning and develop various learning styles (Hall, 2005). Differing outcomes have been discovered in terms of the connection between learning styles and academic performance. According to Rochford (2004) and Kvan and Yunyan (2005), research recommends a strong relationship between learning styles and academic achievement. Abidin et al. (2011) argue that learning styles influence learners' academic achievement. However, Aripin et al. (2008) and Pashler et al. (2008) suggested no relationship between learning styles and academic achievement.

In online education, it is unmanageable to perform observation and detailed personal interviews. However, the VARK questionnaire can verify learners' learning preferences who partake in online education. The VARK questionnaire was stemmed from Lincoln University, Canterbury, New Zealand, in 1995. It centers on the modal inclinations for learners and teachers. According

to Neil D. Fleming, the author of the VARK questionnaire, this questionnaire's utilization allows faculty members to access more learners because of the better match that can be used between teaching and learning styles (Canfield, 1988). Fleming recognizes the most common style for information trade as speech that reaches the learner's ear and therefore is signaled as aural (A) in the tool. Some learners disclose inclinations for accessing information from printed letters.

Students are coded as reading/writers (R) since reading and writing are their most liked modes for receiving data. The third set of learners is tagged as visual (V) since those learners like data to arrive in graphs, charts, and flow diagrams. They like to acquire information by picturing data or augmenting it via colors and layout. The last category of learners likes to learn by utilizing all their senses, including touch, hearing, taste, smell, and sight. This group is tagged as kinesthetic (K) - students from this category like natural, multi-sensory feel in their learning. Learning by doing is preferable, and abstract tools must be illustrated via appropriate analogies, real-life instances, or metaphors. Based on Fleming's learning styles and preferences tool, Zapalska and Brozik (2006) identified the learning preferences suitable for online education. These are auditory, visual and kinaesthetic learning preferences.

However, Mkonto (2010) developed a more detailed learning style inventory called Innovative Learning Experience (ILE). This was used by the Center of Innovative Teaching Experiences (C.I.T.E) consisted of 27 statement questionnaire. The statements were divided into five categories gauging the nine learning styles; visual language (students learn best seeing the information), visual numerical (these students learn best by seeing numbers), expressive written these students when they express themselves in written form), expressive oral (these students learn best when they can express themselves orally), social individual (these students like to study alone), social group (these students learn best when in the group), auditory language(these students learn from hearing information presented to them), auditory numerical (these students learn best from hearing numbers) and kinaesthetic (these students learn best by being involved). This is used in the study instead of the VARK because the former is more detailed and it combines learning preferences so that a more thorough analysis is given and recommendations are more tailored fit.

2.2. Students' Attitudes towards Online Education

Several research types revealed that online education and its acceptance were widely impacted by students' attitudes and traits, regarded as vital in online education in 3rd World countries (Bhuasiri et al., 2012). These attitudes consist of self-efficacy of the Net. Knowledge of computers and the internet, unease with computer usability and tactics to online education (Chu, 2010). Students' attitudes are also impacted via the brilliance and easiness of using modules of online education, application and ease of use of online education, and students' level and computer proficiency (Aixia & Wang, 2011). Their computer experiences and involvement, which contain apparent self-utilization, fulfillment, efficacy, and online education use, play a domineering role (Liaw & Huang, 2011). After all, students' optimistic attitudes regarding online education are vital for online education's reception and espousal (Selim, 2007).

Mainstream past research recognizes the barriers in online learning and the factors that impact students' interest in online learning. A study by Al-Fahad (2009) suggested that students widely consented to mobile learning because mobile networks make it simple for them to explore, gain

and work individually on learning resources in a short period. Woo's (2000) studies revealed that dialogues about online education implementation have been time-consuming and challenging. Similarly, the attitudes or behaviors towards online education, Warnet et al. (2000) researched students typically using the internet in social work. The study claimed that most participants were of the notion about the course module of online education, which was helpful to their overall learning involvement. Sandars et al. (2008) assesses students' attitudes regarding allowing learning through the internet in the biology module at the tertiary level. The research disclosed increasing effects on students' learning regarding their problem-solving systems and the development of crucial thinking skills.

On the other hand, Paris (2004) also evaluated and tested cognition, affective and behavioral aspects among the 52 students of the public institutions in Australia with a special mention of their online education attitudes. The results revealed a better answer of students supporting online education programs, while dissimilarities regarding gender-wise attitude were recorded. Lastly, Ullah et al. (2017) revealed no significant relationship between learners' interest in computers and convenience in using online learning. No intermittent internet connection, not understanding students' online education leads to negative online learning attitudes. Finally, Hoq (2020) said that many university students prefer conventional class types to online learning. The latter is just supplementary to the face-to-face class.

2.3. Perceived Academic Stress on Online Education

According to Al-Sowygh (2013), stress comes in various shapes to a person's life. Stress is a bio-psychosocial pattern that indicates the result of an individual's failure to react sufficiently to mental, emotional, or physical needs, whether real or illusory. On the other hand, according to Akhlaq et al. (2010), stress is considered as a psychophysiological process, which stems from the contact of the person with the situation and results in interruptions triggered to the physiological, psychological, and social environments, altering upon unique individualities and psychological procedures. The person's characteristics may include gender, health conditions, heredity, and socioeconomic environment. Psychological processes denote such features as behaviors, values, and several personality traits (Gormathi, 2013).

Study results revealed that learners suffer some kind of stress. Therefore stress is part of learners' being and can impact how learners cope with university life requirements (Ramos, 2011). Other researchers have credited several emotional and physical symptoms among college students, such as tiredness, head sickness, depression, and stress (Abdullah & Mohd, 2011; Soliman, 2014). Extreme stress among learners results in weak academic learning, university dropout, addictions, criminalities, and other wrongdoings. Moreover, Soliman (2014) contends that high-stress levels precede anxiety and lead to a higher frequency of mistakes and inappropriate behavior such as cheating in tests, deception, and dishonesty. A study by Kwaah (2017) revealed that online education complements tertiary education in Ghana.

To sum it up, the theoretical underpinnings used in this study are the following:

1. Ullah et al. (2017) study is used for the students' perceptions towards online learning;
2. The theory developed by Mkonto (2010) was utilized for the learning preferences; and
3. Kwaah's (2017) research was used to describe the level of academic stress.

3. RESEARCH PROBLEMS

Generally, this research aims to find the association between learning preferences and perceived academic stress experienced by students on online education in Ilocos Norte. Specifically, it answered the following research questions:

1. What are the learning preferences of students in terms of:
    a. Visual language;
    b. visual numerical
    c. expressive written;
    d. expressive oral
    e. social individual
    f. social group;
    g. auditory language
    h. auditory numerical
    i. Kinaesthetic?
2. What are the attitudes of students towards online education?
3. What is the level of academic stress experienced by students in online education in terms of:
    a. Academic-related;
    b. Psychosocial?
4. Is there a significant relationship between learning preferences and perceived academic stress experienced by students towards online education?
5. Is there a mediating effect of student attitudes on the learning preferences and perceived academic stress experienced by students towards online education?

3.1. Hypotheses Development

Hypothesis 1: There is no significant relationship between learning preferences and the level of academic stress experienced by students.

There are limited studies found in the literature correlating learning preferences to stress. One study found was that of Yazici (2017). This study investigated the relationship between social studies professors" learning styles, test anxiety and academic achievement. According to the findings, there was a positive low-level and significant relationship between learning styles and anxiety levels. On the other hand, a study by Gümüşburun Ayalp (2016) found that the learning style dissimilarities of architecture students significantly affect anxiety. In other words, mentoring students in the efficient and effective utilization of learning styles might be advantageous in reducing anxiety.

Hypothesis 2: There is no mediating effect of student attitudes in learning preferences and academic stress on online education.

A study done by Dikmen (2020) sought to determine if attitudes about distant education had a role in understanding the connection between e-learning styles and academic accomplishments of students enrolled in medical school courses that were delivered entirely online. Students at a university's six-year medical program were the subjects of the study, which had 148 students in all. Students participated in the study by completing the e-learning styles scale, the attitude scale toward distant education, and an online questionnaire that included some demographic

information using a Moodle-based Learning Management System, among other things (LMS). Additionally, the end-of-year grade point averages of the students were taken into consideration for the study. According to this study's findings, the direct influence of e-learning styles on grade point average and the indirect effect on attitude toward distant education were examined using the mediation model of analysis. It was discovered that gender does not significantly impact e-learning methods or attitudes toward distance education. It was shown that students who used the internet more often daily had more positive opinions about distance education. According to the study's findings, one's attitude toward distant education has a mediating influence on the link between e-learning style and academic performance. It is critical to consider e-learning styles and attitudes toward remote education to enhance academic achievement in online medical courses and deliver better learning outcomes for students.

On the other hand, several pieces of literature established the relationship of student attitudes to learning preferences. It was said that there is a significant positive relationship between attitudes and learning preferences or styles (Carulla & Hipona, 2018; Fisher et al., 2013; Cline and Fay, 2000). It was said that depending upon the attitude, whether positive or negative, a specific learning style will emerge.

3.2. Research Paradigm

Figure 1: Research Paradigm

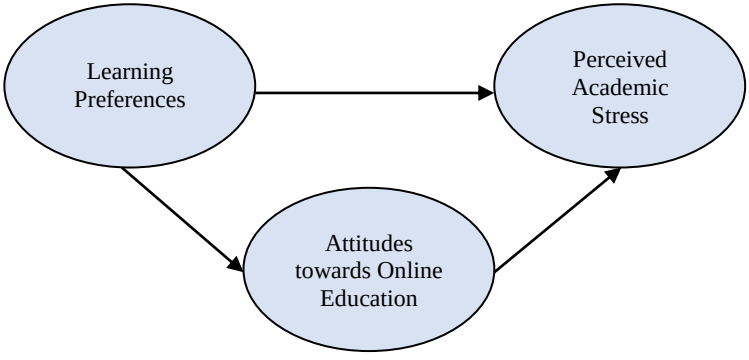

Figure 1 describes the research paradigm of the study. The independent variable is the students' learning preferences, and the dependent variable is the perceived academic stress. On the other hand, the mediating variable is the attitudes towards online education.

4. METHODS

4.1. Participants

The study respondents were selected using a convenience sampling technique. They were the tertiary students of the seven colleges and universities in Ilocos Norte, namely Northwestern University, Mariano Marcos State University, Divine Word College of Laoag, Data Center Laoag, STI-Laoag, and Ama Computer Laoag. Using the Sample size calculator by Raosoft, with a 5% margin of error and confidence level at 95% and a total approximate population of 20,000 students, the full sample size is 377 respondents were computed. Google form was used to gather data virtually. The estimated acceptable sample size is 377, but because the data gathering procedure was done virtually, the actual number of respondents was 2410 students.

Table 1 reveals the respondents' demographic profile. There are 2410 respondents, and out of this, 1353 or 56.1% are aged 20-21, 861 or 36.6 belongs to the age group of 18-19 years of age. Also, in the table, it can be deduced that 1024 respondents or 42.5% are students of MMSU, 881 or 36.6% came from NWU, 277 or 11.5% came from Data Center Laoag, and only 6.2% or 149 students came from DWCL.

Table 1: Demographic Profile of Respondents

Baseline Characteristics	n	%
Age		
Below 15 years old	2	.1
15-17	8	.3
18-19	881	36.6
20-21	1353	56.1
More than 21 years	166	6.9
University/college		
NWU	881	36.6
MMSU	1024	42.5
DWCL	149	6.2
DATA	277	11.5
STI	8	.3
NCC	51	2.1
AMA	20	.8
Year level		
1st year	596	24.7
2nd year	731	30.3
3rd year	990	41.1
4th year	71	2.9
5th year	22	.9
Family income		
Below p10000	1170	48.5
10,001-20,000	683	28.3
20,001-30,000	273	11.3
30,001-40,000	133	5.5
40,001-50,000	55	2.3
Above p 50,000	96	4.0

Most of the respondents (990 or 41.1%) are third-year students, and 731 or 30.3% are second-year students. Only 24.7%, or 596, are first-year students. Lastly, according to income, 1170 or 48.5% of the respondents have below P10,000 family income. 683 or 28.3% have income level of 10,000-20,000 and 273 respondents or 11.3% have family income of P30,001-40,000.

4.2. Research Instrument

The research instrument used in the research was a questionnaire. There are four sections of the questionnaire. For the first part, the demographic profile, and the second part, the student attitudes towards online education, the 3rd part is the learning preferences. The fourth part is the level of academic stress experienced by the students. The demographic profile consisted of age, university/college, year level and monthly family income. The second part was adapted in Ullah et. al's (2017) research entitled Students' Attitude towards Online Learning at Tertiary Level. On the other hand, the learning preferences questionnaire was based on the Learning Styles Inventory by Mkonto (2010) from the Center for Innovative Teaching Experiences (C.I.T.E). Lastly, the perceived academic stress is adapted from Kwaah's (2017) research entitled Stress and Coping Strategies among Distance Education Students at the University of Cape Coast, Ghana.

4.2.1. Reliability Results

Table 2: Reliability Analysis

	mean	**sd**	**Cronbach's α**
scale	3.02	0.329	0.895

Table 2 revealed that the Cronbach Alpha of the questionnaire is .895, which is interpreted as respectable. The acceptable Cronbach alpha is 0.70 or higher, which means that the utilized questionnaire is generally reliable.

4.3. Data Analysis

A quantitative design was used in the present study. Learning preferences were explained using frequencies, and weighted means were employed to explain student attitudes toward online education and perceived academic stress. Moreover, a causal research approach was utilized to measure the relationships of the learning preferences and perceived level of stress towards online education., The structural equation modeling (SEM) using Jamovi software was utilized to estimate the parameters' mediation model. The researcher utilized the SEM to determine the mediating effects of students' attitudes in the relationship of learning preferences and the level of stress experienced by the students.

5. RESULTS

5.1. Learning Preferences of Students in Ilocos Norte

Table 3: Major Learning Preferences of Students in Ilocos Norte

Learning Preferences	Major		Minor		Negligible Use		Total
	n	%	n	%	n	%	N
Kinaesthetic tactile	193	8	2188	90.79	29	1.2	2410
Social individual	242	10.04	2097	87.01	71	2.95	2410
Social group	502	20.83	1887	78.30	21	.87	2410
Visual language	602	24.98	1801	74.73	7	.29	2410
Expressive oral	152	6.30	2150	89.21	108	4.48	2410
Expressive written	414	17.18	1986	82.41	10	.41	2410
Visual numerical	396	16.43	1975	81.95	39	1.62	2410
Auditory language	337	13.98	2062	85.56	11	.46	2410
Auditory numerical	68	2.82	2042	84.73	300	12.44	2410

Note: Major Learning Preference; Minor Learning Preference; Negligible Use Learning Preference.

Table 3 presents the frequencies of the major and minor learning preferences of students. As can be gleaned from the table, 602 students have a significant learning preference for Visual Language (n=602 or 24.98%), which means they learn best when seeing what is presented. Another primary learning preference of students in Ilocos Norte is the Social group (n=502 or 20.83%) which means that these students learn the most when in the group. The third significant learning preference of students in Ilocos Norte is Expressive Written (n=414 or 17.18) which means that these students learn best when they express themselves in written form.

5.2. Attitudes towards Online Education

Table 4: Students' Attitudes Towards Online Education

Statements	$\bar{x}$	VI
It is difficult to understand online learning without getting acquainted with appropriate guidance.	3.39	SA
It is not easy to regularly favor online learning due to the minor face-to-face interaction among students and teachers.	3.30	SA
Slow computers and poor internet connections discouraged to use of online learning.	3.59	SA
As a helpful program suggested for peers to utilize online learning for online learning materials.	3.12	A
Online learning is often avoided as it promotes social isolation.	2.93	A
Online learning highly motivates students to take advanced courses.	2.47	DA
Using online learning makes learning enjoyable.	2.36	DA

Notes: 1.00-1.75 – Strongly Disagree (SD); 1.76-2.50 – Disagree (DA); 2.51-3.25 – Agree (A); 3.26-4.00 – Strongly Agree (SA).

Table 4 presents the students' attitudes toward online education. It can be deduced that the biggest hindrance to online education is a slow computer and poor internet connections ($\bar{x}$= 3.59). Another highlight of the results is that students believe it is difficult to understand online education without proper guidance ($\bar{x}$=3.39). Also, students believe that it is difficult to favor

online education because they still want face-to-face interaction with their colleagues. Another exciting outcome is that students find online learning uninteresting ($\bar{x}$=2.36).

5.3. Perceived Academic Stress

Table 5: Level of Perceived Academic Stressors in Online Education

Stressors	$\bar{x}$	VI
A. Academic-related		
High academic workload	3.22	MS
Dissatisfaction with lectures	2.97	MS
Poor performance in examinations	2.98	MS
Lack of learning materials/resources	3.12	MS
Difficulty reading and understanding modules	3.06	MS
B. Psychosocial stress		
Inability to manage time	3.08	MS
Inability to concentrate during the lecture	3.10	MS
Anxiety about performance in exams	3.21	MS
High parental expectations	3.08	MS
Worries about future	3.34	HS
Loneliness	2.99	MS
Financial problems	3.08	MS
Family/marriage problems	2.45	SS
Difficulty relating to members of the opposite sex	2.35	SS
Lack of time for relaxation	3.20	MS

Notes: 1.00-1.75 – No Stress (NS); 1.76-2.50 – Slight Stress (SS); 2.51-3.25 – Moderate Stress (MS); 3.26-4.00 – High Stress (HS).

Table 5 shows the level of perceived academic stress experienced by students because of online education. It can be deduced that the highest level of academic stress they are experiencing is the high academic load ($\bar{x}$=3.22) with the verbal interpretation of Moderate Stress. Moreover, they experience Moderate Stress because of scarcity or lack of learning material or resources ($\bar{x}$=3.12). Another interesting finding is that students are stressed out because they have difficulty reading and understanding the modules ($\bar{x}$=3.06) with a verbal interpretation of Moderate Stress.

On the other hand, in psychosocial stress related to academics, students are experiencing High Stress worrying about the future ($\bar{x}$=3.34). Moreover, they feel Moderate Stress because of their performance in exams ($\bar{x}$=3.21), lack of time for relaxation ($\bar{x}$=3.20) and inability to concentrate during lectures ($\bar{x}$=3.10).

5.4. Relationship between Learning Preferences and Perceived Academic Stress

Table 6: Results of the Linear Regression

Model	R	R^2	Adjusted R^2	
1	0.196	0.0386	0.0358	
Model Coefficients- Academic Stressors				
Predictor	**Estimate**	**SE**	**T**	**p**
Intercept	2.083	0.1101	18.92	< .001
Preferences	0.339	0.0376	9.02	< .001

Table 6 shows the linear regression results of the independent (learning preferences) and dependent (perceived academic stress) variable, and The p-value is <.001, which means there is a significant relationship between the two variables. The r^2, equal to .0327, shows a low positive correlation between learning preferences and perceived academic stress. Looking into the adjusted r^2 of .0327, 3.27% of the outcome variable, perceived stress, is explained by learning preferences. More factors explain why the students feel these stressors.

5.5. Mediation Results

Table 7: Results of Mediation

Effect	Estimate	SE	Lower	Upper	P	% Mediation
Indirect	0.195	0.0209	0.1553	0.236	< .001	57.9
Direct	0.141	0.0352	0.0695	0.205	< .001	42.1
Total	0.336	0.0341	0.2689	0.399	< .001	100.0

Note: *p< 0.05.

Mediation analysis was performed to evaluate the mediating role of students' attitudes toward online education on the linkage between students' learning preferences and perceived academic stress. The results (see Table 7) revealed that the total effect of learning preferences on perceived academic stress was significant (b = .336; t=9.84, p<.001). With the inclusion of the mediating variable (students' attitudes toward online education), the impact of learning preferences on perceived academic stress in online education was still found significant (b=0.141. t=4.02, p<.001). The indirect effect of learning preferences on perceived academic stress through students' attitudes was significant (b = .195; t=9.31, p<.001). This illustrates that students' attitudes towards online education fully mediate the relationship between learning preferences and perceived academic.

6. DISCUSSIONS

The study showed that students in Ilocos Norte have learning preferences of visual language, social group and expressive writing. This means that students in the Province learn best if they see what is presented to them, are grouped, and express through writing. This does not agree with Mkonto's (2010) results, wherein in his University, most students are social individual and auditory numerical. Learners' awareness of their learning preferences could aid them to obtain learning capacities so that they can profoundly pick the most appropriate learning styles from different kinds of learning preferences to meet particular requirements of the job or activity on

hand. In connection to a study by Onyema et al. (2020), the Coronavirus pandemic has harmed schooling. It is emphasized in the paper that technology should be implemented in education as a means of mitigating the impacts of Coronavirus and other potential pandemics in the educational setting. In the wake of the unprecedented school closures caused by Coronavirus, the whole educational community, particularly those who have yet to embrace or implement emerging learning technologies that facilitate online or remote education, should take note. Participants in the education sector must establish comprehensive plans to deal with the post-Coronavirus era.

Moreover, the study results revealed that in Ilocos Norte, students do not have a positive attitude regarding online education due to poor connection to the internet and difficulty understanding online education. Most students still favor the face-to-face mode of teaching. This agrees with Ullah et al.'s (2017) and Duraku et. al.'s (2020) findings, where tertiary students at his University also had a negative attitude towards online learning. Moreover, upon an interview of some respondents, it was revealed that the internet connectivity in their respective places was improved. An appropriate attitude towards online education will be developed. According to students who took part in the survey, the most challenging component of online learning during COVID-19 was maintaining concentration. Their psychological condition as impacted by current circumstances, their solitude at home, and the changes in their way of life are all factors to consider. The structure of lectures has changed as well as the implementation of teaching obligations online. Additional factors influencing students' negative perceptions of online learning included the following: distraction by family members, decreased level of motivation to engage in online learning, overload with assignments and fatigue, increased use of technology, the family environment is not conducive to learning, doubts and concerns about the future of online learning. Also, there was a negative attitude toward online learning because students prefer face-to-face classes to online classes. This finding of the study was the same as that of Hoq (2020), where it was revealed in his study that online education is just an add-on to the conventional classes and not a replacement. Online education is crucial to incorporate into the education system because of different technologies and students' changing attitudes. However, the conventional or face-to-face classes should not be abolished entirely in our system, but rather it should be a combination of the two types. Instead, universities and colleges should use "blended" learning where the two types are put together, maintained, and utilized.

Another fascinating result of the study was the perceived stress level experienced by students because of online education. In terms of academic-related stress, the students are most stressed on plenty of workloads, lack of materials, and difficulty understanding modules. Based on the researcher's experience, many learners find it difficult to decipher some instructions in the modules. However, the results showed moderate stress, which means that Ilocos Norte students manage their education quite well. They are not yet burn-out. This result followed the findings of Kwaah (2017). He said that distance education had caused anxiety and stress to the students because of his high academic workload, high frequency of exams and financial/family problems.

Nevertheless, what is alarming is that students' significant source of stress is psychosocial stress, which is worrying about the future. A group of students interviewed revealed that they are anxious about the uncertainty of the future of their education, of their jobs, and life as a whole. With the pandemic brought about by Covid-19, the students are agonizing if they can continue their education and careers. This result is aligned with Duraku et al.'s (2020) study, which was with the notion that there is nothing to worry about in the future in Kosovo because of the

pandemic. Furthermore, while some students expressed an interest in taking online courses, others, citing the detrimental impact of the closure of educational institutions on their daily lives, expressed a lack of enthusiasm and negative views toward online learning (Quacquarelli Symonds, 2020). Students indicated that being quarantined at home during COVID-19 and the closure of educational institutions were two of the most significant factors contributing to their experience of being cut off from society and their social groups (Killan, 2020). Because of unfavorable familial circumstances, students had bad experiences while going home during the pandemic (Killan, 2020).

As for the relationship between learning preferences and perceived academic stress, it was found that there is a significant relationship between the two variables. In the linear regression's adjusted r^2, the learning preferences revealed only a low positive relationship between learning preferences and perceived academic stress. This resembles Hlya's (2018) research and Stomff's study (2014), where learning preferences and perceived stress have a significant relationship. The mediation results suggested a full mediating effect of students' attitudes in the relationship of learning preferences and perceived academic stress. This suggests that students' attitudes regarding online education have an effect on the link between their preferred methods of instruction and perceived academic stress. However, it underlined that the link is "weak positive" (low adjusted r2 value), implying that learning preferences/styles do not contribute significantly to academic stress. This may only suggest that additional factors, such as a teacher's ability to encourage their students, could influence learning preferences. In simpler words, there are other variables aside from academic stress that affects learning preferences.

6.1. Implications and Future Research Directions

COVID-19 pandemic is predominantly a health catastrophe. The majority of the countries have chosen to close universities. The catastrophe shape up the predicament policymakers is confronting between closing universities or keeping them operational. Many people felt the stern short-term disturbance: home-schooling is an enormous shock to families' productivity and children's social well-being and education. Teaching is shifting online on an experimental and unproven scale. Learner evaluations are also shifting online, with many trials and errors and doubt for everyone. This study evaluated the learning preferences, perceived stress and students' attitude towards online education and learning, presenting the predicament students and learners faced with this new learning environment. This research will contribute to the enhancement of learner's experience in online education. New teaching strategies will be adopted and carried out because this research presented students' everyday learning experiences such as flipping classrooms, use of e-books and learning management systems. This study also investigated the impact of learning preferences on perceived academic stress if suited to online learning. Furthermore, in finding the students' learning preferences in Ilocos Norte, new strategies for instructions and faculty adjustments can be implemented such as the use of case studies, role playing and other types of assessments and activities that professors can implement. Moreover, now that the mediating effect of student attitudes towards online education on the relationship of learners preferences and perceived academic stress, policymakers and school administrators would know how to improve students' attitudes towards online education since it is a mediator.

One of the study's limitations is that this study was conducted seven months after the closure of schools due to the Corona Virus pandemic. Meaning, the faculty and students are still adjusting

to the "new normal" education. Remote learning in the Province of Ilocos Norte is new, and students are not used to this education scheme. They are more adjusted to the old normal, which is the face-to-face.

For future research direction, researchers should emulate this research in other provinces so that administrators and policymakers of higher education institutions know how to improve their learning management systems. Another research that should be done is students' learning preferences to know what types, designs, and schemes should teacher place in the modules to prevent academic stress brought about by online education.

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