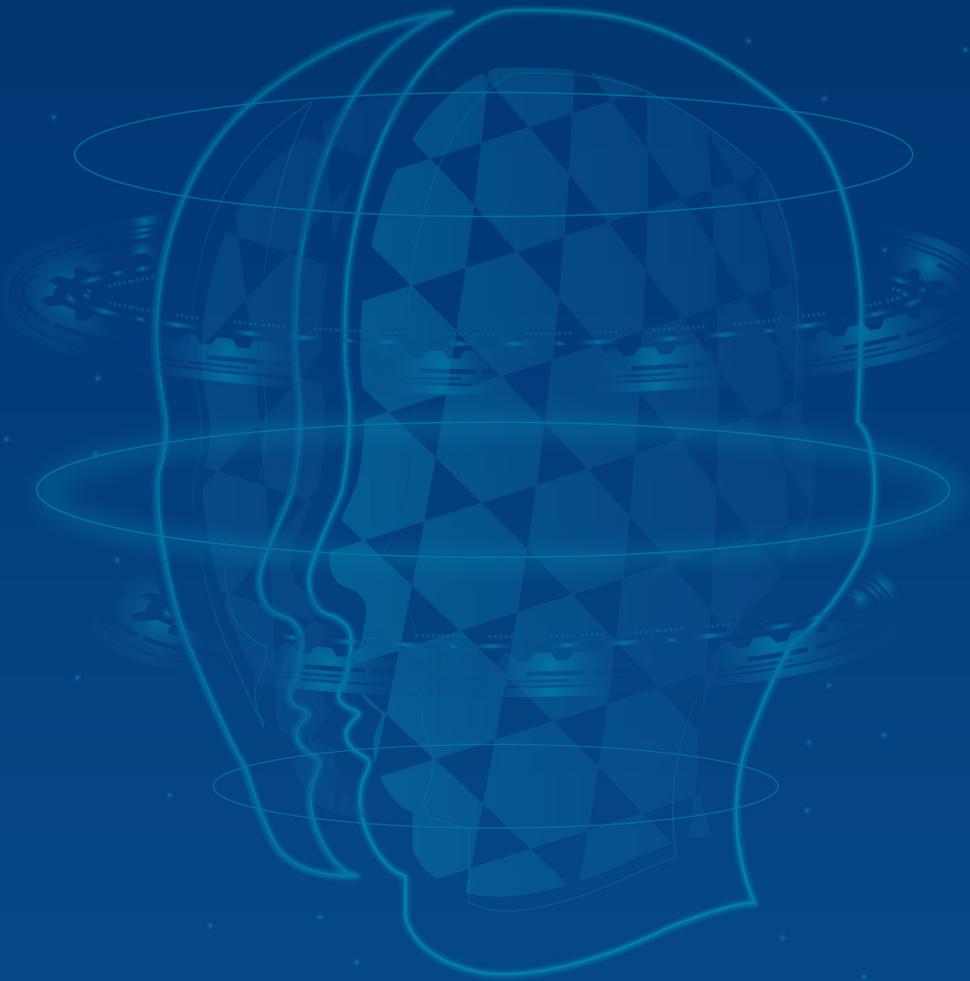




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Exploring Science Learning Anxiety in the New Normal: An Exploratory Factor Analysis

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ABSTRACT

This study utilizes descriptive and exploratory research design to determine the factor structure of science learning anxiety in the new normal. Qualitative data collection was carried out first by interviewing twenty (20) participants from different strands of the Senior High School department of UM Digos College. The identified items were transformed into a questionnaire for the quantitative phase and implemented to the two-hundred thirty-five (235) Senior High School students. Statistically, four factors of Science Learning Anxiety in the new normal were explored, these are; Attitude, Learner's Interaction Towards Assessment and Activities, Learning Environment, and Disappointment. From this result, conducting a confirmatory analysis is recommended to confirm the dimensionality of science learning anxiety in the new normal and to review the explored factors in different contexts.

INTRODUCTION

Science is among the most important subjects for students' cognitive growth and creativity. However, some students consider it a complex discipline to learn. Correspondingly, learners have misconceived perceptions toward science, which negatively impacts their academic performance, and their academic success suffers. Mallow (1983) termed anxiety in science as an aversion to scientific ideas, situations involving science, and experts in the field of science. It can also be described as a tension impeded by the use of apparatus in academic and scientific disciplines—people who have long-term science anxiety likely to have negative views toward science. Moreover, students' enthusiasm for scientific lessons, punctuality, and career choices are all highly impacted by science learning anxiety (Karakaya, Avgin & Kumperli, 2016, as cited by Baysen & Baysen, 2022). The study of Fia, Fosu-Ayarkwah, & Obuobi-Ayim, (2022) showed that the students experienced some level of anxiety about science in relation to homework, entering a science classroom, solving science problems, and even having a bad attitude towards the science teacher. According to the study, the lack of infrastructure as well as inadequate teaching and learning material are some of the factors that cause science anxiety. The study found that students with science anxiety had lower academic results, less interest in science in general, were less likely to pursue science programs in the future and even missed school. With this in mind, this study aims to look into the factors contributing to scientific learning anxiety in the modern environment so that administrators and teachers can create interventions, if necessary, to enhance science education. The current situation affected by the pandemic brought by COVID-19 virus has required schools in other countries to suspend classes to stop the virus from

spreading, posing a significant challenge to the regular schooling of over a million students worldwide. To address the new challenge of the crisis, United Nations Educational, Scientific, and Cultural Organization (2020) stated that the new regular education strategy was that institutions were forced to move toward asynchronous training and away from traditional face-to-face learning. It is worth noting that long-term isolation has caused numerous difficulties for students participating in online education (Bao, Sun, Meng, Shi, & Lu, 2020). Moreover, The World Health Organization (2020) has also voiced concern over the pandemic's psychosocial and mental health effects. Anxiety plays a role in new strategies during pandemic such as self-isolation and quarantine. Studies on COVID-19 effects and lockdowns on Chinese college students found a significant adverse impact on students' psychological well-being and high anxiety levels (Bao *et al.*, 2020). Junior high school students reportedly had low well-being and trouble at school due to their concern throughout the crisis. In addition, COVID-19 endangers students' health and causes anxiety and depression, which can impair learning engagement in isolated students (Liang, Ren, Cao, Hu, Qin, & Mei, 2020). Another of the most significant affective components that affect how well students perform is anxiety.

Additionally, it is crucial to assist pupils in succeeding more and having a pleasant attitude towards science classes. Hassan (2008), as cited by Ucak & Say (2019) claims that students who experience little science anxiety are more motivated to succeed in school and seek careers in science. Also, students who have low levels of science anxiety and stress perform better and have more positive attitudes toward science. Additionally, lack of role models, poor experiences, exam anxiety, the social environment, the teacher's attitude, inappropriate activities for the

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learner's level, the wrong interpretation of the lesson, and other factors can all contribute to science anxiety (Ucak & Say, 2019). Meanwhile, the study of Demetillo, Melitant, & Nabua (2023) found that students reported high levels COVID-19 perceived anxiety. The emotional domain of stress was the most common. The common stress indicators included feelings of anxiety, irritation, forgetfulness, unorganization, sweaty hand, and sleeping difficulties were also experienced by almost all students throughout the academic year during the outbreak of COVID-19 pandemic. Also, the online environment can also lead to a greater level of online science anxiety. This is due to the fact that online learners may feel inadequate, have a fear that they will fail, think negatively, lack concentration, be low on self-efficacy and perform poorly. Some students may worry about the negative consequences of failing or lack of computer-related skills. Others might prefer to avoid technology and think social interaction with others and communication with their instructors is important (Phanphech, Tanitteerapan, Mungkung, Arunrungrusmi, Chunkul, Songruk, & Kinoshita, 2022).

In the Philippines, approximately 28 million students across all levels are required to stay at home and comply with the country's health and quarantine protocols due to the spread of a contagious virus that poses a threat to their health and well-being. The shift from traditional to online-blended learning modes of instruction has had a significant impact on students' learning due to the widespread problem of inadequate access to the internet (UNESCO, 2020). Limited exposure to technology, along with the uncertainty surrounding the impact of the pandemic on their education and the safety of themselves and their families, has led to increased levels of anxiety and stress among students (Cao, Fang, Hou, Han, Xu, Dong & Zheng, 2020). A local study conducted by Diez, Ebro, Dequito, & Diquito (2021) found that students from UM Digos College have encountered difficulties in adapting to the new normal setting, mainly due to slow internet connections and technical problems with the learning management system, which have contributed to negative experiences in the new learning environment. This finding supports the idea that the appearance and spread of COVID-19 have caused considerable concern among people, leading to heightened levels of anxiety (Roy, Tripathy, Kar, Sharma, Verma, & Kaushal, 2020). In this digital, fast-changing age, science education plays an important role in the economic and social growth. This knowledge breakthrough aims to develop a new paradigm of scientific skills, which can be used as a bridge for countries to achieve their promising global economic growth. (Morales (2017). Science education inspires people from all over the world to fight for quality and excellence in science education. It is important to improve science education in order to meet the global standards of competence. Globally, it is clear that there are challenges in providing a quality science education. This is evident by the drastic drop in interest among

students in science careers. Norway, Denmark Germany, and The Netherlands experienced a gradual decline in interest of 40%, 20 %, 20 %, and 6 % respectively. Mnanka (2017) found that only 25-26% students in developing nations pursued physics or chemistry. This is also reflected by the fact that the number of graduates who studied physical sciences has decreased by half (Global Science Forum Report, 2009). The Philippines has experienced this global phenomenon on a dramatic scale. In 2015, the Commission on Higher Education, (CHED) reported a small number of students who are enrolled in secondary schools specializing on science. Of these, two were specialized on biological science and two on physical science. This phenomenon of a small number of students in science education has implications for the Department of Education (Fuente, 2019). The goal of science is to teach students scientific literacy. But the country faces serious challenges in ensuring quality in science education. The Philippines' students are lagging far behind other countries in the Trends International Mathematical and Science Study (TIMSS) of 2009 and in the latest result in Programme for International Student Assessment in Science. This was the first year that the country participated in PISA. The Philippines also ranked 67th among 140 and 138 countries in terms of global competition in quality science in 2016 and 2017 during the World Economic Forum.

Following the Covid-19 outbreak, there may be an increase in students who have a low level of performance due to mass dropouts, a reduction of average learning levels across the board, a widening in the distribution of student learning abilities due to the unequal effects on different populations of the crisis, or even a significant decrease in learning levels. It is estimated that as a direct result of the closure of schools, 25% more students will fall below a basic level of proficiency required to effectively and productively participate in society. Increasing students' interest in science education is not just a challenge for scientific organizations and professional scientists but it is also a challenge for the various Higher Education Institutions (HEIs) that provide secondary education with emphasis on science concept, not just in the Philippines but all over the world. The phenomenon of declining trends in students' interest in science and the shortage of studies on the perception of students' mental health in the field of science education, particularly on what causes student anxiety during the pandemic have prompted researchers to look into a variety of factors that may contribute to anxiety related to science learning.

Research Objective

The main objective of this study is to examine the type of anxiety experienced by students who are taking online scientific courses in the new educational system. However, the overall aim of this research is to tackle the following query:

1. To establish the structure of factors that contribute to anxiety related to science learning in the new normal.

LITERATURE REVIEW

Science Education in the Pandemic

The COVID-19 pandemic is a public health emergency that affects all countries worldwide (United Nations Office for the Coordination of Humanitarian Affairs, 2020). The global epidemic of COVID-19 has an impact on education around the world. The World Health Organization said that unless a vaccination is discovered, no life will return to normal. In consequence of the epidemic, various governments around the world ordered kindergartens, schools, and colleges to close affecting 2.37 million students. As a result, the advancement of instruction has been altered (Xinhua Net, 2020). Different educational institutions are required to undertake distant learning as an alternative to direct teaching in order to continue the educational process through video conferencing software and modules (International Labor Organization, 2020).

Due to the immediate implication of science and technology on today's world and the future, there has been an increased importance on industrial, scientific, and technical breakthroughs in modern nations. It has been observed that scientific procedures influence all human interactions that serve an important part in all countries' national growth, economic development, and scientific advancement. As a result, science education has been seen as critical for knowledge economy and intellectual development, particularly in developing cultures. Schools have encouraged children to acquire science-related disciplines as the relevance of science and technology has grown. Moreover, science branches such as biology, chemistry, physics, sustainability, and environmental science are all researched in all forms of sciences (Abbasi, Moeni, Shahriari, Ebrahimi, & Khoozani, 2018).

Science Anxiety

The scientific, technological, and global advancements of the 21st century have made it necessary for science education at all levels of education to perform well. In fact, both Tella (2007) and Ochonogor (2011) conducted similar research and determined that students' performance in scientific classes in secondary and high school education was inadequate and could not improve over the last decade. There appears to be a blind spot in science education, leaving society defenseless in the face of a pandemic, which enacts crucial considerations for the science educators' community. Public anxiety and fragile confidence in science have increased in recent years (Pietrocola, Rodrigues, Bercot, & Schnorr, 2021). Almost everyone experiences anxiety such as fear and concern as an emotional response to everyday situations that are a natural part of life (Bamber & Schneider, 2016). However, some people have extreme sensations of uneasiness that do not lessen with time and negatively disrupt day-to-day living, according to the National Institute of Mental Health (NIMH, 2016). These more severe or long-lasting emotions of anxiousness are referred to be anxiety. Anxiety is described medically as an unusual or

overwhelming sense of apprehension and fear (Merriam-Webster, 2018). According to the NIMH, roughly 30% of adolescents and adults have anxiety, and women are more likely than males to report anxiety. Seventy-five percent of people with anxiety have their first episode by the age of 22, and only approximately one-third of those with anxiety obtain some therapy (American and Depression Association of America, 2018).

Student anxiety has emerged as a major issue for American schools and institutions. Notably, anxiety among college students has increased in recent years (Center for Collegiate Mental Health, 2017). According to studies, the complexity and difficulty of science course content is a typical cause of student worry, and Mallow invented the term "science anxiety" in 1978 to express the apprehension people can experience when learning science. High levels of anxiety appear to have a harmful impact on kids in general. While there are inconsistent findings about the association between anxiety and performance, a meta-analysis of over a hundred published research investigating the relationship between anxiety and academic performance revealed an overall negative relationship. Furthermore, anxiety has been proven to have a negative impact on student grade point averages (Vitasari, Wahab, Othman, Herawan, & Sinnadurai, 2010) and exam performance (Ballen, Salehi, & Cotner, 2017). Anxiety may be especially harmful for science students, as it has been found to have a negative influence on student performance and retention in science, technology, engineering, and math (England, Brigati, & Schussler, 2017). As a result, anxiety may be a relevant component to investigate when discussing ways to develop more equitable active learning classrooms (Cooper & Brownell, 2020).

METHODOLOGY

Respondents

The research was carried out at the University of Mindanao - Digos College, specifically in the Senior High School department, during the academic year 2021-2022. The study comprised two distinct phases, each requiring a separate set of participants. The sample was comprised of authentic students from UMDC Digos City's SHS institution, enrolled in any of the following academic strands: Science Technology, Engineering, and Mathematics (STEM); Accountancy, Business and Management (ABM); Humanities and Social Sciences (HUMMS); General Academic Strand (GAS) and currently studying for at least one semester. The participants were required to have utilized the institution's online education platform, be available for an interview, and agree to represent their respective academic strands. A total of twenty (20) participants were included in the study (refer to Matrix 1).

Results of the qualitative phase were gathered, analyzed, and transform into questionnaires. In the selection of the quantitative phase, the following criteria were used: The participant is a bona fide student from the SHS institution of UMDC Digos City, Davao del Sur, in the

Matrix 1: The Distribution Matrix of Participants in the Qualitative Phase

| Code Name | Grade Level | Strand |
|--------------------|-------------|--------|
| Participants 1-3 | Grade 11 | GAS |
| Participants 4-5 | Grade 12 | GAS |
| Participants 6-8 | Grade 11 | STEM |
| Participants 9-10 | Grade 12 | STEM |
| Participants 11-13 | Grade 11 | ABM |
| Participants 14-15 | Grade 12 | ABM |
| Participants 16-18 | Grade 11 | HUMMS |
| Participants 19-20 | Grade 12 | HUMMS |

SY 2021-2022, under any academic strands: STEM, ABM, HUMSS, and GAS. The participant is currently enrolled for a minimum of one semester, has used the institution’s online education platform, is willing to answer the survey, and is willing to be the representative from each academic strand enrolled. A total of two-hundred thirty-five participants were gathered (See Matrix 2).

Using the stratified random sampling technique, two hundred thirty-five (235) respondents were gathered. Stratified random sampling divides a population into groups with similar characteristics (Taherdoost, 2016). This method is employed to ensure that the different segments of a population are equally represented. This study, in particular, was conducted to determine the sample size of the UM Digos College – SHS Department.

Matrix 2: The Distribution of Respondents in the Quantitative Phase

| Grade Level & Strands | Frequency | % |
|-----------------------|------------|------------|
| Grade 11 | 86 | 36.6 |
| Grade 12 | 149 | 63.4 |
| Total | 235 | 100 |
| HUMMS | 81 | 34.5 |
| ABM | 82 | 34.8 |
| STEM | 61 | 26.0 |
| GAS | 11 | 4.7 |
| Total | 235 | 100 |

Instruments

In the qualitative phase, the use of Google Meet, a recorder, a pen, notebooks, and an interview guide are the instruments needed to conduct an in-depth interview. Google Meet, a video communication service suitable for audio and video conferencing, is one application that can be used (Singh & Soumya, 2020). In line with this, Google Meet is used because it can be accessed freely with its flexible features. Moreover, over the last 30 years, audio recordings are now a standard technique for creating transcripts from in-depth interviews and group discussions (Lee, 2004 as cited by Rutakumwa, Mugisha, Bernays, Kabunga, Tumwekwase, Mbonye, & Seeley, 2020). Aside from this, one study claimed that

pens and notebooks supported transcribing the data collected from the In-depth interviews (Deterding & Waters, 2021). Furthermore, the researchers have made a semi-structured interview questionnaire as a guide in the qualitative phase of this study. Results of the qualitative phase were used to create a question being used for the quantitative phase of this study. A total of forty-five (45) questions were generated.

Research Design and Analysis

The mixed-method approach used in this study combines quantitative and qualitative descriptive methodologies. An approach to study that blends qualitative and quantitative methods is known as a mixed methodology (Creswell, 2009). This research, in particular, makes use of an exploratory research design. This design is two types of methods that start with a qualitative investigation of phenomena and to be followed by gathering data for quantitative method.

Additionally, descriptive research was used in this study to gather data by identifying conditions present during the study. Nassaji (2015) stressed that a phenomenon’s characteristics and the objective of a descriptive study should be described. It can be applied in this study since it aims to determine the experiences among SHS students in learning science in the new normal. McCombes further asserts that various techniques can be used to examine one or even more variables, and the researcher measures and records the variables without changing them (McCombes, 2022). The researchers investigated the participants’ thoughts and opinions to better understand this phenomenon by learning about their experiences and challenges. As a result, this study disclosed the experiences and corresponding lessons and implications, as well as the determination of the effects of learning science as perceived by science students in the new normal. The key terms formulated interpretations and themes will be used to create a qualitative result when interpreting and analyzing the data gathered (Lochmiller & Lester, 2017; Lester *et al.*, 2020). The researchers utilized the descriptive approach used by Colaizzi (1978) because it is simple and can be processed logically for exploring the fundamental structure of the experience of Senior High School students of UM Digos College.

To ensure and guarantee that all transcribed and translated data were genuine and accurate and presented with the participants’ signatures, the researchers confirmed that the transcribed and translated data were returned to the participants for verification. Two statistical tools were also used to analyze the data and tabulate the collected information. The researchers used the Kaiser-Meyer Olkin Test to evaluate the appropriateness of the sampling size. In order to establish whether the initial correlation coefficient was an independent variable, it was necessary to verify the null hypothesis and ensure that the statistical significance of the test was 0.05 or less as indicated by the p-value. The use of Bartlett’s Test of Sphericity helped to determine whether the correlation

matrix was an identity matrix, indicating a lack of correlation between variables. The results of the KMO measure and Bartlett's Test of Sphericity indicated that factor analysis could be performed on the data. Based on the exploratory factor analysis carried out, the sampling adequacy measure was 0.832, indicating that the KMO measure was more than adequate. The reliability of the data was assessed using Cronbach's alpha, which had a ratio of 0.869, considered acceptable and reliable. Additionally, Bartlett's Test of Sphericity yielded a result of 4813.792, and the coefficient was determined to be significant (0.000). Overall, the results of the KMO and Bartlett's Test of Sphericity suggested that factor analysis could be conducted on the data.

RESULTS AND DISCUSSIONS

Factor Loading of Science Learning Anxiety in the New Normal

Table 1 presents the factor structure of science learning anxiety in the UMDC context. The 45 attitude-related items were arranged according to their underlying dimensions, resulting in four distinct factor groupings. To determine the significance of standardized factor loadings, Tapia, Salvador, and Rodriguez (2020) found that factor loadings should be 0.4 or higher, given a sample size of at least 200 respondents. Cronbach's coefficient of reliability was also used to further test the four-factor groupings' reliability. The first four components demonstrated excellent internal consistency, as evidenced by their very high Cronbach's alpha statistics, which confirms the high reliability of the attitude groups. Consequently, Item_2, Item_3, Item_4, Item_5, Item_6, Item_16, and Item_33 were excluded from the analysis due to their insufficient significance and reliability.

After analyzing the data presented in the table below, the first factor analyzed had 14 items with high factor

loadings, such as Item_11 (0.705), Item_17 (0.506), Item_19 (0.458), Item_21 (0.699), Item_25 (0.647), Item_29 (0.453), Item_30 (0.587), Item_31 (0.515), Item_32 (0.538), Item_38 (0.553), Item_39 (0.538), Item_40 (0.662), Item_43 (0.779), and Item_45 (0.742). This factor relates to the students' attitudes towards science learning in the new normal and is named Attitude. The Cronbach alpha value of 0.896 and 17.629% of the total variance show that these items have high internal consistency and reliability.

The second factor studied includes 12 items with 12.601% of the total variance. The items are Item_12 (0.545), Item_13 (0.418), Item_14 (0.524), Item_18 (0.646), Item_22 (0.667), Item_23 (0.583), Item_24 (0.52), Item_26 (0.675), Item_28 (0.614), Item_34 (0.702), Item_35 (0.673), and Item_42 (0.582). This factor examines how students perform tasks using various assessment modes and activities. Therefore, it is labeled as Learner's Interaction with Assessment and Activities, with an internal consistency of 0.869 determined by Cronbach's alpha and 5.339 eigenvalues, indicating high reliability.

In addition, the third factor analyzed in this study comprised 6 items, including Item_20 (0.505), Item_27 (0.638), Item_36 (0.556), Item_37 (0.547), and Item_41 (0.594). This factor pertains to the learning environment of students during their science classes in a blended learning approach. Thus, it was labeled as Learning Environment, with a high internal consistency and reliability of 0.739.

Lastly, the fourth factor examined in this research included three items: Item_10 (0.550), Item_8 (0.481), and Item_9 (0.633). This factor is related to students' emotional response to low-score assessments. Hence, it was named Disappointment and demonstrated a high level of reliability with an internal consistency of 0.707, determined through Cronbach's alpha.

Table 1: Factor Loading of Science Learning Anxiety in the New Normal

| | Item | Factors | | | |
|----|--|---------|---|---|---|
| | | 1 | 2 | 3 | 4 |
| 11 | I feel nervous whenever I take major science examinations. | 0.705 | | | |
| 17 | Science is difficult because of complex concepts. | 0.506 | | | |
| 19 | I give more effort to understanding scientific concepts. | 0.458 | | | |
| 21 | I feel exhausted if I am bombarded with different scientific concepts during the day. | 0.699 | | | |
| 25 | I got easily distracted in the virtual class. | 0.647 | | | |
| 29 | I feel disappointed if my science teacher did not provide examples, especially in difficult concepts. | 0.453 | | | |
| 30 | I easily got confused whenever difficult concepts are introduced. | 0.587 | | | |
| 31 | I feel disappointed whenever my science teacher did not discuss the difficult concepts more. | 0.515 | | | |
| 32 | I got easily tempted to open Facebook ad other social media platforms resulting in low performance in science. | 0.538 | | | |
| 38 | It is difficult to conduct scientific research in this new normal education. | 0.553 | | | |
| 39 | I don't like the teacher giving simple examples during the discussion but giving difficult situations during examinations. | 0.538 | | | |

| | | | | | |
|---|---|--------|--------|-------|-------|
| 40 | I feel stressed if I can't answer questions during oral recitations on the virtual platform. | 0.662 | | | |
| 43 | Sudden internet problems during online classes added a burden to my learning. | 0.779 | | | |
| 44 | Sudden interruptions by my family members during online classes affected my ability to concentrate during online classes. | 508 | | | |
| 45 | Too noisy surroundings added difficulty to my learnings during online classes. | 0.742 | | | |
| 12 | I feel nervous whenever I take a virtual science laboratory experiment. | | 0.545 | | |
| 13 | I love memorizing science formula. | | 0.418 | | |
| 14 | I enjoy concluding virtual experiments. | | 0.524 | | |
| 18 | I don't like having small mistakes in understanding science concepts. | | 0.646 | | |
| 22 | I don't like it if my science teacher is always present in the virtual class. | | 0.667 | | |
| 23 | I don't like virtual performance assessments in science. | | 0.583 | | |
| 24 | I don't like passive science teachers. | | 0.52 | | |
| 26 | The virtual class is not appropriate for science subjects. | | 0.675 | | |
| 28 | I don't like the knowledge-based science assessment in this modality of learning. | | 0.614 | | |
| 34 | I got frustrated in applying the scientific method in the virtual classroom. | | 0.702 | | |
| 35 | I got frustrated whenever my science teacher gives us assignments on weekends. | | 0.673 | | |
| 42 | I don't like to watch my CP/laptop screen longer. | | 0.582 | | |
| 20 | I don't like it if my science teacher is strict. | | | 0.505 | |
| 27 | My mental health is affected by learning difficult science concepts in the remote learning. | | | 0.638 | |
| 36 | I don't like oral recitation in the virtual classroom. | | | 0.556 | |
| 37 | I feel isolated during this modality of learning. | | | 0.547 | |
| 41 | I played mobile games during virtual classes resulting in low performance in science subject. | | | 0.594 | |
| 10 | I feel disappointed if I got low scores in the science examination. | | | | 0.55 |
| 8 | I motivate myself to learn new science concepts. | | | | 0.481 |
| 9 | I feel disappointed if the examination contents are difficult and not covered in my study guide. | | | | 0.633 |
| Eigenvalues | | 7.469 | 5.339 | 2.773 | 2.592 |
| % variance | | 17.629 | 12.601 | 6.545 | 6.117 |
| Reliability by Cronbach's alpha | | 0.896 | 0.869 | 0.739 | 0.707 |
| Cronbach a 0.869 | | | | | |
| KMO 0.832 | | | | | |
| Bartlett's Test of Sphericity 4813.792, p=0.000 | | | | | |

Attitude

Based on the first explored factor, that respondents having negative assumptions towards science in the new normal. Thus, students feel nervous, exhausted, distracted, and confused when dealing complex and difficult science concept. Consequently, because of its complexity, science continues to be a difficult subject for secondary students, as evidenced by some students' poor achievement. The primary cause of the learner's underachievement is the manner in which the subject is taught. Additionally, based on the respondents, views regarding technologies for online learning in the new normal showed that they have different emotional responses during the adoption of a new teaching methodology. They experienced various feelings such as nervousness, exhaustion, distracted,

disappointment, confusion, temptation, stress, and difficulty that triggered their learning anxiety in science concepts.

According to Osborne, Sengupta & Rodriguez (2019), regarding the endeavor of school science and its effects on society, attitudes are defined as "held feelings, beliefs, and values. People frequently perceive it as a belief that expresses their values and emotions and is frequently manifested in behavior. As the years passed, it was discovered that students performed poorly in science. Ucak and Say (2019) also found that anxiety can come from the environment, including the attitude of family members, teachers, students' perceptions of lessons, social media, fear of exams, and lack of role models. Based on the study, attitude is the main issue because

when students are not interested in learning science, they lack the motivation to learn.

Learner’s Interaction Towards Assessment and Activities

The study revealed and based on the learner’s interaction towards assessment and activities, the result showed that the respondents experienced negative feelings during their interaction through virtual settings, such as feeling nervous while conducting a virtual science experiment and virtual performance assessment in science class. They most likely frustrated in applying scientific method in the virtual classroom. They don’t like passive discussion without interaction during virtual classes. Therefore, this resulted in less effective discussions. As opposed to the conducive learning environment, the students’ worry may have a greater impact on their effective outcomes.

Different researchers have defined communication apprehension as a reluctance to communicate, which may be caused by fear and anxiety or lack of communication skills (Aeni, Jabu, Rahman & Strid, 2017). Consequently, students experience challenges during class participation due to their expression of anxiety symptoms. The more anxious and apprehensive they feel, the more difficult it becomes for them to concentrate on their studies.

Also, students having frustrations on the new mode of instruction that greatly affects the mastery of the subject matter among students. Rehman & Ahmad (2020) argue that long-term isolation could lead to psychological tension and boredom among those who are isolated. This supports the result, which clearly shows that students are distracted during virtual classes by the bad influence of playing mobile games. Hence, the respondents got low grades in their science classes.

Learning Environment

Respondents showed that they are greatly affected by online-based learning systems in the new normal, that they experienced struggles towards their mental health, such as encountering strict science teachers, disliking oral recitation, and feeling isolated while learning complex science concepts that affect their mental health. In primary school science education, the attitudes of teachers toward science and teaching science play a crucial role. Studies have shown that negative attitudes of teachers can hinder students’ learning and eventually diminish their interest in science. This can be attributed to a lack of confidence in teaching science and providing limited opportunities for students to learn, as transmissive pedagogies are relied on and less time is devoted to teaching science in the curriculum (Riegle-Crumb *et al.*, 2015).

According to a research study conducted by McDonald, Klieve, and Kanasa (2021), negative attitudes from strict and unsupportive teachers, as well as a belief of not being intelligent enough to do science, had adverse effects on the participants’ attitudes. Yildirm and Uskun (2018) also discovered that students may experience higher levels of learning anxiety due to the need to adapt to new learning environments and technology-based education, which

may prompt teachers to provide more time for assignments and exams. However, distance learning delivered solely online may result in lower satisfaction with the course and academic grades compared to traditional in-person instruction, as found by Roth, Pierce, and Brewer (2020). Furthermore, implementation of distance learning may lead to reduced socialization and communication among students in comparison to a conventional classroom setting, as reported by McKenna (2018).

As a result, the COVID-19 quarantine can cause various psychological impacts such as fear of infection, disorientation, annoyance, shortage of supplies, and inadequate information, according to Brooks *et al.* (2020). In addition, isolation and limited social interactions caused by stay-at-home orders during the pandemic could lead to anxiety and depression, as noted by Hiremath *et al.* (2020).

Disappointment

The study showed that the disappointment of the respondents on what they experienced while the new teaching method was implemented was having difficulty learning science concepts. Moreover, it also involves the emotion of students toward low-score assessments. Having a low score on science examinations because some of the contents were not entirely covered in the study guide can also cause disappointment. Thus, the challenges of the respondents can lead to disappointment which can affect their mental health.

Furthermore, there have been previous studies on college students’ stress and anxiety. Previous studies uncovered several enduring issues, including “accommodation challenges,” fear about the future, and anxiety over passing exams (Unger & Meiran, 2020). This is how respondents’ mental health suffers from disappointment. Students face tremendous pressure when it comes to studying. Society, family, and finances all require adapting to new circumstances. If they cannot, tensions may arise

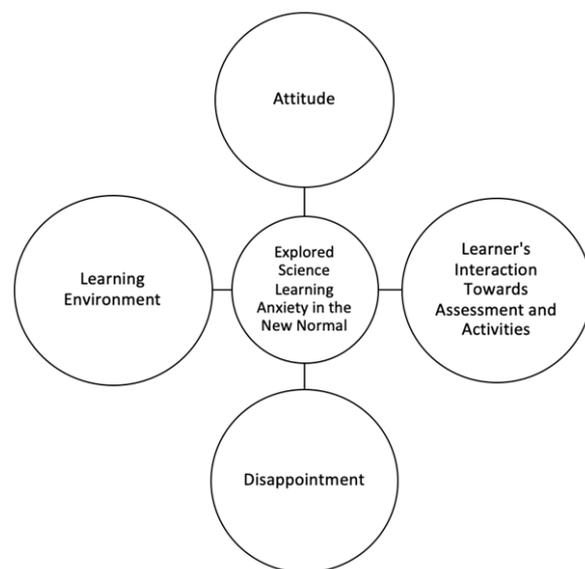


Figure 1: Explored Science Learning Anxiety in the New Normal Framework

over the validity problem. This is an emotional feeling (Phanchamlong *et al.*, 2022). In addition, the remote online exam handling difficulties during COVID-19. This is not all. Since it brings disappointment because of online testing (Wahid & Farooq, 2020). Therefore, students' disappointment in science learning concepts and online exams can greatly affect their mental health in the time of a new normal mode of learning.

CONCLUSIONS

The main objective of this study is to determine the factor structure of science learning anxiety in the new normal education brought by the Covid-19 Pandemic. Based on the result of the study, four domains of science anxiety was explored, these domains are attitude, learning interaction towards assessment and activities, learning environment, and disappointment. The result of the study highlighted the various dimensions associated with science learning anxiety among senior high school students in the new normal education. These explored dimensions can significantly affect the learning process of students towards learning science in the new modality of learning.

RECOMMENDATIONS

The researchers have acknowledged that their findings are limited in scope and should be recognized as such. Based on their initial findings and conclusions, the researchers recommend that future researchers perform a confirmatory factor analysis to confirm the dimensionality of science learning anxiety in the new normal. Additionally, further research should be conducted on science learning anxiety in the new normal to determine if the indicators of science learning anxiety identified in this study are present in the new mode of learning.

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