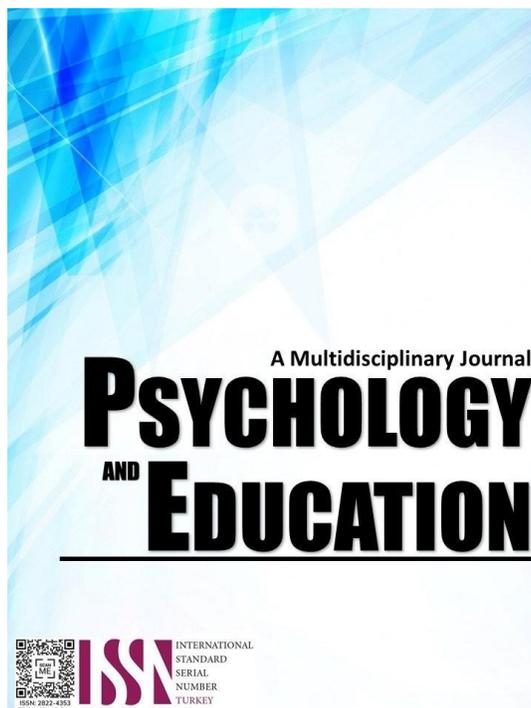


**THE E-LEARNING CLASSROOM IN FLEXIBLE LEARNING AND ITS
RELATION TO ACADEMIC PERFORMANCE OF LEARNERS IN
SCIENCE IN SELECTED PUBLIC ELEMENTARY SCHOOLS
IN THE DIVISION OF CITY SCHOOLS MANILA**



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The E- Learning Classroom in Flexible Learning and its Relation to Academic Performance of Learners in Science in Selected Public Elementary Schools in the Division of City Schools Manila

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Abstract

The study examined the effectiveness of e-learning in flexible learning and its impact on students' academic performance in selected public elementary schools in Manila for the 2021-2022 school year. It found that most teachers were aged 31-40, female, married, held a bachelor's degree, and had less than ten years of teaching experience. E-learning was found to be highly effective in lesson delivery, participation, and discourse but moderately effective in virtual learning and critical analysis. Students' academic performance was outstanding in video conferencing/teleconferencing and very satisfactory in other areas like science investigation, weather reporting, discussion boards, and science journals/news. A significant relationship was identified between e-learning effectiveness and students' academic performance (Pearson-r = 0.84). Teachers faced challenges such as excessive paperwork, expensive professional development, and schedule conflicts. Recommended solutions include reducing paperwork, providing free training, enhancing support from school heads, promoting parent involvement, and securing electronic gadgets for students. Overall, teachers were effective in using e-learning for flexible learning, positively impacting students' academic performance, though addressing these challenges is essential for further improvement.

Keywords: *flexible learning, academic performance, classroom, conference, teleconferencing*

Introduction

Typical Learning usually happens inside the classroom setting and having a face – to – face interactions with their teachers. During typhoons, floods, calamities, and other emergencies like this covid pandemic, the first thing that everybody ask is what can teachers do as to compromise learning? This research examined the effectiveness of e-learning classroom in flexible learning and its relation to academic performance of learners in science in selected public elementary schools in Division of City Schools Manila.

Due to the threat of the COVID 19, many educational institutions in NCR have suspended their academic activities and classes. All the non – teaching personnel had to stop working and advised by the President of the Philippines to stay at home. COVID - 19 is a disease that could easily infect the immune system that can cause greater harm to individuals who are infected. Many countries have declared a national emergency just like the Philippines. Most of the cities around the Philippines are empty. All types of vehicles are few. Important business establishments are closed. Conferences and meetings are strictly prohibited. Flights are affected and they have been grounded. Some grocery stores, drug stores; wherever you are, even at home are being emptied of masks, hand sanitizers, and disinfecting medications. Students are advised to stay home and self-study. Everyone is in doubt as to when this crisis would end.

Technology has been integrated into every aspect of modern life. It is possible in all but the most remote cultures to be exposed to some sort of technology on a daily basis. Technology allows humans to connect without limitations of geography, it makes process more efficient and it supplements the intellect and effectiveness of the human brain. It brings together tools to promote development, use information exchange, has as its main objective of making task easier and the solving of many problems to mankind. It provides a window to the world and access to thousands of learning resources. Learning to work with technology and using computer coding gives children the skills and confidence to help them get good jobs when they leave school and in turn come up with more new technologies.

Asian countries have already advanced their technological capabilities in terms of the delivering quality instructions. E-learning refers to the type of learning that uses the Internet as an instructional delivery tool to carry out various learning activities. It catface the form of a pure online learning in which the curriculum and learning are implemented online without face – to – face meeting between the instructor and the students, or a hybrid in which the instructor meets the students half of the time online and half of the time in the classroom, depending on the needs and requirement of the curriculum.

As a supplement to the traditional courses especially in times of emergencies. Virtual learning is essential by which educators can use this platform to create their web based classroom to teach pupils online. They also have the option to start discussions on the courses at any point of time. Features like invitation to external members and tasks assignment allows users to easily monitor each other's learning and progress. Having sub-topics can be easily managed and taught here while utilizing all basic features of the subject description. Tasks, discussion and invitation to external members. With extra features like adding pictures, presentations, files, YouTube and Vimeo videos users can easily create more engaging. In E-learning management system which educators can use to manage their classrooms online. Several studies have shown that technology integration have been affecting academic excellence and the quality of the delivery instructions by the teachers. Researchers

designed a E-learning system using a set of scaffolding procedures and collaborative learning techniques to enhance students' creative writing in the classroom. Meanwhile, other study stated that the typical "flipped classroom" delivers lecture material in video format to students outside of class in order to make space for active learning in class. Interactive video vignettes incorporate evidence-based teaching strategies to address known areas of confusion for entering students. Online learning solutions provide much-needed effectiveness for teachers, allowing them to maximize the potential for individual learning curves and styles within the classroom. Many online learning solutions account for self-paced learning and allow students and teachers to work together to meet schedule targets.

Learning experiences should employ three-dimensional teaching and learning strategies and make their use explicit. E-learning experiences should give educators opportunities to reflect on the implications of what they are learning to their own practice. E-Learning is effective and powerful. It makes information easy to grasp and absorb. It imparts enhanced ability to learn and implement among the learners. The Audio-Visuals help in remembering knowledge for a longer time. E-learning saves time and money. With online learning, learners can access content anywhere and anytime. E-learning leads to better retention, consistent scalable and it offers personalization.

Its learning experiences give educators opportunities to reflect on the implications of what they are learning to their own practice. Science literacy is of prime importance in the development of students. Each and everyone have to develop this literacy level to deal with the changes in the transient world. Science education must be the basis for informed participation in a technological society, a part of a continuing process of education, a preparation for the world of work and a means for students' personal development. It is needed to solve various problems along with the ever evolving technology. This scientific literacy will benefit students to deal with the various problems they face in their daily life.

The National Science Teachers Association (NSTA) supports and encourages the use of e-learning experiences for science students, as well as for science educators engaging in professional learning in the traditional, informal, or online learning environment. E-learning as the effective learning process created by combining digitally delivered content with learning support and services. E-learning can and should significantly enhance science teaching and learning and may be used in a blended and coherent fashion to extend onsite learning experiences. E-learning experiences provide teachers of science with accurate, up-to-date information relating to science content and pedagogy. E-learning as an important component of teacher preparation and teacher professional learning science educators should use online tools to promote sharing of information, discourse, critical analysis, and collaboration between students and teachers at various locations throughout the world. School districts and science supervisors should seek, evaluate, and provide teachers of science with high-quality, meaningful learning experiences employing e-learning technologies. It also give science educators opportunities to have first experience. The appropriate use of technology in teaching and learning, and increase their confidence in using these tools in their own practice. Online science education can definitely help in increasing science literacy and also enable students to develop advanced computer skills. Online science education can definitely help students in developing a good understanding of scientific concepts through the advantages offered by latest Web designs. The importance of E-Learning education is that it is quick and does not require much cost. The long training period, infrastructure, stationery, travel expenses, etc. is reduced. Effectiveness of the transferred or imparted knowledge and learning is high and powerful. It makes information easy to grasp and absorb.

This study purported to evaluate the effectiveness of e learning classroom in designing an alternative learning tools in times of calamities using the students' perceptions towards its advantages and disadvantages.

Specifically, this study aimed to seek answers to the following objectives: First to know the impact of E-learning classroom on students' academic excellence and on the quality of teachers' delivery of instruction, second to identify the different step-by-step process in creating an online internet classroom using E learning as a platform for teaching and learning interactions in Science, third to present other potential alternative delivery modes in sustaining instructions during calamities.

The Internet and the World Wide Web have made remarkable changes to almost all aspects of our lives ranging from a global economy, personal, and professional networks to sources of information, news, and learning. The Internet has made online learning possible, and many researchers and educators are interested in online learning to increase and improve student learning outcomes while combating the quarantines and viral outbreaks, it would seem that online learning is the only viable way to continue learning at a distance. This, however, seems to rest on a mistaken assumption. It should be emphasized that online learning is just one mode of distance education. Distance education is broadly characterized as any form of learning experience where the learner and the instructor are physically separated from each other not only by place but also by time. The issue of utilization of e-learning packages in the teaching and learning of science, in the light of the efficacy of commercially available e-learning and teacher made packages and their limitations. Online learning is distance learning or distance education, which has long been a part of the American education system, and it has become the largest sector of distance learning in recent years. In this time of pandemic where our country is facing the wide spread of the virus, Covid 19. It affects many lives, business, and face to face learning of the learners.

The Philippines is not the only country facing these problems but all over the world. In Southeast Asian neighbors have creatively responded to the same challenges and started to pivot to a new era of education. Indonesia, Thailand, and Vietnam

have initiated some form of distance learning as early as May 2020. Thailand's Education Ministry originally planned to implement a learning program using a Distance.

Learning Television (DLTV) platform. Seventeen television channels were set up to broadcast educational courses, vocational education, non-formal and informal education (Praphornkul, 2020). The approach combines television or on-air learning and online learning. The rollout, however, was met with criticisms due to broadcasting problems and poor connectivity (Bangkok Post, 2020). The ministry adjusted its plan and focused instead on preparing for schools to reopen nationally after a survey found that 60–70% of students are not ready for TV education (Bangkok Post, 2020). As Thailand universities move their operations online, the Ministry of Higher Education, Science, Research and Innovation (MHESI) provided more than 60,000 educators and 2 million students access to Microsoft applications (Microsoft, 2020). Universities have also taken key initiatives and partnerships to ensure that the transition to digital is successful. Indonesia's Education and Culture Ministry, in collaboration with TVRI, a state-owned broadcaster, released their own distance learning program called "Learning from Home" (Jakarta Globe, 2020). The program focuses on improving literacy, numeracy, and character building for all levels of elementary and high schools. The implementation, however, proved to be challenging even with issues like uneven access to the internet, the disparity in teacher qualifications and education quality, and the lack of Information and Communications Technology (ICT) skills (Azzahra, 2020).

A survey of 1,045 students found that a majority of students who responded, 53.7%, cited concerns about online learning due to poor streaming, limitation in network quota and reception. Though the reactions are mixed, in general, there seems to be a positive response to online learning in Indonesia (Yamin, 2020). Ninety five percent of Indonesian universities carry out online learning using the Online Learning System Program (SPADA) (Yamin, 2020). Vietnam's Ministry of Education and Training (MOET) hosted a national online conference with 300 live meeting hubs to find ways to improve online learning before launching its educational program (Nguyen and Pham, 2020). The conference was attended by HEI leaders, technology and technical service providers including Viettel Group, VNPT, MobiFone, Vietnamobile, Microsoft, Google, Amazon, and FPT (Nguyen and Pham, 2020). MOET reported that 110 out of 240 HEIs in Vietnam had initiated online training. However, not all HEIs have a fully developed LMS (Nguyen and Pham, 2020). Recognizing that they are presented with a unique opportunity to work together and enhance digital teaching and learning, the delegates started working out plans to implement online education long-term and not simply as a response to COVID-19. Viettel's offer of free 3G and 4G data to teachers and students using their e-learning platform called Viettel Study, and VNPT's launch of its online learning solution called VNPT E-Learning which also comes with free 3G and 4G data (Lich, 2020).

After months of experimenting, online teaching is now recognized as a formal method in Vietnam, an interesting development considering that any proposal to formally conduct online learning before COVID-19 had been poorly received by the country's academic community (Nguyen and Pham, 2020). Minister of Education and Training Phung Xuan Nha admitted, however, that issues like connectivity problems, especially in remote areas, as well as some pedagogical concerns, like management of student performance, need to be sorted out for the program to succeed. There are a large number of studies that find positive statistically significant effects for student learning outcomes in the online or hybrid format compared to the traditional face-to-face format. Some of the positive learning outcomes are improved learning as measured by test scores, student engagement with the class material, improved perception of learning and of the online format, stronger sense of community among students, and reduction in withdrawal or failure. In a methodologically attentive study conducted at Ithaka, students were casually assigned to the traditional format and a hybrid interactive online learning format that met once a week where students did most of the work online.

Now that the Philippines is facing pandemic, there are a lot of online education systems in Philippines. The main purpose of those systems is to provide a better and effective way to help students to get learning materials and information. In this project, a web base learning management system also known as e learning management system will be developed to address the needs of the pupils in times of pandemic. Purpose of this system is to enable teachers and students access the study materials at anytime and anywhere. Similarly, DepEd sets a distance learning approach that utilizes three methods: (1) delivery of printed modules to students, (2) access to DepEd Commons, an online education platform DepEd developed to support alternative modes of learning, and (3) delivery of lessons or self-learning modules via radio and television. The specific guidelines on the implementation of distance learning, however, are still under review (Magsambol, 2020). Private universities and institutions have likewise adapted to the limitations imposed by the pandemic and are poised to go either fully online, blended learning, or scheduled in person classes in case the government lifts quarantine measures. In July 2020, DLSU adopted an alternate mode of education that is technology-enabled dubbed Lasallians Remote and Engaged Approach for Connectivity in Higher Education (R.E.A.C.H). R.E.A.C.H emphasizes the importance of engagement between faculty and students and offers three different delivery modes: (1) fully online (synchronous and asynchronous), and whenever possible (2) hybrid (blending of online and face-to-face), and (3) face-to-face. All online academic tools and materials are organized and made accessible via the university's learning management system (LMS), Animo Space (De La Salle University, 2020b). Similarly, ADMU piloted the Adaptive Design for Learning (ADL). ADL combines three different modes of delivery: (1) online, and, whenever possible, (2) blended, and (3) face-to-face; and offers uniquely designed courses that suit faculty style

and respond to learner's needs and contexts. The curricula materials are hosted in Ateneo Blue Cloud, an online platform branded as the university's virtual campus (Ateneo de Manila University, 2020). Meanwhile, UST through its learning management platform, UST Cloud Campus implemented an Enriched Virtual Mode (EVR) that combines both online (synchronous and asynchronous) and offline strategies to ensure accessibility and flexibility in learning. Other than team-teaching, the approaches in EVR include a combination of the following: (1) complementing of professional competencies with industry partners and alumni interactions, (2) collaborative online learning with foreign partner institutions, and (3) remote encounters with community partners (Alejandrino, 2020).

Finally, the University of the Philippines System shifted to blended learning using already existing platforms like (UPOU). UPOU maximizes online learning and distance education and also offers free special courses in online learning. UP College of Education presented an Education Resilience and Learning Continuity Plan (ERLCP) to help schools transition to an alternative learning environment. ERLCP recommends enacting flexible learning options that are learner-centered and are made available in various modes of delivery such as face-to-face instruction, remote learning, and blended learning (University of the Philippines - College of Education 2020). In a traditional, face-to-face classroom setting, teachers have the ability to interact with students, flexibly spot-check understanding, and present learning material in an engaging manner. Our new normal of science teaching, the distance-learning model, has severely compromised these good instructional practices. The use of e-learning in science classes very needed. It will not only help to make the teaching and learning of science to share in educational revolution which e-learning brings into educational system but also to reach the benefits of a more effective method of teaching and learning to offer to the learners. E-learning may not be different from other technological innovative strides that have been present in science education for long but failed to produce significant impact in the teaching and learning of the subjects. E-learning has no rival when it comes to generation of intrinsic motivation and initiation of organized active learning in science education. Instructional materials such as articles, interactive websites, and informative videos can now serve as evidentiary sources as students strive to describe the science behind the mystery. Video recording and screencast tools, such as Screencast and Screencast-O-Matic, can be utilized by the science teacher to promote peer interaction.

Students can use screencast software to explain a relatable science mystery through a narration of a slideshow presentation. Live meet-up tools, such as Zoom and Google Meet, are certainly useful in helping the class connect from home, but they can be a bit awkward. Many students are at a loss as to what to say. Some kids turn their cameras off and participate sparingly. Encouraging students to vocalize their ideas through a screencast allows for more structured and purposeful communication. "Engaging students in science content requires educators to help students see themselves as scientists and engineers instead of passively observing other people doing the work of science," said Melyssa Ferro, a science teacher,

Walden University graduate, and Idaho's 2016 State Teacher of the Year. "It is about creating opportunities for them to see science in application instead of just reading about it in a textbook." Complex textbooks are important to have, but if young learners can't grasp the information and educators aren't effectively teaching the content then it limits students' chances for success.

Research Questions

The study aimed to determine the e-learning classroom in flexible learning and its relation to academic performance of learners in science in selected public elementary schools in the Division of City Schools Manila school year 2021-2022. Specifically it sought answers to the following questions:

1. What is the profile of the respondents as to:
 - 1.1. age;
 - 1.2. gender;
 - 1.3. civil status;
 - 1.4. highest educational attainment; and
 - 1.5. years in service?
2. How effective is e-learning classroom in flexible learning in terms of:
 - 2.1. virtual learning;
 - 2.2. delivery of the lesson;
 - 2.3. participation / discussion;
 - 2.4. critical analysis; and
 - 2.5. discourse;
3. What is the level of academic performance of the pupils towards flexible learning in science in terms of:
 - 3.1. science investigation;
 - 3.2. video conferencing/teleconferencing;
 - 3.3. weather reporting;
 - 3.4. discussion boards; and

- 3.5. science journals/ science news?
4. Is there a significant relationship between effectiveness of the level of e-learning classroom and academic performance of the learners in Science?
 5. What are the problems encountered by the teacher respondents toward the e-learning classroom and the level of academic performance of learners in science?
 6. What are the recommended solutions to the problems encountered by the teacher respondents to the impact of academic performance of the learners?

Methodology

Research Design

The researcher utilized the descriptive method of research as the main thrust to determine the E-Learning Classroom in Flexible Learning and its Relation to Academic Performance of Learners in Science in Selected Public Elementary Schools in Division of City Schools Manila.

The quantitative research design was used in this study. In-depth individual interviews were conducted with the teacher-participants to explore their insights. The method was based on the phenomenology as the researcher wished to describe their perceptions and lived experiences. This design is used to describe how human beings experience a certain phenomenon and attempts to set aside biases and preconceived assumptions about human experiences, feelings, and responses to a perceptions, perspectives, understandings, and feelings of those people who have actually experienced or lived the phenomenon or situation of interest, or the so-called, "lived-experiences."

Participants

The respondents of the study were the one hundred twenty (120) teachers of selected public elementary schools in Division of City Schools Manila SY 2021 - 2022.

<i>Name of School</i>	<i>No. of Teacher Respondents.</i>
Rosauro Almario Elementary School	27
Isabelo delos Reyes Elementary School	16
Emilio Jacinto Elementary School	14
Vicente Lim Elementary School	14
Amado V. Hernandez Elementary School	14
Timoteo Paez Elementary School	12
Teodoro R. Yangco Elementary School	9
Jose Corazon de Jesus Elementary School	4
Jose Rizal Elementary School	10
Total	120

Further more teacher-respondents were particularly elementary teachers. In choosing the respondents, the researcher will be utilized the purposive sampling method where 120 teachers in science in selected elementary schools in Division of City Schools Manila.

Instruments

The survey questionnaire was used as the main tool to gather the data needed in this study. The researcher briefed the participants about the study and informed them that participation was voluntary. They were given a choice if they wanted to be part of the study or not. The participants in the study were asked to complete five test instruments:

The first part which is Personal Profile includes the name (optional), age gender, civil status, highest educational attainment and years in teaching science. The second part which is the Status of effectiveness of E-learning Classroom Questionnaire develop, was used to measure the five indicators of effectiveness of E-learning classroom in flexible learning of the pupils namely virtual Learning, delivery of the lesson, participation/discussion, critical

analysis, discourse. Third part Level of academic performance of the pupils towards flexible learning in science in terms of: Science investigation, video conferencing / teleconferencing, weather reporting, discussion boards, science journals / science news. Part four Problems and challenges encountered by teacher-respondents towards e-learning classroom and the level of academic performance of learners in science. And part five Recommended solution to the problems encountered by the teacher respondent to the impact of academic performance of the learners.

Constructing of the Instruments

In this study, the researcher used a research-made questionnaire as instruments to gather data. The preparation of survey questionnaire were crafted through reading books, journals, magazine and surfing the internet, to give the researcher the best possible ideas and concepts about the survey.



Validation of the Research Instrument

In conducting the surveys necessary to gather data, it is important to validate the instrument to be used in the study. Validation refers to the process of collecting validity evidence to evaluate the appropriateness of the interpretations, uses, and decisions based on assessment results.

Contemporary frameworks view validity as a hypothesis, and validity evidence is collected to support or refute the validity hypothesis (i.e., that the proposed interpretations and decisions are defensible). In validation, the educator or researcher defines the proposed interpretations and decisions, identifies and prioritizes the most questionable assumptions in making these interpretations and decisions (the “interpretation-use argument”), empirically tests those assumptions using existing or newly-collected evidence, and then summarizes the evidence as a coherent “validity argument.” (David A. Cook 2016)

The efficient rubric offers students grading criteria that can be used to inform and develop their assignments prior to submission. Like other rubrics, it offers instructors clear guidelines for gauging student performance. Unlike other rubrics, the efficient rubric involves instructors only providing students with a summary mark and corresponding percent grade on each assignment (Tomaswick, 2017). Similarly, rubrics also allow interpret and predict expected levels of output more effectively when presented to students before and during learning (Tractenberg, Attwood, & Via, 2019). Rubric help students acquired knowledge by deciding a strategy on what method to apply in achieving a solution (Sonseca, Sahuquillo,

Martinez-Casas, Carballeira, Denia, & Rodenas, 2015)Moreover, rubric conforms on the constructivism philosophy of Jean Piaget, in which students learn by integrating new information with what they already know (Behera, 2017). Implies that the use of rubrics in the learning process teaches a learner to develop an understanding of the expectations and components of a particular task given. This also makes a learner aware of his or her learning progress and process. Therefore, this confirms the rubric is one that lets teachers not only accurately assess the work of students but also help students learn unique skills and knowledge (Bargainnier, as cited by Raymond, Alkrisat, & Hebda, 2018).

Procedure

To attain the research objectives and answer the problems stated in the study, the following stages of data collection were done:

The researcher prepared the requirements to secure permission form school Approval from the Division of Schools Superintendent, the school principal and were obtained before the executing the succeeding procedures.A survey questionnaire was administered to the teachers which included their demographic profile indicating their ages, gender, civil status, highest educational attainment, number of years in teaching science. At the same time, the questionnaire was included questions on teacher’s well- being and performance, and possible solutions on the problems encountered. The result of the survey was gather, tailed, analyzed and transformed into statistical data which served as bases to answer the questions of the study.

Data Analysis

The problems stated in the first chapter were answered through the data that were gathered in the course of the study. To objectively interpret the data that were gathered, these were treated and analyzed using statistical tools.

Responses on status effectiveness of E-learning Classroom questionnaire were rated through a 5 point.

Likert scale anchored as 1=not effective, 2= less effective, 3= effective, 4 = more effective, 5= highly effective.

Point Value	Scale	Descriptive Rating
5	4.50 – 5.00	Highly Effective
4	3.50 – 4.49	More Effective
3	2:5 – 3.49	Effective
2	1.50 – 2.49	Less Effective
1	1.00 – 1.49	Not Effective

The level of academic performance of the pupils towards flexible learning in Science, was used to measure the five indicator namely, science investigation, videoconferencing / teleconferencing, whether reporting, discussion boards, science journal/science news. Responses on Work Performance Questionnaire were gathered through 5- point.

Likert scale anchored as 1=poor, 2= fair, 3= satisfactory, 4 = very satisfactory, 5= outstanding.

Point Value	Scale	Descriptive Rating
5	4.50 – 5.00	Outstanding
4	3.50 – 4.49	Very Satisfactory
3	2:5 – 3.49	Satisfactory
2	1.50 – 2.49	Fair



1	1.00 – 1.49	Poor
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The fourth part which deal with the problems encountered by the teacher towards the e-learning classroom and the level of academic performance of the learners in science. Responses on problems

Encountered on Well-being and Work Performance Questionnaire were gather through 5 point.

Likert scale anchored as 1=not a problem , 2= less serious , 3= serious , 4 = very much serious, 5= extremely serious.

<i>Point Value</i>	<i>Scale</i>	<i>Descriptive Rating</i>
5	4.50 – 5.00	Extremely serious
4	3.50 – 4.49	Very much serious
3	2:5 – 3.49	Serious
2	1.50 – 2.49	Less serious
1	1.00 – 1.49	Not a problem

The fifth part which was on the Suggested Solutions on the Problems encountered by the teacher to the impact of academic performance of the learners, was used to measure Possible Solutions on the problems encountered on the impact of academic performance of the learners. Responses on problems Encountered on E learning classroom to academic performance Questionnaire were gather through 5 point.

<i>Point Value</i>	<i>Scale</i>	<i>Descriptive Rating</i>
5	4.50 – 5.00	Highly Recommended
4	3.50 – 4.49	More recommended
3	2:5 – 3.49	Recommended
2	1.50 – 2.49	Less recommended
1	1.00 – 1.49	Not recommended

Percentage

To answer the first problem about the teachers profile specifically the ages, gender, civil status, highest educational attainment, years in service. The data from the questionnaire was summarized using percentages as a descriptor.

Weighted Mean

Frequency distribution tables and average weighted mean were utilized to numerically describe the result of the survey questionnaire in term of the status of e-learning classroom in flexible learning and academic performance of the pupils as well as to summarize the problems encountered by the e-learning classroom in flexible learning and academic performance of the pupils and the possible solutions of these problems.

Pearson – Product Moment Correlation

Pearson correlation was used to analyze if there is a significant correlation on the respondent’s status of well – being and their work performance.

Results and Discussion

This section presents, analyzes and interprets the results of the study. The findings of the study are organized in six parts, based on the problems posed.

The first part describes the profiles of the teacher respondents in terms of age, gender, civil status, highest educational attainment, and years in service. Part two is an assessment on the effectiveness of the e-learning classroom in flexible learning in terms of the following: Virtual Learning, Delivery of the lesson, Participation / Discussion, Critical Analysis, and Discourse. The third part assess the level of academic performance of the pupils towards flexible learning in science in terms of the Science investigation, Video conferencing/Teleconferencing, Weather reporting, Discussion Boards,and Science Journals/ science news. Part four determine any significant relationship between effectiveness of the level of e-learning classroom and academic performance of the learners in Science.

The fifth part of this chapter describe the problems encountered by the teacher respondents toward the e-learning classroom and the level of academic performance of learners in science Finally, part six assess the the recommended solutions to the problems encountered by the teacher respondents to the impact of academic performance of the learners.

Question No. 1 What is the profile of the respondents as to: age, gender, civil status, highest educational attainment; and years in service?

Table 1.1. *Distribution of Respondents According to Age*

<i>Indicators</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Rank</i>
30 & below	34	28.33%	2

31 - 40	47	39.17%	1
41 - 50	28	23.33%	3
51 & above	11	9.17%	4
Total	120	100%	

Table 1.1 presents the distribution of respondents according to age. Based on the data presented out of 120 respondents 47 or 39.17 % belong to age 31-40, followed by age 30 & below with 34 or 28.33 %, then age 41-50 with 20 or 23.33 %, and lastly age 51 & above with 11 or 9.71 %.

Zamaro et. Al (2021), teachers whatever generations they belonged the pandemic crisis brought unexpected changes on their teaching career. The 2020-2021 academic year was unlike any other. After nationwide school closures during the spring of 2020, schools reopened in the fall using combinations of in-person, hybrid, and remote learning models. Teachers had to adapt to unexpected conditions, teaching in unprecedented ways, using synchronous and asynchronous instruction, while also being challenged to establish connections with students, families, and colleagues.

Table 1.2. Distribution of Respondents According to Gender

<i>Indicators</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Rank</i>
Female	102	85.00%	1
Male	18	15.00%	2
Total	120	100%	

Table 1.2 displays the distribution of respondents according to gender wherein the majority of the respondents are females as evidenced by the population of 102 or 85.00 % of the total respondents while only 18 or 15.00 % are males.

According to Korlat et. al (2021), the spread of the COVID-19 pandemic quickly necessitated digital learning, which bore challenges for all pupils but especially for groups disadvantaged in a virtual classroom. As some studies indicate persistent differences between boys and girls in use of technologies and related skills, the aim of this study was to investigate gender differences in the digital learning environment students faced in spring 2020. Results showed higher perceived teacher support, intrinsic value, and learning engagement among girls than boys, while no significant sex differences were found in competence beliefs regarding digital learning. Furthermore, our results indicated clear benefits of an androgynous gender role self-concept for all studied components of digital learning. As an educator or aspiring teacher, it's important for you not only to understand and empathize with the challenges of online education for students — but even more critically, to help implement effective solutions.

Table 1.3. Distribution of Respondents According to Civil Status

<i>Indicators</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Rank</i>
Single	39	32.50%	2
Married	77	64.17%	1
Separated	4	3.33%	3
Total	120	100%	

Table 1.3 shows the distribution of respondents according to civil status in which married respondents recorder a total of 77 or 64.17 %, while single with 39 or 32.50 % and separated with 4 or 3.33 %.

In the study of Villanueva and Meer (2021), the findings revealed that the teacher-respondent is a typical female in her early adulthood, married, Roman Catholic, Mathematics major, Teacher 1, BS degree with masteral units of education and had been teaching for almost a decade. The teacher-respondent agreed on the predictors affecting the level of work performance as to teaching hours, salary/remuneration, school officials/administrators, peer/colleagues, student factor, work environment factor and community support. The teachers were rated “Very Satisfactory” on their level of work performance. There was a significant difference on the assessment towards salary/remuneration when grouped according to civil status, religion and highest educational attainment; on school officials/administrators when grouped according to position/designation

Table 1.4 depicts the distribution of respondents according to highest educational attainment. The data depicted that the respondents holding Bachelor Degree consists of 58 or 48.33 % , next is those who earned Bachelor Degree with MA/MS Units with 54 or 45.00 % , then 8 or 6.67 % completed MA/MS Degree and none of them earned PhD/EdD units neither completed PhD/EdD Units.

The COVID-19 pandemic has been witnessing a growing number of online learners with heterogeneous demographic backgrounds in terms of gender and educational levels. Several studies have investigated the effect of learners' demographic backgrounds on online learning outcomes . Numerous studies have explored the impact of gender, and educational levels ,Gašević et al.(2016).

Table 1.4. Distribution of Respondents According to Highest Educational Attainment

<i>Indicators</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Rank</i>
Bachelor Degree	58	48.33%	1
Bachelor Degree with MA/MS Units	54	45.00%	2
MA/MS Degree	8	6.67%	3
MA/MS Degree with PhD/EdD Units	0	0.00%	4



PhD/EdD Degree	0	0.00%	4
Total	120	100%	

Table 1.5 gives the distribution of the respondents according to years in service. The data provided that respondents have 10 years & below in service with 71 or 59.17 %, followed by 11-20 years in service with 34 or 28.33 % and 15 or 12.50 %.

Table 1.5. *Distribution of Respondents According to Years in Service*

Indicators	Frequency	Percentage	Rank
10 years & below	71	59.17%	1
11 – 20	34	28.33%	2
21 years & above	15	12.50%	3
Total	120	100%	

According to Lopes and Oliviera (2020), teacher job satisfaction is a determiner of the effectiveness of not only the teacher him/herself but also that of the students, the school environment and the educational system at large. The repercussion of teachers' job dissatisfaction could be the heavy costs of selection, training and recruiting new teachers. Satisfaction with one's job is increasingly becoming important in any workplace. Employers and supervisors should recognize that happier and more satisfied employees are more likely to have higher motivation and productivity at work. The pivotal responsibility of educating and nurturing students in any society is on the shoulders of teachers, whose knowledge, affection, and commitment exert a great influence over students' lives. The life-changing influence of an effective teacher in enhancing students' learning and the overall improvement of the educational system attests to the necessity of attending to teachers' performance in the classroom and the possible factors related to their teaching effectiveness.

Question No. 2 How effective is e-learning classroom in flexible learning in terms of: virtual learning, delivery of the lesson, participation/discussion, critical analysis; and discourse

Table 2.1. *Level of Effectiveness of e-Learning Classroom in Flexible Learning As Assessed by the Respondents In Terms of Virtual Learning*

Indicators	Frequency					WM	VI	R
	5	4	3	2	1			
1. Help coordinate online group activities.	33	59	27	1	0	4.03	ME	7
2. Interact and connect with the learners.	61	40	18	1	0	4.34	HE	2
3. Establish time management skills.	44	53	21	2	0	4.16	ME	4
4. Apply new trends strategies, methods and techniques in presenting the lesson	65	35	19	1	0	4.37	HE	1
5. Balance school, work, families, responsibilities, and other extracurricular activities	34	44	37	4	1	3.88	ME	10
6. Extends educational experiences for learners.	46	36	33	4	1	4.02	ME	8.5
7. Cater in addressing learners' needs.	41	46	28	4	1	4.02	ME	8.5
8. Help learners with complicated schedules and diverse responsibilities	53	49	15	2	1	4.26	HE	3
9. Model as an active element of learning system of learners	52	39	22	6	1	4.13	ME	5
10. Attract active participation among learners.	44	48	26	1	1	4.11	ME	6
Average Weighted Mean						4.13	ME	

Legend: 4.20 - 5.00 → Highly Effective (HE); 3.40 - 4.19 → More Effective (ME); 2.60 - 3.39 → Effective (E); 1.80 - 2.59 → Less Effective (LE); 1.00 - 1.79 → Not Effective (NE); WM → Weighted Mean; VI → Verbal Interpretation; R → Rank

Table 2.1 display the assessment of the respondents on the level of effectiveness of e-learning classroom in flexible learning in terms of virtual learning. Among the indicators the highest weighted mean went to indicator 4 “Apply new trends strategies, methods and techniques in presenting the lesson” as rank 1 with a mean score of 4.37 and described as “Highly Effective. Next is indicator 2 “Interact and connect with the learners” as rank 2in which attained a weighted mean of 4.34 and described as “Highly Effective”. Then, indicator 8 Help learners with complicated schedules and diverse responsibilities” as rank 3 in which attained a weighted mean of 4.26 and described as “Highly Effective”. Rank 4 in indicator 3 “Establish time management skills” with a weighted mean of 4.16 and described as “Moderately Effective”. This was followed by indicator 9 “Model as an active element of learning system of learners” as rank 5 with a weighted mean of 4.13 and described as “Moderately Effective”. Rank 6, indicator 10 “Attract active participation among learners” with a weighted mean of 4.11 and described as “Moderately Effective”. And, indicator 1 “Help coordinate online group activities” as rank 7 with a weighted mean of 4.03 and described as “Moderately Effective”. Next, indicator 6 “Extends educational experiences for learners” and indicator 7 “Cater in addressing learners’ needs” both on rank 8.5 in which attained the same weighted mean of 4.02 and described as “Moderately Effective”. And last as rank 10 is indicator 2 “Balance school, work, families, responsibilities, and other extracurricular activities” with the lowest weighted mean of 3.88 but also described as “Moderately Effective”.

The level of effectiveness of e-learning with regards on virtual learning found “Moderately Effective” as confirmed by the average weighted mean of 4.13. The result revealed that e-learning significantly effective with the use of virtual learning however the status is in the average level of effectiveness in which implies there is a need to enhance learning through other alternative mode of learning.

But still the e-learning is one of the best ways to have learning continuity using distance education.

Similar to Cellini (2020), virtual learning will undoubtedly be forthcoming post-pandemic. For now, professors and administrators should consider that students pushed online may be less prepared for future follow-on classes, their GPAs may be lower, course completion may suffer, and overall learning may have declined relative to in-person cohorts in previous years. These results seem particularly problematic for students with less academic preparation and those in bachelor's degree programs. Therefore, maintaining some of the most successful virtual learning will enhance flexibility at this uncertain time and allow some students to continue to make progress on their degrees if they get sick or cannot return to campus for other reasons.

Table 2.2. Level of Effectiveness on e-Learning Classroom in Flexible Learning As Assessed by the Respondents In Terms of Delivery of the Lesson

Indicators	Frequency					WM	VI	R
	5	4	3	2	1			
1.Explain the objectives of the lesson to be achieved.	36	47	29	5	3	3.90	ME	10
2.Organize lectures logically that can help pupils understand the point of each lecture	34	51	31	2	2	3.94	ME	9
3.Deliver content consistently and navigate the objective successfully.	39	48	30	2	1	4.02	ME	7
4.Plan activities that require interaction with the pupils.	43	40	32	3	2	3.99	ME	8
5.Provide videos to deepen the discussion.	58	37	25	0	0	4.28	HE	3
6.Use PowerPoint presentation to deliver the lesson.	51	39	30	0	0	4.18	ME	5
7.Demonstrate the activities to be done.	49	44	25	2	0	4.17	ME	6
8.Provide activities to deepen the discussion.	55	40	23	2	0	4.23	HE	4
9.Assess pupils output using rubrics.	67	39	14	0	0	4.44	HE	2
10.Use attractive backgrounds, clip arts, and pictures to motivate the pupils.	78	31	11	0	0	4.56	HE	1
Average Weighted Mean	510	416	250	16	8	4.17	ME	

Legend: 4.20 - 5.00 → Highly Effective (HE) ; 3.40 - 4.19 → More Effective (ME) ; 2.60 - 3.39 → Effective (E) ; 1.80 - 2.59 → Less Effective (LE) ; 1.00 - 1.79 → Not Effective (NE) ; WM → Weighted Mean ; VI → Verbal Interpretation ; R → Rank

Table 2.2 shows the assessment of the respondents with regards on the level of effectiveness of e-learning classroom in flexible learning in terms of delivery of the lesson. The results showed that indicator 10 “Use attractive backgrounds, clip arts, and pictures to motivate the pupils” as rank 1 in which obtained the highest mean score of 4.56 and interpreted as “Highly Effective”. Next in line is indicator 9 “Assess pupils output using rubrics” as rank 2 in which obtained a mean score of 4.44 and interpreted as “Highly Effective”. Then, indicator 5 “Provide videos to deepen the discussion” as rank 3 with the mean score of 4.28 and interpreted as “Highly Effective”. Indicator 8 “.Provide activities to deepen the discussion” as rank 4 in which obtained a mean score of 4.23 and interpreted as “Highly Effective”. Next, indicator 6 “Use PowerPoint presentation to deliver the lesson” as rank 6 with the mean score of 4.17 and interpreted as “Moderately Effective”. Rank 7 is indicator 3 “Deliver content consistently and navigate the objective successfully” in which obtained a mean score of 4.02 and interpreted as “Moderately Effective”. Then, indicator 4 “Plan activities that require interaction with the pupils” as rank 8 with the mean score of 3.99 and interpreted as “Moderately Effective”. Followed by indicator 2 “Organize lectures logically that can help pupils understand the point of each lecture” with the means score of 3.94 and interpreted as “Moderately Effective”. Finally indicator 1 “Explain the objectives of the lesson to be achieved” as rank 10 in which obtained the lowest means score of 3.90 and interpreted as “Moderately Effective”.

The respondents revealed that the level of effectiveness of e-learning classroom in flexible learning in terms of delivery of the lesson assessed as “Moderately Effective” as evidenced by the average mean score of 4.17. This findings indicate that e-learning classroom helps to intensify the flexible learning in several ways such as the use of attractive background in delivering the lessons to learners, use rubrics to assess performance tasks ensuring that the rubrics used explained to the learners and giving follow up relevant video lessons to enhance understanding about the topics.

The results coinciding with Pant (2021) stated that Teachers work tirelessly in and outside the classroom to deliver effective sessions. It is a well-known fact that more than the subject content, it is the methodology adopted to teach a particular topic that increases students' interest in a classroom. Hence, classroom sessions should be relevant and engaging for children to be eager to learn new topics. Teachers should create a framework for their lessons in advance and include creative activities to retain students' attention. Apart from creating an effective lesson plan, it is also important to deliver it effectively.

Table 2.3 depicts the assessment on the level of effectiveness of e-learning classroom in flexible learning in terms of participation/discussion. Based on the data, indicator 4 “Flip classroom to stimulate deeper discussion” got the highest mean value of 4.51 and placed as rank 1 in which described as “Highly Effective”. Followed by the indicator 9 “Use small groups and breakout rooms to engage learners in collaborative learning” as rank 2 in which got the mean value of 4.44 and described as “Highly Effective”. Next, indicator 6 “.Appreciate learners who make valuable contribution during discussion” as rank 3 in which got a mean value of 4.35 and described as “Highly Effective”. Then, indicator 2 “.Use chat to check for the understanding of the learners” as rank 4 with a mean value of 4.34 and described as “Highly Effective”. Next in line is indicator 5 “Adapt think -pair-share to zoom” as rank 5 with the mean value of 4.33 and described as “Highly Effective”. While indicator 1 “Click the raise hand during discussion to express their opinion



and indicator 10 “Use colorful motivation and light syllabus that can best prepare for each session” both on rank 6.5 with the same mean value of 4.28 and described as “Highly Effective”. Indicator 3 “Organize emoji’s, like thumbs up and thumbs down, to show whether they understood the concept” as rank 8 in which got a mean value of 4.24 and described as “Highly Effective”. Indicator 7 “Establish clearly the expectation and mechanics for virtual discussion” as rank 9 in which got a mean value of 4.07 and described as “Moderately Effective”. Then, rank 10 is indicator 8 “Prepare learners to expect that they might be called in a way that is flexible and kind” with the lowest mean value of 3.88 and described as “Moderately Effective”.

Table 2.3. Level of Effectiveness of e-Learning Classroom in Flexible Learning As Assessed by the Respondents

Indicators	Frequency					WM	VI	R					
	5	4	3	2	1								
1.Click the raise hand during discussion to express their opinion.	60	38	18	4	0	4.28	HE	6.5					
2.Use chat to check for the understanding of the learners	61	42	15	1	1	4.34	HE	4					
3.Organize emoji’s, like thumbs up and thumbs down, to show whether they understood the concept.	52	48	17	3	0	4.24	HE	8					
4.Flip classroom to stimulate deeper discussion	70	41	9	0	0	4.51	HE	1					
5.Adapt think -pair-share to zoom.	60	41	18	1	0	4.33	HE	5					
6.Appreciate learners who make valuable contribution during discussion.	63	37	19	1	0	4.35	HE	3					
7.Establish clearly the expectation and mechanics for virtual discussion.	41	50	25	4	0	4.07	ME	9					
8.Prepare learners to expect that they might be called in a way that is flexible and kind.	30	55	26	8	1	3.88	ME	10					
9.Use small groups and breakout rooms to engage learners in collaborative learning.	70	33	17	0	0	4.44	HE	2					
10.Use colorful motivation and light syllabus that can best prepare for each session.	54	45	21	0	0	4.28	HE	6.5					
Average Weighted Mean						561	430	185	22	2	4.27	HE	0

Legend: 4.20 - 5.00 → Highly Effective (HE); 3.40 - 4.19 → More Effective (ME); 2.60 - 3.39 → Effective (E); 1.80 - 2.59 → Less Effective (LE); 1.00 - 1.79 → Not Effective (NE); WM → Weighted Mean; VI → Verbal Interpretation; R → Rank

The e-learning classroom used as flexible learning techniques with the use of participation/discussion assessed as “Highly Effective” by the respondents as confirmed by the average mean value of 4.27. The assessment of the respondents implies that the learners’ active participation in the discussion highly affect learning outcomes despite the distance education. Indeed, the teachers are always ready to find ways to deal with the changes but the learners on the other hand must embrace the changes.

Findings were supported by Panigrahi et. Al (2018), e-learning and training make full use of the advantages brought by the innovation of Internet technology, breaking through the constraints of time and space, and constructing a new learning model which differs from face-to-face learning. When students study via an online learning platform used as a virtual classroom, they can interact with teachers freely. Successful action requires accurate movement corresponding to the environmental affordances. If an individual incorrectly perceives an action to be afforded, they may either attempt an action that is not possible or make a mistake in a science experiment.

Table 2.4. Level of Effectiveness of e-Learning Classroom in Flexible Learning As Assessed by the Respondents In Terms of Critical Analysis

Indicators	Frequency					WM	VI	R					
	5	4	3	2	1								
1. Explore more on new ideas and theories relevant to your subject area	48	52	17	3	0	4.21	HE	2					
2.Approach on complex issues in various ways.	29	46	35	9	1	3.78	ME	10					
3.Analyze the key issues in your subjects	50	52	16	1	1	4.24	HE	1					
4.Creates new and relevant concepts suitable to your subject area.	35	57	26	2	0	4.04	ME	9					
5.Develop more focus and systematic way of critical thinking.	41	54	23	2	0	4.12	ME	8					
6.Give concrete reasons and evidence to your opinion and ideas.	46	51	22	1	0	4.18	ME	5.5					
7.Assure the credibility of the source	44	49	25	2	0	4.13	ME	7					
8.Evaluate the usefulness, accuracy and credibility of information.	49	48	20	3	0	4.19	ME	4					
9.Approach complex issues in various ways.	47	51	19	3	0	4.18	ME	5.5					
10.Think more clearly, accurately, deeply, and logically in relevant to the subject area.	48	51	18	3	0	4.20	HE	3					
Average Weighted Mean						437	511	221	29	2	4.13	ME	0

Legend: 4.20 - 5.00 → Highly Effective (HE); 3.40 - 4.19 → More Effective (ME); 2.60 - 3.39 → Effective (E); 1.80 - 2.59 → Less Effective (LE); 1.00 - 1.79 → Not Effective (NE); WM → Weighted Mean; VI → Verbal Interpretation; R → Rank

Table 2.4 gives the data on the level of effectiveness of e-learning in flexible learning in terms of critical analysis as assessed by the teacher-respondents. Indicator 3 “Analyze the key issues in your subjects” garnered the highest weighted mean of 4.24 and interpreted as “Highly Effective”. Next, indicator 1 “Explore more on new ideas and theories relevant to your subject area” as rank 2 in which attained a weighted mean of 4.21 and interpreted as “Highly Effective”. Then, indicator 10 “Think more clearly, accurately, deeply, and logically in relevant to the subject area” as rank 3 in which attained a weighted mean of 4.20 and interpreted as “Highly Effective”. Rank 4 is indicator 8 “Evaluate the usefulness, accuracy and credibility of information” in which attained a weighted mean of 4.19 and interpreted as “Moderately Effective”. Followed by indicator 6 “Give concrete reasons and evidence to your opinion and ideas”

and indicator 9 “Approach complex issues in various ways” both on rank 5.5 in which attained the same weighted mean of 4.18 and interpreted as “Moderately Effective”. Next in line is indicator 7 “Assure the credibility of the source” as rank 7 in which attained a weighted mean of 4.13 and interpreted as “Moderately Effective”. Rank 8 is indicator 5 “Develop more focus and systematic way of critical thinking” in which attained a weighted mean of 4.12 and “Moderately Effective”. This was followed by indicator 4 “Creates new and relevant concepts suitable to your subject area” as rank 9 with the weighted mean of 4.04 and interpreted as “Moderately Effective”. Lastly, as rank 10 is indicator 2 “Approach on complex issues in various ways” in which attained the lowest weighted mean of 4.02 and interpreted as “Moderately Effective”.

Focusing on the flexible learning through e-learning classroom assessed as “Moderately Effective” by the respondents in terms of critical analysis as evidenced by the average weighted mean of 4.13. The power of digital technology declared as way to have learning at all times because of having access. The results of the study confirmed that electronic learning can develop critical analysis effectively through the effort of the teachers as they analyze the lessons and explore ideas and understanding with the use of relevant theories.

Likewise, Pardo (2017), the technologies and trace data that are characteristic of many online learning environments have greatly expanded what we can consider in critical analysis. Using new technologies is often seen as a way to make critiquing more effective. Some have focused on using technology to automate creation and transmission of critic information in order to increase the amount of individual analysis that each learner receives. To improve understanding of the role of critical analysis in digital learning environments, one must start by identifying which implicit and explicit conceptualizations of analysis are present in e-learning.

Table 2.5. *Level of Effectiveness of e-Learning Classroom in Flexible Learning As Assessed by the Respondents*

Indicators	Frequency					WM	VI	R
	5	4	3	2	1			
1. Use ice breakers to motivate learners.	35	62	20	3	0	4.08	ME	10
2. Establish etiquette policy before starting the activity.	50	48	18	4	0	4.20	HE	8
3. Maintain interest, motivation, and engagement of learners in active learning.	62	41	17	0	0	4.38	HE	1
4. Allow learners to interact with one another and to the teacher at the high level.	61	39	19	1	0	4.33	HE	2
5. Help learners deepen their processing and validates their contribution to the group.	56	39	22	3	0	4.23	HE	7
6. Encourage, acknowledge, or reinforce learners' contribution.	48	46	24	2	0	4.17	ME	9
7. Control the classroom and learners behavior in the most cases.	61	36	21	2	0	4.30	HE	3
8. Help learners to create inspiring, interconnected learning experiences.	58	41	18	3	0	4.28	HE	5
9. Listen to learners and give attention to maintain the interest in classroom.	53	48	18	1	0	4.28	HE	5
10. Assess the efficacy of the process.	53	49	16	2	0	4.28	HE	5
Average Weighted Mean	537	449	193	21	0	4.25	HE	0

Legend: 4.20 - 5.00 → Highly Effective (HE); 3.40 - 4.19 → More Effective (ME); 2.60 - 3.39 → Effective (E); 1.80 - 2.59 → Less Effective (LE); 1.00 - 1.79 → Not Effective (NE); WM → Weighted Mean; VI → Verbal Interpretation; R → Rank

Table 2.5 provides the assessment on the level of effectiveness of e-learning classroom in flexible learning through discourse. The data provided that indicator 3 ‘Maintain interest, motivation, and engagement of learners in active learning’ as rank 1 in which attained the highest weighted mean of 4.38 and described as “Highly Effective”. Followed by indicator 4 “Allow learners to interact with one another and to the teacher at the high level” as rank 2 with the weighted mean of 4.33 and described as “Highly Effective”. Then, indicator 7 ‘Control the classroom and learners behavior in the most cases’ as rank 3 with the weighted mean of 4.30 and described as “Highly Effective”. While indicator 8 ‘Help learners to create inspiring, interconnected learning experiences’, indicator 9 “Listen to learners and give attention to maintain the interest in classroom”, and indicator 10 “Assess the efficacy of the process” all as rank 5 since recorder same weighted mean of 4.28 and described as “Highly Effective”. Rank 7 is indicator 5 “Help learners deepen their processing and validates their contribution to the group” in which got the weighted mean of 4.23 and described as “Highly Effective”. Indicator 2 “Establish etiquette policy before starting the activity” as rank 8 in which got a weighted mean of 4.20 and described as “Highly Effective”. And rank 9 is indicator 6 “Encourage, acknowledge, or reinforce learners' contribution” in which attained a weighted mean of 4.17 and interpreted as “Moderately Effective”. Last as rank 10 is indicator 1 “Use ice breakers to motivate learners” with the weighted mean of 4.08 and interpreted as “Moderately Effective”.

In terms of discourse e-learning classroom considered as flexible learning as revealed by the respondents “Highly Effective” as confirmed by the average weighted mean of 4.25. E-learning classroom provides several benefits in flexible learning especially in the application of discourse in which helps to maintain interest, motivation, and engagement of learners in active learning and allow learners to interact with one another and to the teacher at the high level. Adapting the use of technology may lead to keep on track especially in teaching and learning process.

According to Junaida et. al (2020), teachers and lecturers largely must adapt in using technology in their teaching as their students are part of the technological generation. The decree encourages conventional schools to implement distance education, making the learning environment take on a dual-mode. Applying e-learning in teaching English as a Foreign

Language (EFL) for students in the early stage is challenging for parties involved in education, especially considering the status quo of



COVID-19 pandemic.

Table 2.6. Summary of the Level of Effectiveness is e-Learning Classroom in Flexible Learning As Assessed by the Respondents

Indicators	Frequency					AWM	VI	R
	5	4	3	2	1			
2.1 Virtual Learning	473	449	246	26	6	4.13	ME	4
2.2 Delivery of the Lesson	510	416	250	16	8	4.17	ME	3
2.3 Participation/Discussion	561	430	185	22	2	4.27	HE	1
2.4 Critical Analysis	437	511	221	29	2	4.13	ME	4
2.5 Discourse	537	449	193	21	0	4.25	HE	2
Composite Weighted Mean	2518	2255	1095	114	18	4.19	ME	0

Legend: 4.20 - 5.00 → Highly Effective (HE) ; 3.40 - 4.19 → More Effective (ME) ; 2.60 - 3.39 → Effective (E) ; 1.80 - 2.59 → Less Effective (LE) ; 1.00 - 1.79 → Not Effective (NE) ; WM → Weighted Mean ; VI → Verbal Interpretation ; R → Rank

Table 2.6 displays the summary of assessment of the respondents on the level of e-learning classroom in flexible learning. The data revealed that in terms of participation and discussion the e-learning is “Highly Effective” as evidenced by the average weighted mean of 4.27, followed by discourse in which garnered an average weighted mean of 4.25 and determined as “Highly Effective”, then in terms of delivery of the lesson obtained an average weighted mean of 4.17 and determined as “Moderately Effective”, same with virtual learning and critical analysis which also assessed as “Moderately Effective” since both obtained an average weighted mean of 4.13.

The composited weighted mean of 4.19 and described as “Moderately Effective” is an implication that the e-learning classroom assessed in the average level of effectiveness with regards on flexible learning. Several ways were applied to ensure that effectiveness will be attained at the end of each lesson such as virtual learning approach, critical analysis, considering the participation/discussion with the learners, delivery of the lesson and discourse. The mentioned ways using e-learning classroom found effective to have a flexible learning in the implementation of distance education.

Same with the study of Francisco and Barcelona (2020), in which aimed to investigate the role of Eliademy as a web-based classroom in designing an alternative learning tool in times of emergencies. The results revealed that students strongly agreed that Eliademy can be used as an alternative tool for teaching and learning as evidenced by their perceived advantages and disadvantages of such platform. The study found out that Eliademy is accessible, can promote time management, promptness and a challenge for the users although it requires strong internet connections and time pressured. The researcher offered three easy steps in using creating this web-based classroom, to wit: “Signing in”, “Designing it”, and, “Managing out”.

In addition, Amir et. al (2020), e-learning is defined as learning that makes use of Information and Communication Technologies (ICTs). The knowledge gain and performance of the students as a result of E-learning were shown to be equivalent to that of face to face methods. Blended learning is mainly defined as the integration of classroom and distance learning to facilitate an independent, interactive and collaborative learning among students. However, to understand it in a more general perspective, blended learning approach redesign courses that are developed, scheduled and implemented through a combination of physical and virtual learning activities.

Question No. 3 What is the level of academic performance of the pupils towards flexible learning in science in terms of: science investigation, video conferencing/teleconferencing, weather reporting, discussion boards and science journals/science news?

Table 3.1 shows the level of academic performance of the pupils in flexible learning science in terms of science investigation as assessed by the respondents. The data showed that among the indicators the highest weighted mean went to indicator 1 “Learn to solve problems and make informed discussion” as rank 1 in which attained a weighted mean of 4.22 and interpreted as “Outstanding”. Next, as rank 2 is indicator 10 “Use scientific vocabulary to build ideas” in which attained a weighted mean of 4.12 and interpreted as “Very Satisfactory”, Then, indicator 5 “Work through real life case stories” as rank 3 in which got a mean value of 4.11, and interpreted as “Very Satisfactory”. Rank 4 is indicator 4 “Perform the study that uses higher order thinking skills and knowledge” in which got a mean value of 4.06 and interpreted as “Very Satisfactory”. Followed by the indicator 2 “Acquire information through direct observation and experiments” as rank 5 in which attained a mean value of 4.04 and interpreted as “Very Satisfactory”. Next, indicator 8 “Apply coherent experiment or real experience and use learning in daily life situation” as rank 6 with a mean value of 4.03 and interpreted as “Very Satisfactory”. Furthermore, indicator 7 “Create live or recorded science studies” as rank 7 with a mean value of 4.10 and interpreted as “Very Satisfactory”. Rank 8 is indicator 9 “Construct predictions based on research and observation” with a mean value of 3.97 and interpreted as “Very Satisfactory”. Indicator 3 “Observe to formulate test to modify a hypothesis” as rank 9 in which attained a mean value of 3.95 and interpreted as “Very Satisfactory”. Finally, rank 10 is indicator 6 “Execute teamwork with collaboration in doing group virtual laboratories” with the mean value of 3.90 and interpreted as “Very Satisfactory”.

Table 3.1. Level of Academic Performance of the Pupils in Flexible Learning Science As Assessed by the Respondents

Indicators	Frequency					WM	VI	R
	5	4	3	2	1			
1.Learn to solve problems and make informed discussion	49	50	19	2	0	4.22	O	1



2.Acquire information through direct observation and experiments.	38	53	25	4	0	4.04	VS	5
3.Observe to formulate test to modify a hypothesis.	28	62	26	4	0	3.95	VS	9
4.Perform the study that uses higher order thinking skills and knowledge.	38	54	25	3	0	4.06	VS	4
5.Work through real life case stories.	42	51	25	2	0	4.11	VS	3
6.Execute teamwork with collaboration in doing group virtual laboratories	32	51	31	5	1	3.90	VS	10
7.Create live or recorded science studies.	33	59	25	2	1	4.01	VS	7
8.Apply coherent experiment or real experience and use learning in daily life situation.	33	62	21	4	0	4.03	VS	6
9.Construct predictions based on research and observation.	31	58	27	4	0	3.97	VS	8
10.Use scientific vocabulary to build ideas.	39	59	19	3	0	4.12	VS	2
Average Weighted Mean	363	559	243	33	2	4.04	04.vVStheS	0

Legend: 4.20 - 5.00 → Outstanding (O); 3.40 - 4.19 → Very satisfactory (VS); 2.60 - 3.39 → Satisfactory (S); 1.80 - 2.59 → Fair (F); 1.00 - 1.79 → Poor (P); WM → Weighted Mean; VI → Verbal Interpretation; R → Rank

Through the evidenced of the average weighted mean of 4.04 the level of pupils’ academic performance in flexible learning science found “Very Satisfactory” in terms of science investigation. The findings implies that the pupils performance a very satisfactory rating as they are learning to solve problems and make informed discussion and uses scientific vocabulary to build ideas such mentioned indicates that they gained knowledge despite distance because of digital technology.

The digitalization of society means that the demands placed on employee skills increase or change throughout their careers (OECD, 2019). To meet the growing need for highly qualified employees in the labor market, higher education should be made accessible to broader sections of the population. To meet the demands of a digital society, educational institutions are expected to provide greater flexibility and individualization so that learners have the opportunity to adapt the learning process to their own needs and specific life phases wherein science investigation will be applied.

Table 3.2. Level of Academic Performance of the Pupils in Flexible Learning Science As Assessed by the Respondents

Indicators	Frequency					WM	VI
	5	4	3	2	1		
1. Watch recorded video of report.	55	50	14	1	0	4.33	O
2.Communicate using online chatting and more online learning networks cooperate with other activities and assignments	60	48	11	1	0	4.39	O
3.Engage in analytical discussion to stimulate experiential learning.	50	51	19	0	0	4.26	O
4.Record and save lessons when they want to review lessons later.	56	53	9	2	0	4.36	O
5.Achieve learning by using goal setting activityy	47	56	16	1	0	4.24	O
6.Utilize interaction, active participation, and collaboration to accomplish learning.	53	51	16	0	0	4.31	O
7.Join in two-way interaction and experience without limitation of boundaries of distance and time.	43	53	23	1	0	4.15	VS
8.Share news and information using real time and audio communication.	50	53	16	1	0	4.27	O
9.Read a loud discussion to encourage listeners.	56	50	14	0	0	4.35	O
10.Institute knowledge through flipped classroom.	46	51	23	0	0	4.19	VS
Average Weighted Mean	516	516	161	7	0	4.29	O

Legend: 4.20 - 5.00 → Outstanding (O); 3.40 - 4.19 → Very satisfactory (VS); 2.60 - 3.39 → Satisfactory (S); 1.80 - 2.59 → Fair (F); 1.00 - 1.79 → Poor (P); WM → Weighted Mean; VI → Verbal Interpretation; R → Rank

Table 3.2 presents the pupils’ level of academic performance in flexible learning science in terms of video conferencing/teleconferencing. The results presented that indicator 2 “Communicate using online chatting and more online learning networks cooperate with other activities and assignments” as rank 1 since it attained the highest mean score of 4.39 and rated as “Outstanding”. Next is indicator 4 “Record and save lessons when they want to review lessons later” as rank 2 in which attained a mean score of 4.36 and rated as “Outstanding”. To continue, rank 3 is indicator 9 “Read a loud discussion to encourage listeners” in which attained a mean value of 4.35 and rated as “Outstanding”, Then, indicator 1 “Watch recorded video of report” as rank 4 in which attained a mean value of 4.33 and rated as “Outstanding”. Next, indicator 6 “.Utilize interaction, active participation, and collaboration to accomplish learning” as rank 5 which attained a mean value of 4.31 and rated as “Outstanding”. Followed by the indicator 8 ‘Share news and information using real time and audio communication” as rank 6 which attained a mean value of 4.27 and rated as “Outstanding”. Next, as rank 7 is indicator 3 “Engage in analytical discussion to stimulate experiential learning” which attained a mean value of 4.26 and rated as “Outstanding”. Indicator 5 “Achieve learning by using goal setting activity” as rank 8 in which attained a weighted mean of 4.24 and rated as “Outstanding”. Then rank 9 is indicator 10 “Institute knowledge through flipped classroom” in which attained a weighted mean of 4.19 and rated as “Very Satisfactory”. Lastly, as rank 10 is indicator 7 “Join in two-way interaction and experience without limitation of boundaries of distance and time” in which attained a weighted mean of 4.15 and rated as “Very Satisfactory”.

The pupils academic performance in flexible learning science in terms of video conferencing and teleconferencing rated as “Outstanding” as evidenced by the average weighted mean of 4.29. It implies that the learners actively participate in teaching and

learning via digital communication, with the use of video conferencing and teleconferencing the pupils foster as a keen observer and a keen listener.

Same with Muller (2021), an increasing number of higher education institutions are considering replacing part of the face-to-face classroom instruction with an online learning environment by offering students a blended learning format. This meta-analysis, with its strict inclusion criteria regarding research design, measurement of learning outcomes and implementation of blended learning, shows that despite reduced classroom time between 30 and 79 per cent, such blended learning environments are not associated with poorer learning outcomes but are equivalent to conventional classroom instruction. .

Table 3.3. *Level of Academic Performance of the Pupils in Flexible Learning Science As Assessed by the Respondents In Terms of Weather Reporting*

Indicators	Frequency					WM	VI	R
	5	4	3	2	1			
1. Speak in a comfortable way without any difficulty	49	53	18	0	0	4.26	O	1
2. Determine future climate expectations.	39	59	20	2	0	4.13	VS	7
3. Understand that some events in nature have a repeating pattern.	48	51	21	0	0	4.23	O	2
4. Tell how high and low temperatures for the past day	45	54	19	2	0	4.18	VS	3.5
5. Utilize weather maps online and provide real time data	40	59	19	2	0	4.14	VS	6
6. Use weather vocabulary and use flash card pictures for unlocking terms.	46	53	18	3	0	4.18	VS	3.5
7. Make use of thermometers, weathervanes, rain gauges, barometer to record data.	33	52	28	6	1	3.92	VS	10
8. Draft a script to make a good craft about weather reporting	39	52	26	3	0	4.06	VS	9
9. Provide thoughtful information for learning base on the research topic.	41	53	22	4	0	4.09	VS	8
10. Generate questions from the topic that serves as a guide that need to include in the report	42	58	16	4	0	4.15	VS	5
Average Weighted Mean	422	544	207	26	1	4.13	VS	0

Legend: 4.20 - 5.00 → Outstanding (O); 3.40 - 4.19 → Very satisfactory (VS); 2.60 - 3.39 → Satisfactory (S); 1.80 - 2.59 → Fair (F); 1.00 - 1.79 → Poor (P); WM → Weighted Mean; VI → Verbal Interpretation; R → Rank

Table 3.3 depicts the level of academic performance of the pupils in flexible learning science in terms of weather reporting. The data depicted that indicator 1 “Speak in a comfortable way without any difficulty” as rank 1 attained the highest weighted mean of 4.26 and described as “Outstanding. Followed by indicator 3 “Understand that some events in nature have a repeating pattern” as rank 2 in which attained a weighted mean of 4.23 and described as “Outstanding. Then, indicator 4 “Tell how high and low temperatures for the past day”, and indicator 6 “Use weather vocabulary and use flash card pictures for unlocking terms” both on rank 3.5 in which attained the same weighted mean g 4.18 and described as “Very Satisfactory”. Next, indicator 10 “Generate questions from the topic that serves as a guide that need to include in the report” as rank 5 with the weighted mean of 4.15 and described as “Very Satisfactory”. Rank 6 is indicator 5 ‘Utilize weather maps online and provide real time data” in which attained a weighted mean of 4.14 and described as “Very Satisfactory”. Indicator 2 ‘Determine future climate expectations” as rank 7 in which attained a weighted mean of 4.13 and described as “Very Satisfactory”. Then, rank 8 is indicator 9 “Provide thoughtful information for learning base on the research topic” in which attained a weighted mean of 4.09 and described as “Very Satisfactory”. Last as rank 10 is indicator 7 “Make use of thermometers, weathervanes, rain gauges, barometer to record data” in which attained a weighted mean of 3.97 and described as “Very Satisfactory”.

The pupils’ performance using weather reports rated as “Very Satisfactory” in flexible learning science as confirmed by the average weighted mean of 4.13. The results revealed that the pupils are aware of suing weather reporting in learning science may be this is because the utilization of e-learning wherein various technological skills were applied.

On a global scale, UNICEF (2020) reported that more than 1.5 billion learners of all ages are affected because of the school and university closures. Shutdowns have put youth in a disproportionate state. With utmost consideration to provide education as a fundamental human right, educational systems around the globe were once again challenged to produce different measures to immediately sustain education efforts (UNESCO, 2020), but this does not consider giving solutions to the problems of every particular student. Generally, the education system seems unprepared and may transpire unpredicted consequences during and beyond the crisis (Bozkurt & Sharma, 2020). Hence the use of e-learning would give alternative solution to have the learning continuity in the midst of crisis.

Table 3.4 displays the level of academic performance of pupils in flexible learning science in terms of discussion boards. The assessment of the respondents revealed that indicator 5 “Exchange of ideas about chosen solution that led to good discussion” obtained the highest mean score of 4.24 and placed as rank 1 and described as “Outstanding”. Then, indicator 7 “Present a topic using visual materials” as rank 2 in which obtained the mean score of 4.14 and described as “Very Satisfactory”. Followed by indicator 3 “Select controversial topic to explore ideas”, indicator 4 “Involve in a group and share distinctive expertise that need by the team to solve problems”, and indicator 6 “Respond to one another in real time by using live format” as rank 4 with same means core of 4.13 and described as “Very Satisfactory”. Next as rank 6 is indicator 2 “Share information about current events and keep updated” with a means core of 4.07 and described as “Very Satisfactory”. Rank 7 is indicator 10 “Create a real world scenario as much as possible” in which attained a mean score of 3.99 and described as “Very Satisfactory”.



Table 3.4. Level of Academic Performance of the Pupils in Flexible Learning Science As Assessed by the Respondents In Terms of Discussion Boards

Indicators	Frequency					WM	VI	R
	5	4	3	2	1			
1.Participate in online forums.	28	54	29	6	3	3.82	VS	9
2.Share information about current events and keep updated.	34	62	22	2	0	4.07	VS	6
3.Select controversial topic to explore ideas	37	64	17	2	0	4.13	VS	4
4.Involve in a group and share distinctive expertise that need by the team to solve problems.	39	60	19	2	0	4.13	VS	4
5.Exchange of ideas about chosen solution that led to good discussion.	45	60	14	1	0	4.24	O	1
6.Respond to one another in real time by using live format.	36	65	17	2	0	4.13	VS	4
7.Present a topic using visual materials.	39	61	18	2	0	4.14	VS	2
8.Discussion, concept maps, and YouTube are being utilized.	31	53	32	2	2	3.91	VS	8
9.Introduce selves and encourage listeners to participate	28	52	31	4	5	3.78	VS	10
10.Create a real world scenario as much as possible.	32	59	25	4	0	3.99	VS	7
Average Weighted Mean	349	590	224	27	10	4.03	VS	0

Legend: 4.20 - 5.00 → Outstanding (O); 3.40 - 4.19 → Very satisfactory (VS); 2.60 - 3.39 → Satisfactory (S); 1.80 - 2.59 → Fair (F); 1.00 - 1.79 → Poor (P); WM → Weighted Mean; VI → Verbal Interpretation; R → Rank

Next is indicator 8 “Discussion, concept maps, and YouTube are being utilized” rank 8 in which attained a mean score of 3.91 and described as “Very Satisfactory”. And rank 9 is indicator 1 “Participate in online forums” in which attained a mean score of 3.82 and described as “Very Satisfactory”. Last as rank 10 goes to indicator Introduce selves and encourage listeners to participate” attained a mean score of 3.78 and described as “Very Satisfactory”.

Discussion boards help the pupils in flexible learning science since the results revealed that the pupils’ academic performance attained a “Very Satisfactory” rating as evidenced by the average weighted mean of 4.03. It can be gleaned that the pupils are now familiar with the use if discussion boards to share information about current events and utilize to participate in discussion forum. The learning continuous as the learners are embracing the needs of time even they encountered difficulties still responding with the challenges will lead to success.

Rotas and Cahapay (2020), to respond to the challenge of innovating educational delivery mechanisms in higher education, colleges and universities across the globe ventured into different practices such as distance education, online teaching, remote learning, blended learning, and mobile learning. These practices can be collectively called emergency remote education. It is the temporary change in the delivery of instruction caused by the sudden occurrence of a crisis. Emergency remote education is also a branch of distance education, however, treated as an ‘option’ not ‘obligation’ in this time of crisi

Table 3.5. Level of Academic Performance of the Pupils in Flexible Learning Science As Assessed by the Respondents

Indicators	Frequency					WM	VI	R
	5	4	3	2	1			
1.Publish experimental and theoretical research online in relation to natural science.	41	56	20	2	1	4.12	VS	6.5
2.Boost confidence and reinforce selves that capable and intelligent.	38	60	21	1	0	4.13	VS	5
3.Enhances critical thinking skills.	31	63	24	2	0	4.03	VS	10
4.Strengthen communication and writing skills.	37	57	23	2	1	4.06	VS	9
5.Use images, videos, and other multimedia in collecting ideas.	40	56	22	2	0	4.12	VS	6.5
6.Record news article or read a set of related stories to widen the information.	38	56	24	2	0	4.08	VS	8
7.Communicate to teachers about understanding science articles by using online tools.	42	60	17	1	0	4.19	VS	3
8.Make a vlog about the topic to promote, deepen, or extend learning to some kind.	47	55	16	2	0	4.23	O	1
9.Submit journal for publication	46	54	18	2	0	4.20	O	2
10.Increase interest in reading good paper or scientific paper.	45	54	18	3	0	4.18	VS	4
Average Weighted Mean	405	571	203	19	2	4.13	VS	0

Legend: 4.20 - 5.00 → Outstanding (O); 3.40 - 4.19 → Very satisfactory (VS); 2.60 - 3.39 → Satisfactory (S); 1.80 - 2.59 → Fair (F); 1.00 - 1.79 → Poor (P); WM → Weighted Mean; VI → Verbal Interpretation; R → Rank

Table 3.5 shows the assessment of the respondents on the level of academic performance of the pupils in flexible learning using science journals/science news. The results showed that indicator 8 “Make a vlog about the topic to promote, deepen, or extend learning to some kind” garnered the highest weighted mean of 4.23 and placed as rank in which assessed as “Outstanding”. Followed by the indicator 9 “Submit journal for publication” as rank 2 in which attained a weighted mean of 4.20 and assessed as “Outstanding”. Next in line is indicator 7 “Communicate to teachers about understanding science articles by using online tools” as rank 3 in which attained a weighted mean of 4.19 and assessed as “Very Satisfactory”. Then, indicator 10 “Increase interest in reading good paper or scientific paper” as rank 3 in which attained a weighted mean of 4.18 and assessed as “Very Satisfactory”. Rank 5 is indicator2 “Boost confidence and reinforce selves that capable and intelligent” with the weighted mean of 4.13 and assessed as “Very Satisfactory”. Indicator 1 “Publish



experimental and theoretical research online in relation to natural science” and indicator 5 “Publish experimental and theoretical research online in relation to natural science” both on rank 6.5 with the same weighted mean of 4.12 and assessed as “Very Satisfactory”. Followed by the indicator 6 “Record news article or read a set of related stories to widen the information” as rank 8 with a weighted mean of 4.08 and assessed as “Very Satisfactory”. Rank 9 is indicator 4 “Strengthen communication and writing skills” in which attained a weighted mean of 4.06 and assessed as “Very Satisfactory”. Finally, as rank 10 goes to indicator 3 “Enhances critical thinking skills” with the weighted mean of 4.03 and assessed as ‘Very Satisfactory’.

The pupils rated as “Very Satisfactory” performance in flexible learning science in terms of journals/science news as confirmed by the average weighted mean of 4.13. It implies that science journals/science news are now effective learning resources to deepen understanding about the content of the lesson in science. It can be determined that the learners explore ideas because of many learning resources provided for them that may serve as relevant references.

The findings supported by Abuhhasna et. Al (2020), the findings showed that the students’ background, experience, collaborations, interactions, and autonomy positively affected students’ satisfaction.

Moreover, effects of the students’ application, remembering, understanding, analyzing, and satisfaction was positively aligned with students’ academic achievements. Consequently, the empirical findings present a strong support to the integrative association between Transactional Distance Theory (TDT) and Bloom’s Taxonomy Theory (BTT) in relation to using online learning platforms to improve students’ academic achievements and satisfaction, which could help decision makers in universities and higher education and colleges to plan, evaluate, and implement online learning platforms in their institutions.

Table 3.6. Summary of the Level of Academic Performance of the Pupils in Flexible Learning Science As Assessed by the Respondent

Indicators	Frequency					AWM	VI	R
	5	4	3	2	1			
3.1 Science Investigation	363	559	243	33	2	4.04	VS	4
3.2 Video Conferencing/ Teleconferencing	516	516	161	7	0	4.29	O	1
3.3 Weather Reporting	422	544	207	26	1	4.13	VS	2.5
3.4 Discussion Boards	349	590	224	27	10	4.03	VS	5
3.5 Science Journals/Science News	405	571	203	19	2	4.13	VS	2.5
Composite Weighted Mean	2055	2780	1038	112	15	4.12	VS	0

Legend: 4.20 - 5.00 → Outstanding (O); 3.40 - 4.19 → Very satisfactory (VS); 2.60 - 3.39 → Satisfactory (S); 1.80 - 2.59 → Fair (F); 1.00 - 1.79 → Poor (P); WM → Weighted Mean; VI → Verbal Interpretation; R → Rank

Table 3.6 gives the summary of the assessment of the respondents on the level of academic performance of the pupils in flexible learning science. The results revealed that in terms of video conferencing/teleconferencing the pupils assessed as “Outstanding” since it garnered an average weighted mean of 4.29, then an average weighted mean of 4.13 provide to weather reporting and science journals/weather reporting as they are both assessed as “Very Satisfactory”. Followed by in terms of science investigation with an average weighted mean of 4.04 and assessed as “Very Satisfactory”, and in terms of discussion boards with an average weighted mean of 4.03 and assesses as “Very Satisfactory”.

The pupils academic performance in flexible learning in terms of Science Investigation. Video Conferencing/Teleconferencing, Weather Reporting, Discussion Boards, and Science Journals/Science News found “Very Satisfactory” as evidenced by the composited weighted mean of 4.12. The result implies that pupils have the continuous learning in science through the implementation of flexible learning and with the application of different learning resources via digital technology because of the use of e-learning.

Similar to the findings of Jawad and Shalash (2020), they examined the effect of E-learning during COVID-19 pandemic on the students’ Academic Achievement at Al-Quds Open University. The study has randomly selected 382 students’ GPA from the University’s official records. It is mainly based on Statistical Package for Social Sciences program (SPSS.20) to make Paired Samples T-test and to study the hypotheses. The study has revealed that there are statistically significant differences in the students’ Academic Achievements during the implementation of the E-learning strategy in COVID-19 pandemic. This study shows that in general the GPA of students has increased about 2.188 points; but in particular the GPA of male students is affected more than female’s by just a slight difference of 1,198 point. On the other hand, looking at the Program of Study at the University; the Community Service is affected most with an increase by 3,276 points, Then Business Administration, Accounting and Finance are respectively affected more with having 2.6 points more on students’ GPA. However, the greatest effect on GPA is largely noticed on the students whose GPA is low in which the increase is about 6.568 points. The study results shows the importance of the implementation of E-learning strategy in higher education institutions so as to improve the students’ Academic Achievements. In addition, it sheds the light on the necessity of taking into consideration the specific features of some learning programs such as the Arabic Language and the Social Studies.

Question No. 4 Is there a significant relationship between effectiveness of the level of e-learning classroom and academic performance of the learners in Science?

Table 4. Significant Relationship Between the Level of Effectiveness is e-Learning Classroom in Flexible Learning and the Level of Academic Performance of the Pupils in Flexible Learning Science



Indicators	Mean	Pearson r	Computed t-Value	Decision	Remarks
Level of Effectiveness is e-Learning Classroom in Flexible Learning	4.19	0.84	2.025	Reject Null Hypothesis (Ho)	Significant
Level of Academic Performance of the Pupils in Flexible Learning Science	4.12	Very High Relationship			

t-Critical/Tabular Value at 0.05 Level of Significance (α)= ± 1.980

Table 4 presents the test of significant relationship between effectiveness of the level of e-learning classroom and academic performance of the learners in Science. Finding revealed that there is a significant relationship between effectiveness of the level of e-learning classroom and academic performance of the learners in Science since the computed value 2.025 is greater than the tabular value 1.980, hence the hypothesis rejected. The use of e-learning classroom in flexible learning approach affects the pupils performance in flexible science a very closed weighted mean recorded for the Level of Effectiveness is e-Learning Classroom in Flexible Learning with 4.19 mean value and for Level of Academic Performance of the Pupils in Flexible Learning Science with 4.12 mean value having pearson-r = 0.84 indicates very high relationship.

The results signify that the frequent use if e-learning will affects the pupils academic performance in flexible learning science. The less application of e-learning in teaching science may decrease the level of performance of the pupils in science.

According to studies Salamat, et al, (2018), the implementation of the E-learning strategy has a positive and statistically significant impact on the students’ academic achievement. This is due to many reasons, including that E-learning helps in accessing enormous amount of information with less time and effort, and provides more flexibility in learning taking into account the individual differences.

Moreover, distance learning enables students to access and engage with quality educational content, all from the comfort and convenience of home. Though COVID-related restrictions will likely begin to relax as the pandemic wanes and vaccination rates rise, it seems unlikely that the e-learning industry. While it’s easy to see both the benefits and relevance of distance education, such as increased flexibility, mobility, and affordability, it’s equally important to acknowledge the potential challenges with distance learning for students. From grade-schoolers to graduate students, e-learners at all age levels must overcome obstacles that are unique to virtual education, such as asynchronous communication and ever-present opportunities for time-wasting distractions. E-learners also face challenges that, while often present in the traditional classroom, can be amplified in a virtual setting, such as delayed or unclear instructor feedback, National University (2022).

Question No. 5 What are the problems encountered by the teacher respondents toward the e-learning classroom and the level of academic performance of learners in science?

Table 5. Problem Encountered on the e-Learning Classroom in Flexible Learning and the Level of Academic Performance in Science

Indicators	Frequency					WM	VI	R
	5	4	3	2	1			
1.Lack of pre-requisites of the course, trainings, seminars, and workshop.	20	29	35	21	15	3.15	S	6
2.Lack of interest to develop professionally.	17	30	30	25	18	3.03	S	9
3.Treating teachers unprofessionally.	18	29	28	23	22	2.98	S	10
4.Lack of teaching and learning materials	21	29	27	21	22	3.05	S	8
5.Teachers work too many paper works at the same time.	41	37	24	10	8	3.78	VMS	1
6.Conflict with work schedule	20	40	21	23	16	3.21	S	4
7.Expensive professional development programs.	20	37	34	19	10	3.32	S	2
Less interactive and boring professional development programs.	20	31	26	30	13	3.13	S	7
9.Repetition of topics during the training and seminars	23	31	29	25	12	3.23	S	3
10.Irrelevant topics to subject matter	24	26	30	25	15	3.16	S	5
Average Weighted Mean	224	319	284	222	151	3.20	S	0

Legend: 4.20 - 5.00 → Extremely Serious (ES); 3.40 - 4.19 → Very Much Serious (VMS); 2.60 - 3.39 → Serious (S); 1.80 - 2.59 → Less Serious (LS); 1.00 - 1.79 → Not a Problem (NP); WM → Weighted Mean; VI → Verbal Interpretation; R → Rank

Table 5 presents the assessment on the problem encountered on the e-learning classroom in flexible learning and the level of academic performance of the pupils in science. The data presented that among the mentioned problems indicator 5 “Teachers work too many paper works at the same time” as rank 1 in which obtained the highest mean score of 3.78 and described as “Very Much Serious”. Followed by indicator 7 “Expensive professional development programs” as rank 2 in which obtained the mean score of 3.32 and described as “Serious”. Rank 3 is indicator 9 “Repetition of topics during the training and seminars” in which attained the weighted mean of 3.23 and described as “Serious”. Then, indicator 6 “Conflict with work schedule”, as rank 4 in which obtained a weighted mean of 3.21 and described as “Serious”. Next, indicator 10 “Irrelevant topics to subject matter” as rank 5 with the weighted mean of 3.16 and described as “Serious”. Rank 6 is indicator 1 “Lack of pre-requisites of the course, trainings, seminars, and workshop” in which attained a weighted mean of 3.15 and described as “Serious”. Followed by the indicator 8 “Less interactive and boring professional development programs” as rank 7 in which got a weighted mean of 3.13 and described as “Serious”. Indicator 4 ‘Lack of



teaching and learning materials” as rank 8 in which attained a weighted mean of 3.05 and described as “Serious”. Next, as rank 9 is indicator 2 “Lack of interest to develop professionally” in which attained a weighted mean of 3.03 and described as “Serious”. And lastly, rank 10 is indicator 3 “Treating teachers unprofessionally” in which got the lowest weighted mean of 2.98.

The problem encountered in the e-learning classroom and academic performance of the pupils in science found “Serious” as evidenced by the average weighted mean of 3.20. The results revealed that despite the effectiveness of using e-learning classroom problems are there to test the dedication of the teachers to overcome such problems since changes may come time to time problems may also happen. Some of the problems assessed as serious by the respondents includes Expensive professional development programs and conflict with work schedule in which such problems may serve as a barrier to continuously develop teacher’s competencies.

The sudden migration of education from traditional on-campus learning to remote learning has put students at a great disadvantage. While universities already had great successes in establishing online learning systems for their students, it has been recognized that this transition to a new educational paradigm for most universities has not been properly organized. Thus, the intention of this paper is inspired by its purpose to describe the difficulties in remote learning as voiced out by Filipino students in the wake of the COVID-19 crisis.

Consistent with previous studies, the participants similarly voiced out unstable internet connectivity as one of the main difficulties they encounter in the practice of remote learning. The poor network is commonly a major problem for developing countries with telecommunication systems and ICT, not being properly developed (Aboagye et al., 2020).

In addition, overloaded lesson activities were also expressed by the students. As mentioned by them, a teacher would require them almost three activities in a subject, thus giving them less time to carefully answer them all. This difficulty in remote learning has been confirmed in the study of Sundarasan et al., (2020) where university students in Malaysia expressed stress about the overwhelming number of assignments required by the teachers. Their findings also revealed that this difficulty had a huge impact on the stress and anxiety levels of the students.

Question No. 6 What are the recommended solutions to the problems encountered by the teacher respondents to the impact of academic performance of the learners?

Table 6. Recommended Solutions in e-Learning Classroom in Flexible Learning and the Level of Academic Performance in Science As Assessed by the Respondents

Indicators	Frequency					WM	VI	R
	5	4	3	2	1			
1. Provide the basic and introduction of the courses, trainings, seminars, and workshops	75	29	14	2	0	4.48	HR	9
2. Motivate and encourage the teachers how important the professional growth and development	71	31	16	2	0	4.43	HR	10
3. Treat teachers like professional.	80	23	15	2	0	4.51	HR	7.5
4. Provide more materials to make teaching more meaningful	79	29	12	0	0	4.56	HR	4.5
5. Less paper works for teachers to make them focus on teaching	87	26	7	0	0	4.67	HR	1
6. Well - planned schedules and seminar, training and workshops that are fitted to the work schedule	81	28	11	0	0	4.58	HR	3
7. Provide training and seminars that are free.	84	26	10	0	0	4.62	HR	2
8. Involves hands-on strategies to promote participation	80	28	11	1	0	4.56	HR	4.5
9. Evaluate previous trainings/seminars and make a training plan that include topics that are not yet conducted or given.	77	29	12	2	0	4.51	HR	7.5
10. Plan professional development that is different in every context or subject matter.	79	28	13	0	0	4.55	HR	6
Average Weighted Mean	793	277	121	9	0	4.55	HR	0

Legend: 4.20 - 5.00 → Highly Recommended (HR); 3.40 - 4.19 → More Recommended (MR); 2.60 - 3.39 → Recommended (R); 1.80 - 2.59 → Less Recommended (LR); 1.00 - 1.79 → Not Recommended (NR); WM → Weighted Mean; VI → Verbal Interpretation; R → Rank

Table 6 displays the suggested solutions in e-learning classroom in flexible learning and the level of academic performance in science as assessed by the respondents. There are suggested solutions to cope up with the problem encountered in the e-learning classroom and pupils’ academic performance in science. In the list the assessment revealed that indicator 5 “Less paper works for teachers to make them focus on teaching” as rank 1 in which garnered the highest weighted mean of 4.67 and interpreted as “Highly Recommended”. Followed by the indicator 7 “Provide training and seminars that are free” as rank 2 in which attained the weighted mean of 4.62 and interpreted as “Highly Recommended”. Then, indicator 6 “Well - planned schedules and seminar, training and workshops that are fitted to the work schedule” as rank 3 in which attained the weighted mean of 4.58 and interpreted as “Highly Recommended”. Next, indicator 4 “Provide more materials to make teaching more meaningful” and indicator 8 “Involves hands-on strategies to promote participation” both on rank 4.5 and attained the same weighted mean of 4.56 in which determined as “Highly Recommended”. Rank 6 is indicator 10 “Plan professional development that is different in every context or subject matter” in which got a weighted mean of 4.55 and interpreted as “Highly Recommended”. Next indicator 3 “Treat teachers like professional” and indicator 9 “Evaluate previous trainings/seminars and make a training plan that include topics that are not yet conducted or given” both on rank 7.5 with the same

weighted mean of 4.51 and interpreted as “Highly Recommended”. Rank 9 is indicator 1 ‘Provide the basic and introduction of the courses, trainings, seminars, and workshops” with the weighted mean of 4.48 and interpreted as “Highly Recommended’. Then as rank 10 is indicator 2 “Motivate and encourage the teachers how important the professional growth and development” with the lowest weighted mean of 4.43 and interpreted as “Highly Recommended’.

The average weighted mean of 4.55 determined as “Highly Recommended” for the recommended solutions to address the problem encountered. This signifies that in every problem there is always a solution and it is a matter of analyzing the problem to come with a suited solution for it. Thus, the teachers considered the problems as part of development in which they treated a problem since that is one of the ways to hidden discover potentials.

Kwaa (2017), innovations in information technology has enabled other methods of education delivery such as Distance Education (DE) gained prominence in higher education delivery. DE has the student in remote from the campus and is educated through a mixture of media such as TV, video, print and personal computer. In many Sub-Saharan countries, tertiary institutions are under pressure to train skilled manpower to meet the increasing sophisticated demands of workplace. However, universities lack the infrastructure to cater for the increasing numbers of students who graduate from senior high schools every year and the high demand of organizations from workers to upgrade themselves to meet the current demand of development.

Furthermore, Distance education has come to complement the efforts of increasing access to tertiary education in Ghana. However, this study has revealed that high academic work, high frequency of examinations, financial and family problems combined with other social responsibilities are the major causes of stress distance education students. The distance education program in the University of Cape Coast lack students support services that could design program that at least to reduce stress among students.

Conclusions

In light of the findings, the following conclusions were drawn: The respondents were tricenarian, school mistresses, matrimonial, had completed baccalaureate degrees, and had less than a decade of teaching experience. The e-learning classroom in flexible learning was found highly effective in terms of participation and discussion, with an average weighted mean of 4.27, and discourse, with an average weighted mean of 4.25. However, it was found moderately effective in terms of lesson delivery, obtaining an average weighted mean of 4.17, similar to virtual learning and critical analysis, both with an average weighted mean of 4.13. The level of academic performance of the pupils in flexible learning science was observed as outstanding in terms of video conferencing/teleconferencing, garnering an average weighted mean of 4.29, while very satisfactory in weather reporting and science journals/weather reporting, both with an average weighted mean of 4.13, and in science investigation and discussion boards, with average weighted means of 4.04 and 4.03, respectively. There is a significant relationship between the effectiveness of the e-learning classroom and the academic performance of the learners in Science, leading to the rejection of the hypothesis. Various problems were encountered by the respondents in e-learning classroom flexible learning and the level of academic performance of the pupils in science, with recommended solutions provided. Teachers should pursue graduate studies to gain understanding about the latest classroom techniques, teaching management, and learning resources, and continuously integrate e-learning for flexible learning to ensure learning continuity at home. Teachers should receive sufficient technical assistance from school heads to support pupil learning, and school administrators should consistently monitor e-learning utilization and pupils’ academic performance to create strategic development plans. Teachers should conduct profiling to detect learners’ difficulties with e-learning and identify and analyze teaching and learning problems to apply effective solutions without compromising learning quality. School heads should extend help to cope with unexpected teaching and learning challenges, enhancing teachers’ performance. Parent involvement should be considered effective in developing pupils’ academic performance, with teachers building good rapport with parents. Lastly, school administrators should seek possible donors of electronic gadgets for learners unable to afford their own.

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