Impact of E-Learning on Medical Technology Students in Higher Education Institutions in Metro Manila

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Abstract: - Traditional learning conducted in the classroom setting has always been the standard for education in higher education institutions. During the COVID-19 pandemic however, most institutions opted to conduct classes through elearning to limit the spread of the virus. The study assessed the impact of the new curriculum of elearning for Medical Technology students to provide institutions a foundation on how to design lesson plans that fully utilize online learning resources and services for students to achieve the intended learning outcomes. Descriptive approach was utilized in determining the impact of elearning based on three parameters which include the learning styles, learning experiences, and learning outcomes. The respondents who participated in the study were first year to third year Medical Technology students from accredited higher education institutions in Metro Manila. The participants were chosen via purposive sampling and an online survey questionnaire was used in gathering the data. The findings showed that the students undergoing elearning are highly competent on all eight learning outcomes. This indicates that the implementation of elearning is effective among the participants. Furthermore, while the learning styles were found to not have a significant impact on the learning outcomes, the learning experiences, composed of the learning resources and the coping mechanisms, had a significant positive impact on the intended learning outcomes. Learning styles should still be taken into account, although learning experiences through online resources should be prioritized by institutions. Recommendations such as increased number of respondents and the inclusion of offline respondents for comparative studies are suggested.

Key Words: — ***COVID-19, Elearning, Learning experiences, learning outcomes, learning styles, Medical Technology, Traditional learning.***

I. INTRODUCTION

A. Background of the Study

Face-to-face learning has been stopped due to the high number of cases that have increased as a result of close interaction with the events of global emergencies such as the COVID-19 pandemic. According to the World Economic Forum (2020), due to the transmitting potential of COVID-19, 1.2 billion students in 186 countries are affected by school closures. As a result of the closure of classrooms, the opening of classes by online means was formulated by educational institutions to continue the education of students amidst the pandemic. With the assistance of electronic tools combined with the means of synchronous structured instruction, online courses integrate the e-Learning method as the basis of the continuity of education.

Most higher education institutions have engaged in online classes to continue the education of college students due to the effects of the pandemic. This includes medical technology students all over the universities in Metro Manila to experience e-Learning based education for the first semester of the curriculum of A.Y. 2020-2021. Most students will encounter online learning for the first time and the transition and adaptivity to the new system could provide certain problems for both instructors and students. Courses conducted in the laboratory could be greatly affected due to

Manuscript revised August 17, 2021; accepted August 18, 2021. Date of publication August 20, 2021.
This paper available online at www.ijprse.com
ISSN (Online): 2582-7898

limited administration of practical and hands-on activities in view of the constraints in the access of laboratory equipment and apparatuses. Training of skills in the performance of procedures are also substituted to online based which do not provide medical technology students the actual experience of performing procedural techniques in a clinical laboratory. With the concerns and issues regarding the concept of online learning for medical technology students, investigating the effect of the new mode of instructional delivery could provide knowledge on the feasibility of employing e-Learning as a tool for education in the field of medical technology.

B. Statement of the Problem

The Philippines, a developing country, has recently adopted the use of e-learning as an alternative teaching method in order to continue education in spite of the Covid-19 pandemic. Though it may seem to be innovative the Philippines faces a lot of challenges in implementing the said learning method. This, being an unfamiliar mode of learning, can pose several problems. The lack of resources such as laptops and tablets; lack of learning materials; and poor internet connectivity and accessibility are considered to be the major obstacles faced by students. According to Biana et.al (2020) of the Southeast Asian Research Center and Hub, DLSU Manila, the access to internet connection and learning devices remains a privilege, with those without access being at a disadvantage when it comes to online learning. Learning style is also another factor to consider in determining the efficiency of e-learning. Incompatibility of e-learning to teach certain skills is also an additional challenge faced since some of the work-related skills such as staining, smearing, microscopy, hematologic and histopathologic techniques are hard to teach by using this new learning system since they require equipment, practice, and experience.

C. Objectives of the Study

General Objective:

The study aimed to determine the impact of E-Learning in the acquisition of knowledge and skill, as well as its effectiveness on Medical Technology students in Higher Education Institutions in Metro Manila.

Specifically, it aimed to:

- To determine the learning styles of Medical Technology students in Higher Education Institutions in order to complete their education.
- To determine the positive and negative learning experiences of Medical Technology students in Higher Education Institutions in an e-Learning environment.
- To determine the predictors of achieving the intended learning outcomes for Medical Technology students in Higher Education Institutions.
- To determine to what extent the intended learning outcomes have been achieved by the Medical Technology students in Higher Education Institutions in an e-Learning environment.

D. Hypotheses

The researchers hypothesized the following:

- There is a positive relationship between e-learning mode of delivery and the learning styles of Medical Technology students.
- E-learning mode of delivery has a positive effect on the learning experiences of Medical Technology students.
- E-learning mode of delivery is a positive predictor of achieving the intended learning outcomes for Medical Technology students.

E. Significance of the Study

The onset of COVID-19 forced a number of higher education institutions to adopt alternative modes of learning. The abrupt transition from traditional learning in the classroom setting to the complete utilization of online based web programs to facilitate learning is unprecedented in the history of Philippine education. The lack of data concerning web based education is evident of the abruptness and experimental nature of online learning in the Philippines. Therefore, this study may be among the first to describe the impact and efficacy of E-learning/Web based modes of instruction on Medical Technology education. From the findings of this research, institutions offering Medical Technology may better understand how to design lesson plans that fully utilize online learning resources and services to enhance student learning and the learning experience. The study was framed in the context of medical education in the Philippines, specifically Medical Technology education, and

considers the current implementation, recommendations, and guidelines officially published by the Commission on Higher Education (CHED). As such, the paper may guide the future policy making of CHED with regards to the implementation of e-learning.

F. Scope and Limitations

The research was limited to determining the impact and factors that affect e-learning, as well as to gauge its effectiveness in the acquisition of knowledge and development of skills that are essential in the profession of Medical Technologists. The study only involved Medical Technology students currently enrolled in the academic year 2020-2021 of level III and above Philippine Association of Colleges and Universities Commission on Accreditation (PACUCOA) accredited higher education institutions (HEIs) offering Medical Technology courses within Metro Manila.

G. Conceptual Framework

The researchers formulated a model that could show the measurement to the impact of e-learning through the learning style, learning experience and learning outcome on the higher institution Medical Technology students of Metro Manila. Under the learning style of a student there are four categories representing the four dimensions of learning, which are Active vs. Reflective under the processing dimension of learning, Sensing vs. Intuitive under the perception dimension of learning, Visual vs. Verbal under the input dimension of learning, and Sequential vs. Global under the understanding dimension of learning. The learning experience is focused on the student's working environment and attainable resources. The learning outcome of a student is based on their application of the knowledge they have learned during e-learning. A conceptual framework is shown below in Figure.1.

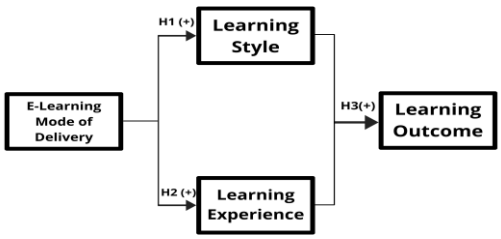

Fig.1. The conceptual framework of the study

H. Definition of Terms

- *Active Learner* - A person that tends to retain and understand information best by doing something active with it
- *COVID-19* - Infectious disease caused by a newly discovered coronavirus which caused a worldwide pandemic in 2020.
- *E-Learning* - Learning conducted via electronic media, on the internet
- *Face-to-face Learning* - An instructional method where course content and learning materials are taught in person to a group of students.
- *Feedback* - Information about reactions to a product, a person's performance of a task, etc. which is used as a basis for improvement.
- *Higher Education Institution* - A level of education that is provided by universities, vocational universities, community colleges, liberal arts colleges, institutes of technology and other collegiate level institutions, such as vocational schools, trade schools and career colleges, that award academic degrees or professional certifications.
- *Impact* - The influence or effect on an individual or group that is marked by certain factors.
- *Intuitive Learner* - A person who prefers discovering possibilities and relationships rather than facts.
- *Laboratory Skills* - Capability or competency of performing certain tasks and procedures in a clinical laboratory setting.
- *Learning Outcomes* - Statements that specify what the students are able to do after the course which is recommended by the CHED Memorandum Order.
- *Learning Styles* - Preferred learning modes of students that allow them to learn the most which are categorized into four: Active vs. Reflective, Sensing vs. Intuitive, Visual vs. Verbal, and Sequential vs. Global.
- *Medical Technology* - A four-year degree program that provides students with the necessary skills and training in conducting laboratory tests.
- *Reflective Learner* - A person that prefers to think things passively and prefers to work alone.
- *Sensing Learner* - A person that tends to like learning facts rather than patterns.

- *Verbal Learner* - A person who gets more out of words such as written and spoken explanations.
- *Visual Learner* - A person who remembers best at what they see such as pictures, diagrams, flowcharts, etc.

II. METHODOLOGY

A. Research Design

This study employed a descriptive approach to determine the impact of e-learning based on the learning styles, learning experiences and learning outcomes of Medical Technology students at its current state of implementation. This style of research involved the identification of characteristics and attributes of a certain phenomenon which examined the current situation at its current state (Williams, 2007). Descriptive research was necessary to emphasize the factors that dictate the phenomenon of e-learning and provide quantitative evidence for its indicative assertions. Inclusion of a demographic profile was included in conjunction with the aforementioned variables in order to assess and evaluate the characteristics of the participants in relation to the gathered data. The study utilized a quantitative research method where statistical techniques were applied in the processing and interpretation of collected data. Utilization of digital software and applications such as SPSS statistics was used to process and interpret data for the research findings.

B. Research Participants

The researchers focused on gathering data from Medical Technology Students in the higher education institutions that are accredited as level 3 and above by PACUCOA in Metro Manila. Specifically, students who are in their first to third year that are over the legal age of 18 years old. Students who are minors were excluded from the study. Students who are in their fourth year were also excluded in this study since these students are in their internship. Lastly, students who are irregular were also excluded from the study, given that they already have a background on the lessons during face to face learning.

In total, there are 5 schools in Metro Manila who offer the program B.S Medical Technology with level III and above PACUCOA accreditation status. These schools were where the researchers gathered at least 380 respondents. These institutions are namely: Far Eastern University - Nicanor Reyes Medical Foundation (FEU-NRMF), Our Lady of Fatima University - Valenzuela (OLFU), Manila Central University (MCU), Centro Escolar University - Manila (CEU), and the University of Santo Tomas (UST).

C. Research Tool

A standardized survey questionnaire carefully adapted from pertinent questionnaires published in related studies was administered to each participant of this study. The questionnaire aimed to provide data by modelling questions centered around the learning styles, learning experiences and learning outcomes of the respondents as the basis for determining the impact of e-learning. The questionnaire was divided into five sections.

First is the demographic profile which includes the participants' personal information such as name, age, gender, address, email, year level, institution, nationality and current mode of instruction. Following the demographic profile is the index of learning styles. This section of the research tool was used to assess correlations between individual learning style and academic achievement of students using e-learning modes of instruction. The third section pertained to the resources of e-learning mode of delivery, which is primarily based on the feedback of the participants with regards to institutional and personal resources. The section utilized a seven point Likert scale in order to provide the participants with flexibility in choosing an accurate answer on how they feel about a certain statement. The fourth section involved the coping mechanisms on e-learning mode of delivery, which employed a similar scale to the previous section, albeit focusing on the students' way of managing issues concerning e-learning. Lastly, the fifth section covered the learning outcomes that are based on the guidelines provided by the CHED Memorandum Order No. 13, Series of 2017, where it gauges the knowledge and skills minimally needed for medical technologists.

D. Data Gathering Procedure

The target population of this research were 1st to 3rd year students of BS Medical Technology programs currently undergoing e-learning/online modes of instruction in higher education institutions within Metro Manila. A total of 380 students were taken from the level III and above accredited

universities. The researchers employed the snowball sampling technique, wherein research participants further recruited other participants. This technique was employed since this study would include participants from four other universities. Thus, the researchers found it appropriate to first identify 10 subjects from the University of Santo Tomas, as well as one or two potential subjects in each of the 4 universities. After which, those same subjects will be asked to encourage other people to participate. These steps were repeated until the needed sample size was achieved.

A questionnaire examined by a psychometrician was administered to the participants using the survey administration software Google Forms. The link for the researcher's questionnaire was disseminated to the aforementioned identified subjects through Facebook messenger, which is a widely used social media platform for communication. Prior to data gathering, pilot testing using a smaller sample size was performed to test the validity of the questionnaire. The 30 participants belonged to First to Third year students from Far Eastern University - Manila, Saint Louis University, and the University of Perpetual Help - Dr. Jose G. Tamayo Medical University. The Cronbach's alpha score for each set of questions showed that the questionnaire is reliable and consistent with a reliability of 0.97. At most, the duration of data collection occurred during the months of February to March of 2021.

E. Ethical Considerations

Among the numerous ethical considerations that were taken into account to ensure that the study was conducted in an appropriate manner, Anonymity and Confidentiality were of utmost importance. In compliance with research ethics, participants were given an online survey questionnaire containing significant information about the paper. This included the purpose of the research, which briefly explains the nature of the study. Whilst requiring a consent form remains to be a formal approach of procuring consent, the researchers employed a method that utilized an online survey designed to allow filling in one's name, as well as personal information, as an *option*, to guarantee that anonymity was demonstrated. This ensured that the participants would not bear any discomfort throughout the survey.

The participants also had the option to withdraw from the study at any time without questions being asked. In this case, since an online survey through google forms was utilized, the participants had the freedom to terminate the survey without completing it. This option was employed for situations where participants feel uncomfortable with the topic questions, or that it does not apply to them. Nevertheless, this research remained to be of low risk since the survey was intended to involve only perceptions, preferences, and self-evaluations of participants in an anonymous and confidential manner.

F. Data Analysis

Utilization of the software platform IBM SPSS® v22.0 was performed by the researchers for the statistical analysis of the data gathered from the research tool. SPSS greatly assisted in the visualization and computation of the determinants of learning styles, learning experiences and learning outcomes through correlation analysis and multiple linear regression in order to assess the impact of e-learning among the respondents. Percentage is a statistical tool that was determined for descriptive purposes, especially for demographics. Boone (2011) suggested that statistical tools that should be quantified in Likert scale tests would include the mean, standard deviation, Pearson's correlation, analysis of variance (ANOVA), t-test and regression.

The study used the mean, standard deviation, and Pearson's correlation. Furthermore, factor analysis was used in order to determine the predictors. The level of significance that was used for testing the hypotheses was 0.05. The formulas for the aforementioned statistical tools are presented in Appendix D. The Likert scale tests were interpreted using a scale dependent on the average of the scores inputted by the participants, which is represented by the legend below.

Table.1. Likert Scale Interpretation for Learning Experiences

Scale	**Range**	**Verbal Interpretation**	**Classification**
Strongly Disagree	1.0 - 1.5	Completely Dissatisfied	Negative (-)
Disagree	1.6 - 2.5	Mostly Dissatisfied	Negative (-)

Slightly Disagree	2.6 - 3.5	Somewhat Dissatisfied	Negative (-)
Normal	3.6 - 4.5	Neither Satisfied nor Dissatisfied	Neutral (+/-)
Slightly Agree	4.6 - 5.5	Somewhat Satisfied	Positive (+)
Agree	5.6 - 6.5	Mostly Satisfied	Positive (+)
Strongly Agree	6.6 - 7.0	Completely Satisfied	Positive (+)

Table.2. Likert Scale Interpretation for Learning Outcomes

Scale	**Range**	**Verbal Interpretation**	**Classification**
Strongly Disagree	1.0 - 1.5	No Competency	Negative (-)
Disagree	1.6 - 2.5	Very Low Competency	Negative (-)
Slightly Disagree	2.6 - 3.5	Low Competency	Negative (-)
Normal	3.6 - 4.5	Average Competency	Neutral (+/-)
Slightly Agree	4.6 - 5.5	High Competency	Positive (+)
Agree	5.6 - 6.5	Very High Competency	Positive (+)
Strongly Agree	6.6 - 7.0	Outstanding Competency	Positive (+)

Table.3. Index of Learning Styles Interpretation

The Index of Learning Styles (ILS) is a tool that assesses the learning style preferences of students on the four dimensions of learning style model developed by Richard M. Felder and Linda K. Silverman (Index of Learning Styles, n.d.). The (ILS) questionnaire was graded through the following process. A numerical score of "1" is placed in the column corresponding to the box the participant has checked off for that particular question. The totals for each column are written on the spaces provided.

The total from the first column ("1st box") is subtracted from the second column ("2nd box") and the difference is taken, a positive difference indicates a preference for the first learning style in that particular dimension, while a negative difference indicates a preference for the second learning style in the same learning style dimension.

Activist/Reflector			Sensing/Intuitive			Visual/Verbal			Sequential/Global		
Q	1st box (Activist)	2nd box (Reflector)	Q	1st box (Sensing)	2nd box (Intuitive)	Q	1st box (Visual)	2nd box (Verbal)	Q	1st box (Sequential)	2nd box (Global)
1.			2.			3.			4.		
5.			6.			7.			8.		
9.			10.			11.			12.		
13.			14.			15.			16.		
17.			18.			19.			20.		

21.			22.			23.			24.		
Total			Total			Total			Total		

III. RESULTS AND DISCUSSION

The study has managed to gather a total of 218 respondents from the dispatched survey questionnaire out of the targeted sample size of 380 respondents that was originally proposed to be accomplished. The researchers were not able to gather from the remaining respondents due to lack of time allowance and the ongoing challenges presented by the pandemic during the commencement of the data collection process. Nonetheless, the majority of the survey questionnaires were disseminated randomly, allowing the students to answer freely. Thus, the 218 respondents are still a good source of authentic, valid, and reliable responses.

A. On Demographic Profile of the Respondents

The respondents are 28% male with sixty-two respondents and 72% female with one hundred and fifty-six respondents as shown in table.4. This suggests that female respondents are more than two times the number of male respondents that participated in the study. In the category of the institutions that were chosen for the study, there are seven (3%) Far Eastern University - Nicanor Reyes Medical Foundation (FEU-NRMF), eleven (5%) Our Lady of Fatima University - Valenzuela (OLFU), eleven (5%) Manila Central University (MCU), forty-one (19%) Centro Escolar University - Manila (CEU) and one hundred and forty-eight (68%) University of Santo Tomas (UST) respondents from a total of five higher education institutions that are inside our scope of accredited institutions. FEU-NRMF is determined to be a level III RA PACUCOA accredited institution, OLFU is a level III RA accredited institution, MCU is a level III RA institution, CEU is a level IV 1st RA institution, and UST is a level IV institution. All of the five institutions are also found out to be private institutions as their institutional sector.

Table.4. Demographic Profile of the Respondents

Demographic	**Frequency**	**Percentag**
		e
Gender		
Male	62	28.4%
Female	156	71.6%
Institution		
CEU - Manila	41	18.8%
FEU - NRMF	7	3.2%
MCU	11	5.0%
OLFU - Val.	11	5.0%
UST	148	67.9%
Year Level		
Freshman	28	12.8%
Sophomore	59	27.1%
Junior	131	60.1%
Mode of Delivery		
Offline	0	0.0%
Online	178	81.7%
Blended	40	18.3%

There are twenty-eight (13%) freshmen, fifty-nine (27%) sophomores, and one hundred and thirty-one (60%) juniors as shown in table.4. This suggests that juniors or 3rd-year medical technology students are found out to comprise the

majority of the respondents. There are no seniors included due to the exclusion of medical technology interns as stated in the research participants in Chapter 3. Mode of delivery was based from the CMO No. 4, series of 2020 where it lists the three various modalities in the implementation of flexible learning and teaching, namely offline, online, and blended learning. Results showed that there are no respondents who indicated that their modality of delivery is offline and that there are one hundred and seventy-eight (82%) respondents that indicated an online modality while forty (18%) respondents indicated a blended modality of delivery. There are no students under offline modality among the respondents while there are more than 4 times the number of respondents that experience online mode of delivery in contrast to blended mode of delivery.

B. On the Index of Learning Styles

Table.5. presents the different learning style preferences of the participant's vis-à-vis the mode of instruction.

Table.5. Determination of Learning Styles vis-à-vis to Mode of Delivery

Learning Style	Online (%)	Blended (%)	Total (%)
Active	76 (14%)	19 (17%)	95 (15%)
Reflective	58 (11%)	8 (7%)	66 (10%)
Sensing	119 (22%)	23 (21%)	142 (22%)
Intuitive	21 (4%)	6 (5%)	27 (4%)
Visual	118 (22%)	26 (24%)	144 (22%)
Verbal	24 (4%)	4 (4%)	28 (4%)
Sequential	96 (18%)	17 (15%)	113 (17%)
Global	32 (6%)	7 (6%)	39 (6%)

Majority of the students under the online mode of delivery have a preference towards the Sensing learning style as indicated by 119 students (22%). This is followed by the number of Visual learners who are not very far from the number of students who indicated a Sensing preference with a total of 118 (22%) students.

Following this is a preference for the Sequential learning style indicated by 96 (18%) students, and Active learning style as indicated by 76 (14%) students. The least preferred learning styles are Reflective as indicated by 58 (11%), Global as indicated by 32 (6%) students, Verbal as indicated by 24 (4%) students, and lastly Intuitive as indicated by 21 (4%) students. Under the blended mode of instruction, students have a preference for the Visual learning style as indicated by 26 (24%) students. This is followed by a preference for Sensing as indicated by 23 (21%) students, Active as indicated by 19 (17%) students, Sequential as indicated by 17 (15%) students, and Reflective as indicated by 8 (7%) students. The least preferred learning styles by students under the blended mode of instruction are Global, Intuitive, and Verbal as indicated by 7 (6%), 6 (5%), and 4 (4%) students respectively. Generally, the learning style preferences for both modalities, when ranked, are the same.

C. On the Experiences of the Medical Technology Students in Higher Education Institutions in Metro Manila

Step 1: The indicators are based on the learning resources of Medical Technology Students in E-Learning. The data presents what type of resources the students are experiencing given their situations.
Step2: The indicators are based on the coping mechanisms the Medical Technology Students are using while in E-Learning. The data presents what the students do to cope given a negative experience.

On the Learning Resources of the Medical Technology Students:

Table.6. Learning Resources for Different Modes of Delivery

Indicator	Online Mean (SD)	Blended Mean (SD)	Total Mean (SD)	Interpretation (Total)

1. The institution utilizes accessible and operative platforms to support online classes.	5.83 (1.02)	5.50 (1.06)	5.77 (1.04)	Mostly Satisfied (+)
2. The institution provides an overview and orientation guide to prepare and equip the students for online learning.	5.84 (1.08)	5.48 (1.32)	5.77 (1.13)	Mostly Satisfied (+)
3. The institution provides learning materials suitable and applicable for online learning.	5.66 (1.01)	5.03 (1.39)	5.55 (1.12)	Mostly Satisfied (+)
4. The institution maintains a consistent and well-paced delivery of online classes throughout the course.	4.98 (1.42)	4.45 (1.69)	4.89 (1.49)	Somewhat Satisfied (+)
5. The institution offers convenient services for online enrollment and registry, online payment of tuition, and online assessment and grades monitoring.	5.81 (1.26)	5.68 (1.44)	5.78 (1.29)	Mostly Satisfied (+)
6. The institution conducts guidance and mental health seminars/talks for student health and psychological support.	5.21 (1.49)	5.25 (1.57)	5.22 (1.50)	Somewhat Satisfied (+)
7. The institution offers online library subscription for journals and e-books related to the respective course for subsequent addition to previous knowledge.	5.90 (1.22)	5.73 (1.38)	5.87 (1.25)	Mostly Satisfied (+)
8. The institution utilizes a variety of online platforms to achieve specific learning outcomes of the respective course (e.g. online laboratory simulation websites such as NC Bio Network)	4.94 (1.49)	4.65 (1.61)	4.89 (1.51)	Somewhat Satisfied (+)
9. The students have access to a stable internet connection in their current location.	5.19 (1.30)	5.10 (1.37)	5.17 (1.31)	Somewhat Satisfied (+)
10. The students have gadgets that are able to access and download the Learning Materials deployed for online learning	6.30 (0.92)	6.15 (1.05)	6.27 (0.95)	Mostly Satisfied (+)
11. The students are in possession of gadgets that have a functional microphone and video camera to engage in class participation.	6.21 (1.03)	6.23 (0.89)	6.21 (1.00)	Mostly Satisfied (+)
12. The students have a designated workspace comfortable enough to boost their academic productivity.	5.10 (1.60)	5.20 (1.62)	5.12 (1.60)	Somewhat Satisfied (+)
13. The students have back-up devices capable of supporting cellular data incases of sudden internet interruption or connectivity problems.	5.09 (1.83)	4.88 (1.88)	5.05 (1.84)	Somewhat Satisfied (+)
14. The students have access to reference	5.52 (1.50)	5.85 (1.19)	5.58 (1.46)	Somewhat Satisfied

materials such as encyclopedias, books, dictionaries etc.				(+)
15. The students have an email address/social media account that they can use to contact their professors and classmates.	6.67 (0.71)	6.53 (0.91)	6.65 (0.75)	Completely Satisfied (+)
16. The students have a backup storage in case their files get deleted or become corrupted.	5.03 (1.90)	5.45 (1.65)	5.11 (1.86)	Somewhat Satisfied (+)
Overall Learning Resources	5.60 (0.77)	5.39 (0.90)	5.56 (0.80)	Somewhat Satisfied (+)

Table.6. shows the mean ratings for each indicator on the learning resources as indicated by the score, as rated by the students whose mode of delivery is Online and Blended. A total of 17 indicators were given to the students, in which the students were asked to rate from a score of 1 to 7. 1 as the lowest and 7 as the highest. Under both the Online and Blended modality of learning, Indicator 15 "The students have an email address/social media account that they can use to contact their professors and classmates", has the highest mean ratings of 6.67 and 6.53 respectively. Specifically, students under the online mode of delivery indicated a mean rating of 6.67, indicating that they are Completely Satisfied in terms of communicating with their teachers and peers using email and social media. The same indicator was rated with the highest mean rating of 6.53 by those students under the Blended modality of learning. However, the ratings are Mostly Satisfied on this indicator. For both Online and Blended modality of learning, Indicator 15 has a Positive classification.

Subsequently, under the Online modality of learning, Indicator 1 (The institution utilizes accessible and operative platforms to support online classes), Indicator 2 (The institution provides an overview and orientation guide to prepare and equip the students for online learning), Indicator 3 (The institution provides learning materials suitable and applicable for online learning), Indicator 5 (The institution offers convenient services for online enrollment and registry, online payment of tuition, and online assessment and grades monitoring), Indicator 7 (The institution offers online library subscription for journals and e-books related to the respective course for subsequent addition to previous knowledge), Indicator 10 (The students have gadgets that are able to access and download the Learning Materials deployed for online learning), and Indicator 11 (The students are in possession of gadgets that have a functional microphone and video camera to engage in class participation), has mean ratings of 5.83, 5.84, 5.66, 5.81, 5.90, 6.30, and 6.21 respectively. These indicators are interpreted as Mostly Satisfied, with Positive classifications. On the other hand, Indicators 5, 7, 10, 11, 14 (The students have access to reference materials such as encyclopedias, books, dictionaries etc.), and 15, has mean ratings of 5.68, 5.73, 6.15, 6.21, 5.85, and 6.53 respectively, under the Blended modality of learning. These indicators are interpreted as Mostly Satisfied, with Positive classifications.

As for Indicator 6 (The institution conducts guidance and mental health seminars/talks for student health and psychological support), Indicator 8 (The institution utilizes a variety of online platforms to achieve specific learning outcomes of the respective course (e.g. online laboratory simulation websites such as NC Bio Network), Indicator 9 (The students have access to a stable internet connection in their current location), Indicator 12 (The students have a designated workspace comfortable enough to boost their academic productivity), Indicator 13 (The students have back-up devices capable of supporting cellular data incases of sudden internet interruption or connectivity problems), Indicator 14 (The students have access to reference materials such as encyclopedias, books, dictionaries etc.), Indicator 16 (The students have a backup storage in case their files get deleted or become corrupted) and Indicator 17 (Other Resources for e-learning), these have mean ratings of 5.21, 4.94, 5.19, 5.10, 5.09, 5.52, 5.03 and 5.60 respectively under the Online modality of Learning. These indicators are interpreted as Somewhat Satisfied with Positive classifications. On the other hand, Indicators 1, 2, 3, 6, 8, 9, 12, 13, 16, and 17 has mean ratings of 5.50, 5.48, 5.03, 5.25, 4.65, 5.10, 5.20, 4.88, 5.45, and 5.39 respectively, under the

Blended modality of learning. These indicators are interpreted as Somewhat Satisfied, with Positive classifications.

Among the 17 indicators, Indicator 4 "The institution maintains a consistent and well-paced delivery of online classes throughout the course", under the Blended modality of learning, is the only Indicator that is interpreted as Neither Satisfied nor Dissatisfied, having the mean rating of 4.45 and a Neutral classification. Under the Online modality of learning, Indicator 8 "The institution utilizes a variety of online platforms to achieve specific learning outcomes of the respective course (e.g. online laboratory simulation websites such as NC Bio Network)", has the lowest mean (mean = 4.94, SD = 1.49) among the 17 indicators, as shown in Table 3.3a, which was interpreted as Somewhat Satisfied with a Positive classification, while under the Blended modality of learning, the same indicator was ranked with the second lowest mean (mean = 4.65, SD = 1.61). Similarly, Indicator 4 "The institution maintains a consistent and well-paced delivery of online classes throughout the course.", has the lowest mean (mean = 4.45, SD = 1.69) among the 17 indicators under the Blended Category, which was interpreted as Neither Satisfied nor Dissatisfied, with a Neutral classification. While under the Online modality of Learning, it was ranked with the second lowest mean (mean = 4.98, SD = 1.42).Indicator 4 may have been deemed to have the lowest degree of attainment under the Blended modality of learning due to factors such as internet connectivity problems. As stated by Goh et al. (2017), Internet connectivity remains to be the primary issue in long distance communication, especially concerning online learning. It was also stated that in the Philippines, there have been reports of frequent disturbances and issues regarding Internet connection speed, leading most to believe that online learning would fail. Thus, being a contributing factor to an inconsistency in the delivery of online courses throughout the course. In addition, Indicator 8 was deemed to have the lowest degree of attainment under the Online modality of learning. This may be due to the limitations of the virtual laboratory in specific courses. As stated by Shah and Stefaniak (2018) in their study, although institutions may have integrated the virtual laboratories in some activities, acquiring new knowledge and skill was found to be least effective compared to traditional methods. Moreover, the review led by McDonald et al. (2018) concluded that the skill level acquired was greatly inferior to that of face-to-face patient stimulation due to lack of practice and experience. Thus, may be one of the factors that hinder institutions to employ virtual laboratory activities.

Indicator 15 may have been deemed to have the highest degree of attainment in both the Online and Blended modality of learning due to its component being one of the supplements for E-learning. As implied by El-Sabban (2009), each institution establishes an email account for each student upon admission. The main purpose of this e-mail account is for the instructor to disseminate all relevant information, announcements and document files containing handouts. Moreover, upon the collection of data of the researchers in their respective study, it was found that all the respondents filled in the email address section using their respective institutional email addresses. Hence, indicator 15 is the most attainable since it is already implied that every student enrolled in a university is given a respective email address.

On the Coping Mechanisms Applied by the Medical Technology Students:

An interpretation of the answers was made in order to aid in the determination of the positive and negative learning experiences of Medical Technology students in Higher Education Institutions in an e-Learning environment.

Table.7. Coping Mechanisms for Different Modes of Delivery

Indicator	Online Mean (SD)	Blended Mean (SD)	Total Mean (SD)	Interpretation (Total)
1. The students are able to find resourceful means to accomplish tasks when experiencing technical difficulties during online activities and examinations.	5.83 (1.21)	5.35 (1.23)	5.38 (1.21)	Somewhat satisfied (+)
2. The students are able to seek emotional support	4.33 (1.88)	4.33 (1.91)	4.33 (1.88)	Neither satisfied nor

from their family when the academic workload feels too excessive to handle.				dissatisfied (+/-)
3. The students are able to come up with a strategy about what to do when they feel that their work space at home is not suitable anymore.	4.51 (1.71)	4.43 (1.77)	4.49 (1.71)	Neither satisfied nor dissatisfied (+/-)
4. The students are able to see a different light and make it seem more positive when they receive low gradings on assessments and tasks.	4.60 (1.61)	4.65 (1.93)	4.61 (1.67)	Somewhat satisfied (+)
5. The students are able to call up and maintain communication and feelings of connectedness with their friends and classmates in online mode when they feel the lack of in-person interaction.	5.12 (1.71)	5.20 (1.17)	5.13 (1.70)	Somewhat satisfied (+)
6. The students are able to rest comfortably when they feel tired and lose motivation.	4.53 (1.91)	4.40 (2.22)	4.51 (1.96)	Neither satisfied nor dissatisfied (+/-)
7. The students are able to stop themselves from procrastinating when they feel lazy in doing their school requirements.	3.97 (1.86)	4.08 (1.82)	3.99 (1.84)	Neither satisfied nor dissatisfied (+/-)
8. The students have friends who they can rely on to help them bounce back when they fall behind in class.	5.94 (1.32)	5.68 (1.49)	5.89 (1.35)	Mostly Satisfied (+)
9. The students have classmates who inform their professors and tell them what they have missed when they are sick or unable to attend online classes.	6.26 (1.08)	5.85 (1.56)	6.18 (1.19)	Mostly Satisfied (+)
10. The students have the means to calm themselves down when they feel overwhelmed.	4.92 (1.57)	4.93 (1.75)	4.92 (1.60)	Somewhat satisfied (+)
Overall Coping Mechanisms	4.97 (1.07)	4.87 (1.20)	4.95 (1.09)	Somewhat satisfied (+)

Table.7. shows the mean ratings for each indicator on the coping mechanisms as indicated by the score, as rated by the students whose mode of delivery is Online and Blended. A total of 11 indicators were given to the students, in which the students were asked to rate from a score of 1 to 7. 1 as the lowest and 7 as the highest.

Under both modalities of Online and Blended, Indicator 9 "The students have classmates who inform their professors and tell them what they have missed when they are sick or unable to attend online classes.", has the highest rating of mean (mean = 6.26, SD = 1.07) (mean = 5.85, SD = 1.56) for Online and Blended respectively, thus having a total mean of 6.18 and total standard deviation of 1.19. The indicator is interpreted as Mostly Satisfied as stated in Figure 3.6. Subsequently, Indicator 8 "The students have friends who they can rely on to help them bounce back when they fall behind in class." has a total mean of 5.89, as stated in Figure 3.6 it is also interpreted as Mostly Satisfied. As for Indicator 1 (The students are able to find resourceful means to accomplish tasks when experiencing technical difficulties during online activities and examinations.), Indicator 4 (The students are able to see a different light and make it seem more positive when they receive low gradings on assessments and

tasks.), Indicator 5 (The students are able to call up and maintain communication and feelings of connectedness with their friends and classmates in online mode when they feel the lack of in-person interaction.), Indicator 10 (The students have the means to calm themselves down when they feel overwhelmed), and Indicator 11 (Other Coping Mechanism for e-learning) have total means of 5.38, 4.61, 5.13, 4.92, and 4.95 respectively. As stated in Figure 3.6, these questions are interpreted as somewhat satisfied

Under both modalities of Online and Blended category, Indicator 7 "The students are able to stop themselves from procrastinating when they feel lazy in doing their school requirements.", has the lowest rating of mean (mean = 3.97, SD = 1.86) (mean = 4.08, SD = 1.82) for Online and Blended respectively. It is interpreted as neither satisfied nor dissatisfied only as shown in Figure 3.6. As for Indicator 2 (The students are able to seek emotional support from their family when the academic workload feels too excessive to handle.), Indicator 3 (The students are able to come up with a strategy about what to do when they feel that their work space at home is not suitable anymore.), and Indicator 6 (The students are able to rest comfortably when they feel tired and lose motivation.) have total means of 4.33, 4.49, and 4.51 respectively. As shown in Figure 3.6, these indicators are also interpreted as neither satisfied nor dissatisfied. Indicator 7 "The students are able to stop themselves from procrastinating when they feel lazy in doing their school requirements." has the lowest rank overall for both Online and Blended, this may be due to students having less self-control when committing to their academic duties given their situation in the pandemic. According to Rahdadella and Latifah (2020) in order for students to avoid procrastinating they must improve their self-control. Procrastination among students is not something new, now it is more evident since we are still in the midst of a pandemic with online learning. Students tend to have less self-control given the setting that their professor/supervisor is only behind a screen unlike face-to-face learning wherein there is close student-teacher contact. According to Glazier and Harris (2020) instructors seem to matter more in face-to-face learning, where they can establish personal relationships with students, whereas assignments are more important in online learning. Given that assessments are more important in an online setting, it is evident that more assessments are given compared to the face to face setting.

Indicator 9 "The students have classmates who inform their professors and tell them what they have missed when they are sick or unable to attend online classes." has the highest indicator rank overall for both Online and Blended. This may be due to easy access of the online materials, students who have missed online sessions may easily access the materials in their own convenient time.

According to Mukhtar et al. (2020), online learning helped ensure remote learning, students could easily access teachers and teaching materials. It eased administrative tasks such as recording lectures, for the purpose of students to access the lectures again. The online setting has helped students become self-directed learners wherein they are able to learn asynchronously every day. With easier access to the learning materials students who have missed online sessions may just access the material and asynchronously learn it in their own convenient time.

D. On the Extent of the Attainment of Program Learning Outcomes

Table.8. Extent on Program Learning Outcome I on Different Modes of Delivery

Indicator	Online Mean (SD)	Blended Mean (SD)	Total Mean (SD)	Interpretation (Total)
Outcome I: Demonstrate technical competence in the performance of clinical laboratory tests in aid of diagnosis, treatment, and management of diseases vis-à-vis biosafety and waste management				
1. The students are able to collect, handle, and process biological specimens properly and safely.	4.75 (1.56)	4.63 (1.72)	4.73 (1.59)	High Competency (+)

2. The students are able to perform laboratory testing accurately through the use of appropriate techniques, skill, and technology	4.35 (1.61)	4.28 (1.55)	4.34 (1.59)	Average Competency (+/-)
3. The students are able to analyze and interpret laboratory test data.	4.78 (1.44)	4.73 (1.30)	4.77 (1.41)	High Competency (+)
4. The students are able to monitor testing procedures, equipment, and professional/ technical competency using quality assurance methodologies	4.33 (1.58)	4.30 (1.54)	4.33 (1.57)	Average Competency (+/-)
5. The students are able to operate instruments properly and perform appropriate preventive and corrective maintenance	4.29 (1.78)	4.33 (1.61)	4.29 (1.74)	Average Competency (+/-)
6. The students are able to adhere to all laboratory safety rules and regulations	5.88 (1.39)	6.03 (1.00)	5.91 (1.33)	Very High Competency (+)
7. The students are able to use computers and laboratory software competently	4.98 (1.66)	5.48 (1.47)	5.07 (1.64)	High Competency (+)
8. The students are able to discuss appropriate and novel technology for Medical Technology/ Medical Laboratory Science application	4.58 (1.54)	4.58 (1.60)	4.58 (1.54)	Average Competency (+/-)
9. The students are able to evaluate new procedures and instruments	4.39 (1.60)	4.50 (1.43)	4.41 (156)	Average Competency (+/-)
10. The students are able to apply principles of educational methodology and laboratory management	4.87 (1.53)	5.03 (1.53)	4.90 (1.53)	High Competency (+)
Outcome I Total	4.72 (1.30)	4.78 (1.32)	4.73 (1.30)	High Competency (+)

Table.8. shows the results for the interpretation of each indicator from the impact of the learning outcome 1 section of the questionnaire. These indicators were also subdivided into two categories: online and blended learning.

Among the ten indicators designated for the first learning outcome, based on the CMO No. 13 series of 2017, indicators 6, 7, and 10 ranked the highest while indicators 2, 4, and 5 ranked the least in both blended and online categories. Indicator 6, the students are able to adhere to all laboratory safety rules and regulations, acquired means 5.88 and 6.03 on the online and blended category respectively which was the highest among the three. Indicator 7, the students are able to use computers and laboratory software competently, came in second with means 4.98 and 5.48, and indicator 10 came in third with means 4.87 and 5.03. These ranked high among the rest of the indicators for students who will have easier access to study materials in online or blended learning (Gautam, 2020). Among the three indicators who ranked the lowest, indicator 5, The students are able to operate instruments properly and perform appropriate preventive and corrective maintenance, ranked the least in online with the mean of 4.29 while indicator 2, The students are able to perform laboratory testing accurately through the use of appropriate techniques, skill, and technology, had the least under the blended category with a mean of 4.28. Despite these indicators ranking least among the ten indicators, it is still an average competency. Based on the consistency in rankings, we can conclude that

both online and blended learning excel in teaching laboratory safety rules and regulations, the use of computer and laboratory softwares, as well as in teaching the principles of education methodology and proper laboratory management. This is likely due to the fact that these are basic knowledge which are focused by professors in order to produce competent medical technologists. Indicators 2, 4, and 5 however also ranked consistently at the bottom which are indicators involving techniques required in the field such as performing laboratory tests, as well as monitoring and operating laboratory equipment and its maintenance. In a study conducted by Jayara (2020), it was found that in online learning students were at a disadvantage when it comes to developing skills needed to become competent laboratory professionals. These are skills that require physical interaction and practice in order to hone therefore it being consistently low is not a surprise since teaching these fundamentals are considered to be both online and blended learning's weakest points. Therefore, from the outcome I segment we can say that despite both categories being able to teach theoretical or general knowledge effectively, it falls short when it comes to teaching techniques essential for actual laboratory practice.

Table.9. Extent on Program Learning Outcome II on Different Modes of Delivery

Indicator	Online Mean (SD)	Blended Mean (SD)	Total Mean (SD)	Interpretation (Total)
Outcome II: Demonstrate analytical and critical thinking skills in the workplace				
1. The students are able to demonstrate skills in quality assurance and continuous quality improvement	4.80 (1.52)	4.70 (1.67)	4.78 (1.54)	High Competency (+)
2. The students are able to evaluate the validity of the generated data and assure its reliability before reporting	5.15 (1.42)	4.90 (1.53)	5.10 (1.44)	High Competency (+)
3. The students are able to recognize errors/problems and perform root cause analysis to establish a course of action	4.89 (1.42)	4.93 (1.33)	4.89 (1.40)	High Competency (+)
4.The students are able to apply the principles of educational methodology and resource management	4.92 (1.37)	4.83 (1.53)	4.90 (1.40)	High Competency (+)
Outcome II Total	4.92 (1.33)	4.72 (1.38)	4.88 (1.34)	High Competency (+)

On learning outcome two, it was found that indicator 2, The students are able to evaluate the validity of the generated data and assure its reliability before reporting, ranked the highest in the online category with a mean of 5.15 while indicator 3, The students are able to recognize errors/problems and perform root cause analysis to establish a course of action, ranked highest on the blended category with a mean of 4.93 giving them both an interpretation of high competency while indicator 1, The students are able to demonstrate skills in quality assurance and continuous quality improvement, ranked the least on both online and blended teaching method with means 4.80 and 4.70 respectively which is still considered high competency. Indicator 2 ranked highest in the online category signifies that students are able to confidently evaluate the validity of a data before presenting it. The reason behind this would be the fact that the resources in online learning are abundant therefore it would be easier to cross reference the data. Indicator 3 ranked highest on the blended category signifies that the students are able to recognize problems and perform root cause analysis in order to solve a

specific problem which means that blended learning is effective when it comes to developing problem solving skills which is needed in the field of medical technology.

Another reason why indicators 2 and 3 ranked highly in online and blended learning would be the availability of authenticating tools and checkers which can verify the validity of data as well as its credibility. The internet is also filled with credible sites which can be a source of information to further support gathered data as well as solutions to answer problems encountered. It also contains e-books and other learning materials which serves as a good source of information (Jayara, 2020). Indicator 1 ranked the least among the indicators and it focuses on the students ability to maintain quality assurance and continually improve the quality of service. Development of technical skills and techniques is considered to be one of the vital weaknesses of online learning as well as blended.

Table.10. Extent on Program Learning Outcome III on Different Modes of Delivery

Indicator	Online Mean (SD)	Blended Mean (SD)	Total Mean (SD)	Interpretation (Total)
Outcome III: Engage in the collection, analysis, and projection of health information for improving the health care management system				
1. The students are able to analyze health information data	5.32 (1.27)	4.98 (1.48)	5.26 (1.31)	High Competency (+)
2. The students are able to analyze health information data	5.20 (1.25)	4.90 (1.45)	5.14 (1.29)	High Competency (+)
3. The students are able to contribute in designing and planning a course of action to address health concerns and issues	4.96 (1.49)	4.88 (1.40)	4.94 (1.47)	High Competency (+)
Outcome III Total	5.13 (1.27)	4.94 (1.42)	5.10 (1.29)	High Competency (+)

On learning outcome three, indicator 1 was ranked the highest under both the Online and Blended categories, with means 5.32 and 4.98 respectively. Thus, having a total mean of 5.26. This indicator was interpreted as having a High Competency according to table.10. Indicator 1 under learning outcome three may have been deemed to have the highest degree of attainment in both the Online and Blended category due to the training that Medical Technology students have been receiving since freshman year. As stated by Section 5 of the CMO No. 13 series of 2017, one of the program goals is for the graduates to be able to,"develop the knowledge, skills, professional attitude, and values in the performance of clinical laboratory procedures needed to help the physician in the proper diagnosis, treatment, prognosis, and prevention of diseases". With that in mind, honing and enhancing the student's ability to analyze and interpret health information data is a critical requirement in the diagnosis, treatment, prognosis, and prevention of diseases. On the other hand, Indicator 3 was ranked the lowest in both the Online and Blended categories, with means 4.96 and 4.88 respectively. Thus, having the lowest total mean of 4.94. This indicator was also interpreted as having a High Competency according to table.10. Indicator 3 under this learning outcome may have been deemed to have the lowest degree of attainment due to the limited amount of hands-on experience that the students are experiencing with e-Learning. According to McLean et al. (2016), medical students are traditionally imposed to attend lectures and then transitioned into patient care as a type of on-the-job training. In this on-the-job training, the students are simultaneously learning through actual cases, as well as designing and planning a course of action, addressing health concerns and issues. Hence, indicator 3 had the lowest total mean since it is important for the students to be actively engaged in their respective courses.

Table.11. Extent on Program Learning Outcome IV on Different Modes of Delivery

Indicator	Online Mean (SD)	Blended Mean (SD)	Total Mean (SD)	Interpretation (Total)
Outcome IV: Demonstrate interpersonal skills, leadership qualities, and ethical practice of the profession				
1. The students are able to work effectively with peers, with multi-disciplinary, and multi-cultural teams	5.87 (1.17)	5.65 (1.39)	5.83 (1.21)	Very High Competency (+)
2. The students are able to plan and organize activities	5.61 (1.25)	5.43 (1.58)	5.57 (1.32)	High Competency (+)
3. The students are able to practice professionalism	6.08 (1.14)	5.85 (1.25)	6.04 (1.16)	Very High Competency (+)
4. The students are able to exhibit ethical behavior	6.21 (1.00)	6.03 (1.27)	6.17 (1.05)	Very High Competency (+)
Outcome IV Total	5.96 (0.98)	5.74 (1.21)	5.92 (1.03)	Very High Competency (+)

On learning outcome four, indicator 4, The students are able to exhibit ethical behavior, ranked the highest in both online and blended learning with means 6.21 and 6.03 respectively which interprets as having a very high competency while indicator 2, The students are able to plan and organize activities, ranked the least in both categories with means 5.61 and 5.43 as respectively which is deemed to have a high competency interpretation. High mean values in indicator 4 signifies that the students are effectively taught to act ethically by either learning methods. This can also be due to the fact that there are more resources available with online and blended learning since there are tons of credible videos, research papers, as well as books about ethics and ethical behaviour found on the internet. Indicator 2 ranked the lowest in this learning outcome since it focuses on the ability of students to organize and plan their routine. It is quite hard to plan since there are more factors to consider such as internet connectivity, gadget availability, electricity, and other unforeseen factors. Lack of internet connectivity means that there would be times wherein you would not be able to pass your requirements, attend classes, or even take assessments same goes when there are sudden power outages in a certain location (Gautam, 2020). Other factors would be family matters since not everyone has the luxury to live comfortably during this pandemic.

Table.12. Extent on Program Learning Outcome V on Different Modes of Delivery

Indicator	**Online Mean (SD)**	**Blended Mean (SD)**	**Total Mean (SD)**	**Interpretation (Total)**
Outcome V: Apply research skills in relevant areas of Medical Technology/Medical Laboratory Science practice				

1. The students are able to identify research topic relevant to Medical Technology/ Medical Laboratory Science	5.56 (1.10)	5.38 (1.33)	5.52 (1.15)	High Competency (+)
2. The students are able to use appropriate research methods	5.42 (1.17)	5.38 (1.06)	5.41 (1.15)	High Competency (+)
3. The students are able to perform the research according to plan	5.48 (1.25)	5.30 (1.18)	5.44 (1.24)	High Competency (+)
4. The students are able to analyze and interpret research data	5.45 (1.28)	5.40 (0.94)	5.44 (1.17)	High Competency (+)
5. The students are able to disseminate research results	5.44 (1.07)	5.20 (0.94)	5.40 (1.05)	High Competency (+)
Outcome V Total	5.48 (1.07)	5.39 (0.94)	5.46 (1.05)	High Competency (+)

Learning outcome five is determined by the research skills of the medical technology students. According to Lee et al. (2020), the diversity of teaching programs could prove to highlight challenges in achieving the necessary research skills of medical students. Therefore, this learning outcome is primarily affected by its mode of delivery. Table.12. shows the extent of learning outcome five on different modes of delivery. On learning outcome five, indicator 1 (5.56) and indicator 4 (5.40) ranked the highest for online and blended modes of instruction respectively. Indicator 1, the students are able to identify research topics relevant to Medical Technology/ Medical Laboratory Science, can be interpreted as a very high competency while Indicator 4, the students are able to analyze and interpret, is a high competency where both suggest a positive result. Meanwhile indicator 2 (5.42) and indicator 5 (5.20) ranked the lowest for online and blended modes of instruction respectively. Indicator 2, The students are able to use appropriate research methods, and indicator 5, The students are able to disseminate research results, are both interpreted as high competency and both suggest a positive result despite being the lowest ranked. All the indicators for learning outcome five are interpreted as high competency in the total result of both modes of instruction. Indicator 1 focuses on the ability of the student to identify research topics related to the field while indicator 4 focuses on the ability to analyze and interpret data, two of these are fundamental skills needed to become a competent medical technologist. These abilities are honed by the student through research and reading which are made easier with the access of the internet which are both required in online and blended learning. Indicators 2 and 5 ranked lowest among the five indicators likely because these are more on the application of theoretical knowledge such as the identifying and using research methods as well as disseminating research findings which vary from student to student. However despite having a lower mean compared to the rest, all the results of outcome five showed high competency which is a positive result.

Table.13. Extent on Program Learning Outcome VI on Different Modes of Delivery

Indicator	**Online Mean (SD)**	**Blended Mean (SD)**	**Total Mean (SD)**	**Interpretation (Total)**
Outcome VI: Participate in community-oriented activities				
1. The students are able to engage in community-oriented activities	5.06 (1.61)	5.20 (1.59)	5.09 (1.61)	High Competency (+)

2. The students are able to plan and organize medical technology-related activities in the community	4.74 (1.79)	4.65 (1.63)	4.72 (1.76)	High Competency (+)
3. The students are able to apply the principles of good practice in community service and social responsibility	5.37 (1.51)	5.35 (1.23)	5.36 (1.46)	High Competency (+)
4. The students are able to implement, monitor, and evaluate activities in the community	4.93 (1.68)	4.78 (1.64)	4.90 (1.67)	High Competency (+)
Outcome VI Total	4.98 (1.50)	5.01 (1.39)	4.98 (1.48)	High Competency (+)

On learning outcome six, indicator 3 ranked the highest under both the Online and Blended categories, with means of 5.37 and 5.35 respectively. Thus, having a total mean of 5.36. This indicator was interpreted as having a High Competency according to table.13. Indicator 3 under learning outcome six may have been deemed to have the highest degree of attainment since this characteristic has been deep-seated in each student since freshman year. According to Liu (2018), strengthening humanistic quality education in higher medical science is the need of medicine itself. In the Philippines, one program has been implemented by institutions in order to encourage the students to actively participate in community development activities; this program is the National Service Training Program (NSTP). With the aid of this program, the students are able to develop the ethics of service and patriotism, with the goal of applying good practice in community service. On the other hand, indicator 2 was ranked the lowest in both Online and Blended categories, with means of 4.74 and 4.65 respectively. Thus, having the lowest total mean of 4.72. Based on Table.13. This indicator was also interpreted as having a High Competency. Indicator 2 under this learning outcome may have been deemed to have the lowest degree of attainment due to the inability to conduct community-based activities in these trying times. According to a study by Rose (2020), social distancing is the most effective preventative strategy since the emergence of COVID-19. By definition, this would imply that students are prohibited from social gathering. Thus, prompting the idea that planning and organizing medical technology-related activities in the community as the least feasible, therefore, ranking the lowest under learning outcome six.

Table.14. Extent on Program Learning Outcome VII on Different Modes of Delivery

Indicator	**Online Mean (SD)**	**Blended Mean (SD)**	**Total Mean (SD)**	**Interpretation (Total)**
Outcome VII: Engage in life-long learning activities				
1. The students are able to discuss trends/ developments in Medical Technology/ Medical Laboratory Science practice	5.05 (1.35)	5.03 (1.49)	5.05 (1.37)	High Competency (+)
2. The students are able to participate in professional organizations	4.51 (1.74)	4.68 (1.77)	4.54 (1.75)	Average Competency (+/-)
	4.77 (1.40)	4.74 (1.50)	4.76 (1.41)	High Competency

Outcome VII Total				(+)

On learning outcome seven, indicator 1 had a higher mean compared to indicator 2 in both learning methods. Indicator 1, The students are able to discuss trends/ developments in Medical Technology/ Medical Laboratory Science practice, had a mean of 5.05 and 5.03 which is interpreted as having high competency while indicator 2, The students are able to participate in professional organizations, had 4.51 and 4.68 which is interpreted as having an average competency. Indicator 1 focuses on the students ability to discuss current trends and developments in the field of medical technology. With the use of current technology, it is way easier to gain access about the current trends such as developments of vaccines and the mutations of the virus that caused the pandemic, Sars-CoV 2. News and updates are so much accessible, with just one click and a few minutes of reading, knowledge can already be obtained. Indicator 1 ranked highest since it was found in a study conducted by Gautam (2020) that e-learning gives access to research materials relevant to the field of interest thus gaining knowledge about the current trends in medical technology is made easier by both learning methods. Indicator 2 on the other hand focuses on the ability of the student to participate or join professional organizations and as we all know, the pandemic has limited our ability to join and create activities especially those related to the field of medical technology. Therefore only webinars or similar activities can be conducted therefore limiting the options and opportunities of the student.

Table.15. Extent on Program Learning Outcome VIII on Different Modes of Delivery

Indicator	**Online Mean (SD)**	**Blended Mean (SD)**	**Total Mean (SD)**	**Interpretation (Total)**
Outcome VIII: Demonstrate effective teaching and communication skills				
1. The students are able to prepare correct communication materials	5.47 (1.18)	5.15 (1.39)	5.41 (1.22)	High Competency (+)
2. The students are able to communicate effectively across multiple platforms	5.69 (1.24)	5.43 (1.45)	5.64 (1.28)	Very High Competency (+)
Outcome VIII Total	5.57 (1.11)	5.35 (1.37)	5.53 (1.16)	High Competency (+)

On learning outcome eight, indicator 2, The students are able to communicate effectively across multiple platforms, came out the highest in both online and blended learning with mean of 5.69 and 5.43 which is translated as having a very high competency while indicator 1, The students are able to prepare correct communication materials, had 5.47 and 5.15 respectively which translates to having a high competency. The reason behind indicator 2 having a high mean was because during online and blended learning sessions we are trained to use different platforms which require different ways of communication. An example situation would be the use of zoom meetings, blackboard ultra, or google classroom as a way of teaching during class sections. These platforms require a microphone or webcam in order to see other participants as well as to have the ability to communicate with them verbally on the other hand, platforms such as facebook require the students to have the ability to express themselves through typewritten messages (Friedman, 2014). As the students use different platforms they learn how to adapt and to communicate more effectively. Though having a lower mean, indicator 1 still has a high competency therefore it is still being effectively learned. Indicator 1 focuses on the ability of the student to prepare correct communication materials such as written works or voice messages. Along with indicator 2, both are being developed with online and blended learning thus resulting in high competencies with both aspects. The

difference would be more on the ability of the students to readily express themselves resulting in a lower score in indicator 1 compared to indicator 2.

Table.16. Overall Extent on Program Learning Outcomes on Different Modes of Delivery

Indicator	Online Mean (SD)	Blended Mean (SD)	Total Mean (SD)	Interpretation (Total)
Outcome I: Technical competence in clinical laboratory tests	4.72 (1.30)	4.78 (1.32)	4.73 (1.30)	High Competency (+)
Outcome II: Analytical and critical thinking skills	4.92 (1.33)	4.72 (1.38)	4.88 (1.34)	High Competency (+)
Outcome III: Collection, analysis, and projection of health information for improving the health care management system	5.13 (1.27)	4.94 (1.42)	5.10 (1.29)	High Competency (+)
Outcome IV: Interpersonal skills, leadership qualities, and ethical practice	5.96 (0.98)	5.74 (1.21)	5.92 (1.03)	Very High Competency (+)
Outcome V: Apply research skills in relevant areas of Medical Technology	5.48 (1.07)	5.39 (0.94)	5.46 (1.05)	High Competency (+)
Outcome VI: Participate in community-oriented activities	4.98 (1.50)	5.01 (1.39)	4.98 (1.48)	High Competency (+)
Outcome VII: Engage in life-long learning activities	4.77 (1.40)	4.74 (1.50)	4.76 (1.41)	High Competency (+)
Outcome VIII: Teaching and communication skills	5.57 (1.11)	5.35 (1.37)	5.53 (1.16)	High Competency (+)
Overall Outcome Total	5.19 (1.07)	5.13 (1.09)	5.18 (1.07)	High Competency (+)

Considering all the outcomes, we can see that there are common factors. One would be the ability of the students to gain access to a vast array of resources found in the internet. With access to the internet, students are able to search, check, and even learn from the works of other people as well as impart their knowledge to others. It was also evident that a majority of the results in the data showed a positive result which then signifies that both online and blended learning are doing a great job as a learning tool. However, despite all this, such learning methods are limited especially when it comes to developing technical skills essential for a student to become a competent medical technologist. Skills such as laboratory testing and techniques, machine maintenance and other laboratory equipment competencies are limited since most of these require laboratory practice and interaction. Another crucial limitation would be internet connectivity and other unforeseen events such as power outages. Even so, both online and blended learning have shown highly competent results.

E. On the Predictors of Learning Outcomes

Table.17. Correlation between Learning Styles and Current Mode of Delivery

	Learning Styles (r)							
	Active	**Reflective**	**Sensing**	**Intuitive**	**Visual**	**Verbal**	**Sequential**	**Global**
Mode of Delivery	.079	-.079	-.059	.059	-.007	.007	-.094	.094

*Legend: * = Correlation is significant at 0.05 (p<0.05), ** = Correlation is significant at 0.01 (p<0.01).*

Table.17. Shows the relationship between the preferred learning styles of the students and the mode of delivery. Based on the results, the Sequential - Global dimension of learning, which determines how a student prefers to organize himself to learn new information, has the highest correlation (.094) with the mode of delivery; followed by Active - Reflective (.079), which determines how a student prefers to process information; Sensing - Intuitive (.059), which determines how the student prefers to perceive information; and finally the Visual - Verbal (.007) dimension of learning, which determines how a student prefers information to be presented to him. However, it must be noted that all of these correlation values are to a very little extent and are negligible. Thus, the learning styles are not significantly correlated with the mode of delivery.

Table.18. Correlation between Learning Styles and Learning Outcomes

	Learning Styles (r)							
Outcome	**Active**	**Reflective**	**Sensing**	**Intuitive**	**Visual**	**Verbal**	**Sequential**	**Global**
Outcome 1	.057	-.057	-.088	.088	.000	.000	-.020	.020
Outcome 2	.036	-.036	.028	-.028	.051	-.051	.096	-.096
Outcome 3	.023	-.023	-.048	.048	.002	-.002	.017	-.017
Outcome 4	.061	-.061	.029	-.029	.049	-.049	.052	-.052
Outcome 5	-.034	.034	-.028	.028	.056	-.056	.062	-.062
Outcome 6	.060	-.060	-.064	.064	-.013	.013	.130	-.130
Outcome 7	.034	-.034	-.068	.068	-.063	.063	.059	-.059
	.095	-.095	-.010	.010	.043	-.043	.010	-.010

Outcome 8								
Total Outcome	.073	-.073	-.042	.042	.050	-.050	.051	-.051

*Legend: * = Correlation is significant at 0.05 (p<0.05), ** = Correlation is significant at 0.01 (p<0.01).*

The correlation values between Learning Styles and Learning outcomes are to a very little extent and are negligible. Thus, the learning styles of Medical Technology students in higher education institutions is not significantly correlated with the mode of delivery.

Table.18. shows the relationship between the preferred learning styles of the students and the achievement of learning outcomes. Based on the results, the Active - Reflective dimension of learning, which determines how a student prefers to process information, has the highest correlation (.073) with learning outcomes; followed by Sequential - Global (.051), which determines how a student prefers to organize himself to learn new information; Visual - Verbal (.050) dimension of learning, which determines how a student prefers information to be presented to him; and finally the Sensing - Intuitive (.042), which determines how the student prefers to perceive information.

However, the correlation between learning styles and the achievement of learning outcome is negligible, suggesting that a student's individual learning style has little to no influence on the attainment of learning outcomes.

The tendency of the mode of delivery to be conducive to one particular learning style in each dimension of learning is represented by a positive or negative correlation. However, the strength of preference to the individual learning styles in each dimension could not be measured and is one limitation of the study. As a result, the specific learning styles in each dimension of learning express an equal degree of either positive or negative correlation.

The data reveals that the mode of delivery creates an environment for learning that is most suited for Active learners (.073) to achieve the learning outcomes proposed by CHED and is the least suitable environment for Reflective learners (-.073).

Active learners are more likely to thrive in the online setting than reflective learners as the data suggests. Active learners are defined by Felder & Silverman (1988) as students who require active experimentation in order to learn. They perform best when they are able to experience what they are learning, work better in groups, and prefer practice to theory. While reflective learners perform best when they are able to think about the information being presented to them and are well suited for lectures. They work better alone and prefer reflective observation. In the current online learning environment, there is a positive correlation with the Active learning style to the achievement of learning outcomes. This suggests that despite the limitations of the online mode, the curriculum still provides opportunities for the students to collaborate and experience somewhat the principles of medical technology, instead of passive learning through pure lecture. Perhaps this is due to the various activities, presentations, and group activities that are required of the students.

Global learners (-.051) are defined by divergent thinking and synthesis, often jumping between lessons and material. They require the freedom to devise their own methods to solving problems and perform best when given the big picture or goal of a lesson. Sequential learners (.051) follow linear reasoning when solving problems, relying on steps and methods, learning in a steady and predictable manner. Like the name suggests, sequential learners learn sequentially and rely on paced learning. This result may be explained by the lesson structure that is employed in teaching online classes wherein there is a lesson plan and lesson schedule that is given by the instructor. Students therefore learn the material at a paced manner going through the lesson in increments.

The data shows that e-learning facilitates the achievement of learning outcomes in Visual learners (.050) more than Verbal learners (-.050). Visual learners have an easier time processing and recalling pictures, diagrams, charts, films, and demonstrations. Verbal learners are defined as preferring verbal explanation to visual demonstration. They get more out of discussions and have an easier time recalling information that was said to them and what was said back. The current mode of instructure creates an environment in which Visual

learners can thrive, thus the positive correlation. This result may be explained by the heavy reliance on visual media to present information to students in the online mode. Visual learners are more comfortable learning through the online medium due to the multitude of visual content such videos, graphs, presentations, pre-recorded demonstrations, etc. to convey the lesson.

And lastly, with the weakest correlation to achievement of learning outcomes, are the Intuitive (.042) and Sensing (-.042) learners. Intuitive learners are defined as abstract thinkers who are more oriented to understanding underlying concepts through speculation and imagination. Intuitors prefer principle and theory, are more innovative and better at grasping new concepts. Sensors on the other hand prefer facts, data, and experimentation. They would rather solve problems through established methods, are detail oriented, and are good at memorizing facts. This finding suggests that the curriculum encourages the understanding of principles and theory before facts and steers the thought process towards critical thinking. In the online environment, where opportunities to apply what is taught during class is limited, the focus has shifted to experience based learning to learning through theorem and principle.

In the first learning outcome, medical technology students are asked to rate their ability to "Demonstrate technical competence in the performance of clinical laboratory tests in aid of diagnosis, treatment, and management of diseases vis-à-vis biosafety and waste management". The skills needed to develop competence in the first learning outcome require physical interaction and, most importantly, practice. The limitations of the online mode preclude any physical engagement or hands on experience. Therefore, Active learners are expected to suffer in terms of demonstrating competence while engaged in online modes of instruction in this learning outcome. The data shows that the Intuitive learning style is the greatest predictor for achieving this learning outcome. Intuitive learners are abstract thinkers and are able to grasp new concepts easily and prefer theory to data and experimentation. In the online mode, where all information is basically theoretical, Intuitive learners may be at an advantage.

In the second learning outcome, students are asked to rate their ability to "Demonstrate analytical and critical thinking skills in the workplace". The critical thinking and analytical skills are most demonstrated by the Sequential learners, as they are defined as being strong in convergent thinking and analysis, according to Felder & Silverman (1998). And indeed, the sequential learning style has the highest correlation with achieving the second learning outcome.

In the third learning outcome, the students were asked to rate their ability to "Engage in the collection, analysis, and projection of health information for improving the health care management system". Thus, data analysis, interpretation, and practical application are important skills. The analysis of data falls within the realm of the Reflectors and Sensors, however, as seen in the table, the learning style preference with the greatest correlation to achieving the third learning outcome are the Intuitive learners.

In the fourth learning outcome, the students were asked to rate their ability to "Demonstrate interpersonal skills, leadership qualities, and ethical practice of the profession". The skills involved in this learning outcome, such as planning and leadership, are highly developed in Active learners, who are defined by Felder & Silverman (1988) as working well in groups.

In the fifth learning outcome, the students were asked to rate their ability to "Apply research skills in relevant areas of Medical Technology/ Medical Laboratory Science practice". As such, the skills necessary for achieving the fifth learning outcome include critical analysis and interpretive skills and the ability to understand facts and data. Data analysis and interpretation are the strong points of Sensing and Intuitive learners.

In the sixth learning outcome, the students were asked to rate their ability to "Participate in community-oriented activities". Due to the limited social and physical interaction that took place in the online mode of instruction, this was the lowest scoring among the learning outcomes. The skills required to achieve this learning outcome include community-oriented skills that include interpersonal skills and practical application of principles to community-oriented activities. Active learners would be the most capable of achieving this learning outcome because of their proclivity to work in groups and take on more practical hands-on methods. However, the data reveals that Sequential learners have the highest correlation to achieving community-oriented outcomes in the online mode of instruction. This may be because community-oriented activities in the online mode do not take on a hands-

on approach and are more or less replaced by deploying case studies, explaining why, in the online mode, Sequential learners with the ability to analyze and interpret data have the highest correlation.

In the seventh learning outcome, the students were asked to rate their ability to "Engage in life-long learning activities". The skills involved in life-long learning include creativity, adaptability, curiosity, and collaboration. These skills are aligned with the learning preferences of Intuitive learners, who are defined as being abstract thinkers who seek creative solutions to solving problems. In the online mode, students are required to adapt and continue their pursuit of knowledge. Based on the data, Intuitive learners have the highest correlation when it comes to achieving outcomes in life-long learning.

In the eighth learning outcome, the students were asked to rate their ability to "Demonstrate effective teaching and communication skills". Tasks that involve interaction with other people to achieve a particular goal are best handled by individuals with the active learning style preference as they thrive in group situations and prefer to collaborate and be hands-on in their approach, which is valuable for effective teaching and communicating information.

Table.19. Correlation of Various Predictors with Learning Outcomes

Predictor	**Outcomes (r)**								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Gender	.013	.036	-.007	.156*	.091	.019	-.013	.009	.027
Institution	-.135*	-.066	.001	.041	.033	-.128*	-.075	-.035	-.031
Year Level	-.011	-.007	.036	.027	.070	-.043	-.029	-.066	.011
Mode of Delivery	.017	-.058	-.057	-.083	-.036	.007	-.008	-.074	-.022
Learning Styles (Active)	.057	.036	.023	.061	-.034	.060	.034	.095	.073
Resources	.234**	.314**	.287**	.334**	.394**	.253**	.309**	.351**	.385**
Coping Mechanisms	.352**	.343**	.280**	.297**	.345**	.317**	.305**	.211*	.388**

*Legend: * = Correlation is significant at 0.05 (p<0.05), ** = Correlation is significant at 0.01 (p<0.01)*

Table.19. displays the correlation analysis of the most significant predictors that were determined from the research tool. It could be implied in the result of the total outcomes that gender (r = 0.027), institution (r = -0.031), year level (r = 0.011), mode of delivery (r = -0.022) and learning styles (r = 0.073) have a very small strength of association or no correlation with program learning outcomes due to their Pearson's correlation coefficient value being less than 0.1. This indicates that the variables are highly unlikely to affect the learning outcomes of the respondents, although it could be determined under the category of gender that outcome 4 has a small correlation with the program learning outcomes. This could be interpreted that females are more likely to have more competence in interpersonal skills, leadership and ethical practices. Outcomes 1 and 6 also have a small negative correlation with institutions which indicates that technical competency skills and community-oriented participation varies among different institutions. Resources (r = 0.385) and coping mechanisms (r = 0.388) on the other hand, have a positive medium strength of association with the program learning outcomes, indicating that the variables are likely to influence the learning outcomes of the respondents.

Specifically, the effect of learning resources (r2 = 0.148) in predicting the learning outcomes is only about 14%, while the effect of the coping mechanisms (r2 = 0.151) in predicting the learning outcomes is about 15%. This is further expounded upon by the correlation of the individual learning outcomes where most values are deemed to have a medium correlation with learning outcome 5 (r = 0.394) being the highest for learning resources and learning outcome 1 being the highest for coping mechanisms. Therefore, the learning experiences, stemming from the combination of both the learning resources and the coping mechanisms, is a positive predictor of learning outcomes.

IV. Conclusion

A. Summary of Findings

Based on Table 3.5b, since all of the learning styles are insignificant at 0.05 by comparing the activist learning style which has a p-value of .285 which is the lowest of all the learning styles. Since .285 is not less than 0.05, it can be concluded that hypothesis 1 (H1) is rejected, indicating that there is no positive relationship between e-learning mode of delivery and the learning styles of Medical Technology students. For hypothesis 2 (H2), based on Table 3.3a and Table 3.5b, both means for learning resources (5.56) and coping mechanisms (4.95) are above the normal mean of 4.50, indicating that e-learning mode of delivery indeed has a positive effect on the learning experiences of Medical Technology students. In this case, the results failed to reject H2. For hypothesis 3 (H3), based on Table 3.4i, the overall mean for learning outcomes is 5.18, which is greater than the normal mean of 4.50, indicating that e-learning is a positive predictor of achieving the intended learning outcomes. Thus, the results failed to reject H3.

Demographic Profile of the Respondents:

The results acquired from the research tool have strongly displayed an overview of the characteristics of the research participants. Most of the respondents were found to be female, comprising about nearly three times the number of male respondents. Among the higher education institutions in Metro Manila, University of Santo Tomas had the highest prevalence, amounting to more than half of the total respondents. In the category of year level, the respondents consist mainly of third year medical technology students with first year medical technology students consisting the least among the three year levels. And lastly, under the mode of delivery, there were no respondents among the five higher education institutions that experienced offline modality, while the majority of the respondents experienced online mode of delivery.

Index of Learning Styles:

The learning style preferences of Medical Technology students currently enrolled in Higher Education Institutions were identified in this study using the Felder-Silverman learning style model. A correlation analysis was performed to determine the strength of association between the learning styles of the student and their ability to achieve learning outcomes in the online mode. It was found that learning style has very little or negligible effect on the attainment of learning outcomes, suggesting that the performance of the student is independent of his or her individual learning style.

Experiences of the Medical Technology Students in Higher Education Institutions in Metro Manila:

- *Learning Resources of the Medical Technology Students*

A total of 17 indicators on the Learning Resources was utilized to aid in the determination of the positive and negative learning experiences of Medical Technology students in Higher Education Institutions in Metro Manila. A seven point Likert scale was applied for the students to rate each indicator from a score of 1 as the lowest and 7 as the highest. Under the Blended modality of Learning, Indicator 4 was the only Indicator interpreted as Neither Satisfied nor Dissatisfied. Indicators 1, 2, 3, 6, 8, 9, 12, 13, 16, and 17 were interpreted as Somewhat Satisfied, while Indicators 5, 7, 10, 11, 14, and 15 were interpreted as Mostly Satisfied. Under the Online modality of Learning, Indicators 6, 8, 9, 12, 13, 14, 16, and 17 were interpreted as Somewhat Satisfied. Indicators 1, 2, 3, 5, 7, 10, and 11 were interpreted as Mostly Satisfied, while Indicator 15 was the only Indicator interpreted as Completely Satisfied. Overall, Indicator 4 had the lowest mean ranking. This may be attributed to the Internet connectivity problems and disturbances that the students are facing. On the other hand, Indicator 15 had the highest mean ranking. This can be due to the fact that Institutions administer email addresses to their students upon admission. An additional attribution is that most of this study's respondents

utilized their institutional email addresses to complete the survey questionnaire. Finally, among the 17 Indicators under both the Online and Blended modalities of Learning, only one indicator (Indicator 4) had a classification of Neutral, while 16 Indicators had a Positive classification. This can indicate that Medical Technology Students in Higher Education Institutions in Metro Manila have Positive experiences in terms of Institutional and Student Resources.

- *Coping Mechanisms Applied by the Medical Technology Students:*

Coping Mechanisms has used a total of 11 indicators to determine the positive and negative learning experiences of Medical Technology students in Higher Education Institutions in Metro Manila. A seven point Likert scale was used for the rating of each indicator, it had a score of 1 being the lowest and 7 being the highest. Under the Blended modality of Learning, Indicators 2, 3, 6, and 7 had low means and was interpreted as neither satisfied nor dissatisfied. Indicators 1, 4, 5, 10, and 11 were interpreted as Somewhat Satisfied, while Indicators 8 and 9 had high means and was interpreted as Mostly Satisfied. Under the Online modality of Learning, Indicators 2, 3, 6, and 7 had low means and was interpreted as neither satisfied nor dissatisfied. Indicators 4, 5, 10, and 11 were interpreted as Somewhat Satisfied, while Indicators 1, 8 and 9 had high means and was interpreted as Mostly Satisfied. Overall, Indicator 7 under the Blended modality of Learning had the lowest mean rating.

On account of students having less self-control when given an online mode of learning. While Indicator 9 under the online modality of Learning had the highest mean rating. This may be due to having easier access of learning materials on the online platform. Under both the Total of Blended and Online modality of learning there were a total of four indicators that had a result of Neutral experience and a total of seven indicators that had a result of Positive experience. This can indicate that Medical Technology Students in Higher Education Institutions in Metro Manila have Positive experiences in terms of Coping Mechanisms for Different Modes of Delivery

Extent of the Attainment of Program Learning Outcomes:

The Commission on Higher Education (CHED), based on the CMO 13 of 2017, has set a total of eight (8) learning outcomes, each of which would be vital in order to produce quality and globally competitive medical technology graduates. A seven point Likert scale was used for the rating of each outcome, 1 being the lowest and 7 being the highest. Based on the results, all eight outcomes had at least an interpretation of high competency, and among all outcomes only outcome IV, Demonstrate interpersonal skills, leadership qualities, and ethical practice of the profession, had an interpretation of very high.

Based on the results, among all the outcomes, we can see that there is little to no difference in the total between online (5.19) and blended learning (5.13). Both are interpreted as having a high competency from which we can conclude that no matter which mode of delivery a High Education Institution opts to adapt, there will be little to no difference when it comes to teaching and learning medical technology.

Students were able to demonstrate: (a) technical competence, (b) analytical and critical thinking, (c) the ability to engage in data collection and analysis, (d) interpersonal skills, (e) research skill relevant to medical technology, (f) the ability to participate in community-oriented activities, (g) life-long learning, and (h) effective teaching and communication skills. We can also conclude that despite having high competencies it has vital weak points such as limited resources such as the need for a stable internet connection, and the limited capacity to teach and develop technical laboratory skills and techniques which would be needed to effectively and accurately do laboratory testing procedures and interpretations. Even so, by having a total of 5.18 which translates to high competency, we can still consider both learning methods as effective.

Predictors of Learning Outcomes:

The most significant predictors determined from the demographic profile, learning styles, and learning experiences were analyzed and it was found that gender, year level, mode of delivery, and learning styles are not considered to be notably correlated with the findings from the program learning outcomes. Meanwhile, learning resources and coping mechanisms presented a positive medium correlation with learning outcomes, hence labeling the predictors as significant predictors of learning outcomes. Since the learning resources and coping mechanisms are both components of the learning experiences of the respondents, it could also denote

that learning experiences are positive predictors of learning outcomes.

B. Conclusions

- In terms of Institutional and Student Resources, it can be concluded that Medical Technology Students in Higher Education Institutions in Metro Manila have positive learning experiences in an elearning environment.
- Learning experiences of Medical Technology Students in Higher Education Institutions in Metro Manila is a positive predictor of achieving the intended learning outcomes of Medical Technology.
- There is little to no difference between online and blended learning in terms of intended learning outcomes making both suitable when it comes to teaching and learning Medical Technology.
- Learning Outcomes gave a positive feedback, high competency, from which we can conclude that both online and blended learning are effective modes of learning Medical Technology.
- The Learning Styles of Medical Technology Students in Higher Education Institutions have little to no correlation to the achievement of Learning Outcomes in both online and blended learning modes of instruction.

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