Original Research

Computer – Based learning strategies and Environment: Understanding Student's Perspectives and Experiences amidst Covid – 19 Pandemic

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ABSTRACT

Various academic institutions had rapidly shifted to a computer – based type of learning as a response to the emergence of COVID-19 pandemic. These changes had caused positive and negative effects on students' learning. Thus, the purpose of this study was to determine the effects of utilizing computer – based learning and its environment to the conceptual understanding of medical technology students from Emilio Aguinaldo College Manila during the first semester of the school year 2020- 2021. A mixed-method research design wherein two interventions were utilized in the study which includes the computer - based pedagogical environment scale (CBPES) and a semi structured interview. The CBPES measures the opinions and views of medical technology students towards the effects of computer - based learning to their conceptual understanding. A total of 129 students were randomly selected as the participants and it was administered through Google forms. For the quantitative approach, a semi – constructed interview was employed to twelve randomly selected students to determine participants' perspective and experiences in utilizing various online learning platforms and were delivered using Google Meet. The results showed that communication and effective teaching were the only factors that had an effect with the students conceptual understanding suggesting the importance of having an effective communication between students – teachers during an online type of learning. Furthermore, a significant relationship was identified between year level to the students conceptual understanding. Four themes have emerged with regards to the benefits and challenges in utilizing online learning platforms during this pandemic including the efficiency of implementing an online learning modality.

Keywords: COVID-19,   Technology,   Digital   learning,   Medical   Technology   students,   New   Normal

INTRODUCTION

The COVID-19 pandemic has caused an unprecedented global crisis, leading to a significant loss of life and posing massive threats to public health, food supply systems, and the functioning of the workplace. As the number of deaths from the virus increases, governments decided to close their borders,

forbade travel to other nations, and issued a nationwide lockdown wherein residents are instructed to remain at home, resulting in many public events and meetings being canceled. Moreover, millions of people have also lost their jobs and are at risk of falling into extreme poverty. However, economics and livelihood are not the only thing that has been affected due to this pandemic. (WHO, 2020). The educational sector is one of the critically affected sectors in our society due to the COVID - 19 pandemic, with schools and institutions shutting down as a precautionary measure since traditional settings for learning posed a high risk of possible transmission of the COVID - 19 virus among the students. Hence, various alternative learning approaches had emerged and were considered as the most preferable option to ensure the continuity of the educational system despite the pandemic. The growth and adaptation of education technology has reached billions and billions over the past few months (Li & Lalani, 2020).Since COVID - 19 is still evident in the Philippines, the temporary closing of educational institutions has led to the implementation of online learning to constitute the sudden changes and problems in education amid the pandemic (Tria, 2020).

With the continuous emergence of the COVID-19 pandemic, many academic institutions are rapidly shifting to online or distance learning. Various Computer - based learning approaches have emerged and played a crucial role in the continuous delivery of education. However, Computer—based learning was being practiced even before the outbreak of Covid 19, as it emerged in the first half of the 20th century (Simonson and Berg, 2016). Its primary goal is to allow flexibility for people to attend classes, especially those who have other responsibilities outside of school. It primarily discusses learning through the use

of electronics, the internet, audio, video conferencing, chat rooms, and as well as webcasts (Koller et al. 2006). In addition to that, it also encompasses related terms such as online learning or online classes, web-based learning, and computer-based learning that utilizes the use of the internet for further information. It is also considered to be a rapid evolution of the method of education. Computer - based learning has also been used to make the advancement of technology and way of communicating with the use of the internet that would further replace the traditional (classroom-setting) instruction. At this point, the transformation of traditional instruction to a newer generation of learning, TBL is now seen almost in every developing country that exercises different means of learning. Also, these developing countries are known to continue exercising and adapting to TBL (Gamse et al., 2014).

Furthermore, online learning can be subdivided into two types of programs; synchronous or asynchronous (Hrastinski, 2008). Synchronous programs require a real time interaction between the students and professors while asynchronous programs allow the student to access their course website whenever they have time. Depending on the style of lecture, either practical or theoretical, many platforms for e- learning are available and easy to use. Among the possible e-learning platforms utilized are G-Suite, Brightspace by D2L, Google Meeting, Google Classroom, Zoom, and other learning management systems. These different online learning platforms and learning management systems allow the students and professors to have a good and real time interaction despite the online settings, as well as it organizes eLearning content in one location which allows easier and unlimited access to different eLearning materials.

Moreover, having a good pedagogical environment can also be a good factor in helping the student gain a deeper grasp of a specific fundamental material (Persaud, C., 2021l.

Pedagogy, as described by Murphy (2008), is an "interaction between teachers, students, learning environment and the learning tasks." Hence, it is not simply just an interaction between these 3 cooperating factors, but it is also a reflection of the outcomes that these factors produced. Furthermore, Alexander (2008) had differentiated pedagogy with teaching, wherein teaching is more likely to be considered as an act while pedagogy is both an act and a discourse. Therefore, pedagogy is formed when an individual such as an instructor showcases an action to the learners and in order to further understand the meaning of this certain action, communication is very essential. Pedagogical Environment is an active area wherein students interact, explore, learn and apply their knowledge. An independent nature provided by an online learning approach favors a student - centered means of teaching, thus it enables production of more reflexive construction of knowledge which is based on the objectives and skills of the student (Bill Pelz, 2009). It was also stated in a study of O'Neil, Wainess and Baker (2005) that an effective online pedagogy emphasized a student—centered learning and integrated various active learning activities. Thus, interactivity among students and professors both in synchronous and asynchronous classes is clearly essential to produce clear and specific learning outcomes. Even though an online learning setting is not completely a new learning approach to certain higher educational institutions, it is still evident that a sudden implementation of this kind of setting due to the COVID - 19 pandemic affects students and

professors due to lack of preparation, resources, guidelines, etc. It must also be taken in consideration that adaptation of new and efficient learning platforms that will compensate for the needs and will provide an appropriate learning environment to the students and professors is still undergoing continuous development.

Although Computer - based learning or online learning is considered the best option to ensure continuity of the educational system even during the pandemic, it is inevitable that the sudden switch of learning modality can cause drastic effects to the learning outcomes and quality of education delivered especially that there are drawbacks when it comes to the policies implemented with regards to the integration of online learning to various institutions, technical support and training for both students and professors, insufficiency in the resources available and other identified external factors(Oyedotun, 2020).

One of the most affected are the allied health courses wherein skill - based learning is critically important in order to disseminate various practices that are essential for this profession which can be very limited during an online learning approach. Medical Technology or Medical Laboratory science education is one of the allied health courses affected and as stated in the CHED Memorandum order no. 14 (2006) can be considered as a foundation in the fundamentals of Medical laboratory science which involves the study of human tissues, bodily fluids, excretions, the biological production, and the design and manufacturing of equipment for medical laboratory testing, treatment and research. Moreover, this is also considered as a practical based profession and since online learning may limit these practices, improvement in the policies and training institutions

must be established in an online learning approach to produce appropriate learning outcomes. (Obeta et al, 2020b, Etukudoh et al, 2020). Herewith, this study aims to determine the effect of a technology—based learning approach and its pedagogical environment towards the conceptual understanding of students in different medical technology subjects. Additionally, this study also identified the challenges students experience and as well the benefits of utilizing various online learning platforms amid the COVID - 19 pandemic.

METHODOLOGY

Research Design

This study utilized a mixed method research design wherein a combination of qualitative and quantitative approaches is employed. This method draws potential strengths to both the approaches and permits researchers to explore a much more diverse viewpoint and determine or uncover relationships that might exist between the complex layers of the different questions in the research (Smith and Shorten, 2017). Additionally, collection of the following data for the following approaches were done simultaneously with gathered quantitative and qualitative data and analyzed using various techniques.

The quantitative approach encompasses the majority of the data which focuses on both the identified variables of the study: Computer – Based learning and Pedagogical environment and its effect on the conceptual understanding of the following Medical Technology students towards MT concepts during the first semester of the school year 2020-2021 ,wherein various web-based collaborative learning platforms such as Brightspace and video-conferencing apps including Zoom and Google meet integrated in the said semester.

The qualitative portion of the study involved the engagement of a semi-constructed interview to randomly select 12 selected 1st - 3rd year Medical Technology Students employed using the platform, Google Meet. The analysis of the following interview aims to provide an in-depth understanding of the experiences, challenges encountered, influence of identified collaborative learning platforms to the students' conceptual understanding and how students are utilizing these certain platforms both in a synchronous and asynchronous type of learning. Both the collection and analysis of the gathered quantitative and qualitative data provides a deeper, thorough and comprehensive characterization of the following variables of the study.

Setting

The study was conducted in the Emilio Aguinaldo College - Manila during the second semester of the school year 2020-2021 and encompasses the 1st and 3rd year students from the school of medical technology. Due to the occurring pandemic, the study was conducted with only limited resources and time frame. Specific platforms specifically as google forms and google meet were utilized in order to carry out the qualitative and quantitative phase of the study including the data collection procedure which was performed in the 2nd semesters of the school year 2020- 2021 in a period of three months only.

RESULT AND DISCUSSION

Population and Sampling

The target population of this study were 1st - 3rd year students from the School of Medical technology who were enrolled in the first semester of the school year 2020- 2021 from Emilio Aguinaldo College which is a private, non-sectarian, co-educational higher education institution in Manila. Both students who are classified as regular, who strictly follow the subject sequence of the prescribed curriculum of a specific course and irregular, who are unable to follow the prescribed subject sequence classified in the program curriculum are included in the study.

A random sampling procedure was utilized for the selection of participants for the quantitative portion of this study. Thus, every member of the population had an equal chance of being selected to be a participant in this study. Moreover, in order to avoid sampling errors or biases and to ensure reasonable accuracy of results, the researchers determined the sample size of the population by using the formula of Slovin (Sevilla, et.al,1992).

Table 1. Sample Distribution of Respondents

Year Level	Population	Sample size	Percentage
1st Year	62	35	27.1%
2nd Year	73	51	39.5%
3rd Year	55	43	33.3%
Total	190	129	

As shown in Table 1, the total sample size obtained using the Slovin's formula was 129 Medical Technology students. Thus, out of 190, 129 Medical

Technology students from 1st - 3rd year participated in the quantitative portion of this study wherein a survey questionnaire was employed to the following participants. The distribution of the obtained sample size for each year level is also shown in table 1. Majority of the participants for this study are from 2nd year level wherein 51 Medical technology students were randomly selected and account for 37.5 % of the total population. While 43 or 33% of the population that were randomly selected are from the third year and the remaining 35 of the randomly selected MT students are from the 1st year which accounts for 27.1% of the population.

For the dissemination of the qualitative portion of the study, a semi constructed interview was employed. Participants were obtained by randomly selecting Medical Technology students from each year level from the respondents of the survey questionnaire. Moreover, a convenient sampling was also employed in the selection of the participants since it was evident that communication is difficult to employ especially for students from the lower year level thus majority of the selected participants are medical technology students (MT) from the 3rd year level. Thus, a total of 12 MT students, which comprises 5 MT students from the 3rd year, 4 MT students from 2nd year and 3 Medical Technology (MT) students from 1st year.

Data Gathering Material

In evaluating the effects of the following identified variables: Computer - based learning and Pedagogical environment to the understanding of students to the various medical technology concepts, two interventions: a survey questionnaire which encompasses the quantitative portion and a

semi-structured interview for qualitative portion was applied in the study.

There are two instruments that were utilized for the data gathering in both the qualitative and quantitative parts of this study. The research instrument that was used for the quantitative data collection is a survey questionnaire entitled as Computer - Based Pedagogical environment scale (CBPES) for both the identified variables of this study, and is composed of four identified sections: Equity and fairness, Pedagogical Environment, Technological Enrichment, and Communication and Effective Teaching.

For the qualitative part of the study, a researcher-made semi - constructed interview question guide is utilized and aligned to the third question of the study's statement of the problem with regards how students utilized online learning to understand various MT concepts.

The CBPES or Computer - Based Pedagogical environment scale was a researcher-made research instrument and is based on the variables identified in this study. The semi-constructed interview questions were also researcher - made and conferred to the third and fourth question of the statement of the problem. Taking into consideration all the research objectives, all instruments utilized for both the qualitative and quantitative part of the study whether researcher- made or modified underwent a similar process of development.

The following questionnaire underwent content validation from a panel with expertise in Medical Technology, Molecular Biology and Biochemistry/education/public health. The first panel was a registered medical technologist, graduate of

Master in Public health and Health Profession Education and a professor at the Emilio Aguinaldo College - Manila. The second panel was also a registered Medical Technologists, a candidate for a Master of science in Medical Technology, and also a professor and Internship coordinator of the School of Medical Technology at Emilio Aguinaldo College. The last panel is a registered medical technologist, an educator with a master's degree in Microbiology and a doctorate degree holder in the field of Molecular Biology and Biotechnology. All the research instruments were submitted to them through E-mail for content validation.

After the content validation for accuracy, clarity and appropriateness of the following items included in the following questionnaire, necessary revisions were made based on indicated comments and recommendations made by the experts. In order to ensure that the following statements in the questionnaire are articulated clearly by the respondents, eliminate any unnecessary statements that are not reliable and relevant, and uncover any unclear terms and ambiguous phrases or words in the questionnaire, a pilot study was carried out to the CBPES or Computer - Based Pedagogical environment scale through google forms prior to the actual data collection process. The pilot study was performed exclusively to the following 1st - 3rd year medical technology students of Aguinaldo College - Manila. Emilio To disseminate the testing, the researchers asked beforehand permission to certain instructors to enter specific classes to give a brief introduction, instructions and present the informed consent to the respondents to ensure that they are aware of any risks, benefits and even assure them that all information that was collected in this study was treated

with utmost confidentiality. A total of 108 students have participated in the said pilot study.

The Cronbach's alpha of CEPES utilized in this study were processed, computed and obtained. According to (Bruin, 2006), Cronbach's alpha is not a statistical test but rather a coefficient of reliability or internal consistency wherein a single test is administered in order to determine the degree of relatedness of a factor or a set of items to all other given factors. An average value of reliability coefficients can be obtained from all possible combinations of items when split into half-tests. Additionally, a high value of it is frequently utilized to determine that a certain item measures a latent construct. (Hajjar, 2018). The integration of both qualitative and quantitative methods of data collection in the study had provided a deeper and comprehensive understanding of the effects of two identified variable: Computer – Based Learning and Pedagogical Environment on the conceptual understanding of Medical Technology students towards the various concepts of medical technology during this COVID-19 pandemic. All the sample items for the Computer – Based Pedagogical environment scale are included in the appendices. Moreover, all data gathered from the Computer - Based Pedagogical environment scale questionnaire were utilized primarily for quantitative data analysis.

The qualitative data analysis was primarily based on the semi constructed interview performed to selected medical technology students. Sample of the semi- constructed interview questions guide and transcripts from the interview are also included in the appendix E of this study. 2.5 Computer – Based Pedagogical Environment scale The computer - based Pedagogical Environment Scale is a researcher - made instrument that measures the opinions and views of medical technology students towards the effects of Computer - based learning and pedagogical environment to their conceptual understanding of the various concepts of the following Medical Technology subjects during the first semester of school year 2020 - 2021. The initial instrument was composed of 30 items and four dimensions were identified namely: Computer - based learning, Technological Enrichment, Equity and Fairness, and Pedagogical environment. The following items and dimensions were constructed based on the variables and settings of the study. Moreover, a 5 - point Likert scale was employed thus five response options were provided. The sample items for the CBPES scale are presented in the appendix E of the study.

The CBPES instrument was validated by three experts in the field of medical technology and Science education as already discussed in the previous section. After integrating the necessary comments and recommendations as noted by the experts, Pilot testing of the questionnaire was administered to 108 Medical Technology students from Emilio Aguinaldo College - Manila. Moreover, the CBPES instrument was employed using Google forms since resources were very limited and strict implementation of lockdown measures were still implemented due to the ongoing COVID-19. Moreover, the questionnaire was administered to the respondents during their synchronous class. A consent letter intended to conduct pilot testing during the student synchronous classes, which are specifically Research class for the third year, Community and Public Health for the second year, and Parasitology: Laboratory class for the first year was sent via an electronic mail to particular class instructors and was duly granted permission to conduct the particular intervention. The Cronbach's alpha of

CBPES utilized in this study were processed, computed and obtained. The value computed for the identified initial instrument comprising 30 items was 0.8974. In the study of Taber (2016), a wide range of descriptors were utilized and presented to interpret the alpha values. It was indicated that alpha values of 0.84 -- 0.90 were described as Exploratory Factor Analysis reliable. And since the computed value of the identified questionnaire of this study was within this range, the said instrument is thus deemed reliable. The CBPES questionnaire had also been subjected to Kaiser-Meyer Olkin (KMO) Test which is considered as a measurement of how suitable a particular set of data is for Exploratory factor analysis and sampling adequacy. The computed value for this instrument is equal to .813. Based on Pallant (2013), KMO values between 0.8 to 1.0 indicate that the sampling or data is deemed sufficient or adequate. Since the computed value is within the said range, the sampling data for this instrument is deemed sufficiently acceptable. Bartlett's test of sphericity tests was also employed in the said questionnaire and identified as a test that examines whether redundancy between variables is present that can be summarized into a few factors. The computed value for the CBPES is .000 and as indicated in Pallant (2013) and Field (2000), the Bartlett's test for sphericity was significant at values <0.05 and an indication that the data is multivariate and deemed suitable, and acceptable for further analysis. Both following tests were examined prior to analysis and interpretation of the factor loadings. Appendix G shows the values obtained from the Kaiser - Mayer - Olkin (KMO) test and Bartlett's Test for sphericity for the Computer - based learning Pedagogical Environment Scale. (EFA) is a statistical procedure utilized to determine correlation among a group of observed variables and reduce it into a small number of related factors/components (Hadi, Abdullah & Sentosa, 2016). The final instrument was reduced to 18 items after performing EFA or Exploratory Factor Analysis yielding dimensions/components. four The first dimension was related to equity and fairness and mainly refers to the extent in which students are being treated equally by the professors. It is composed of 5 items in total. The second dimension focuses on the pedagogical environment and is composed of 6 items. The third dimension involves technological enrichment which refers to the extent in which impact of technology to teaching and learning are recognized. It is composed of 4 items in total. Lastly, the fourth dimension focuses on communication and effective teaching which covers Student - Instructor interaction and is composed of only 3 items. 2.5 Semi – Constructed Interview Guide After the survey questionnaire was employed, a semi-constructed interview was conducted for randomly selected medical technology students. A Semi - constructed Interview Guide question was utilized during the intervention which is composed primarily of four questions in correlation to the 2 identified research objectives presented in the statement of the 2.6 Data Collection problem. The aim of this interview is to determine participants' perspective, opinions and experiences in utilizing various online learning platform in order to determine the benefits of utilizing various learning platforms with regards to students conceptual understanding and the challenges experiences that may pose an impact how students perceived medical technology concepts during this COVID - 19 pandemic. Additionally, information obtained from this interview claims/results questionnaire. can support the of the survey A total of 12 respondents from different year levels were selected using the method of random sampling and convenience sampling and were interviewed through utilization of a video conferencing

app, Google Meet. Prior to the actual interview, participants are first identified, and a consent form is delivered to them individually through Electronic Mail. A total of 12 consent forms were delivered back to the researchers with the interviewees' name and signatures, which signify that they have understood the content of the form and willingly participated in the said interventions. Then, each participant was asked specifically with regards to the day and time they were available to proceed with the said interview. All the interview sessions were delivered using Google Meet and were recorded with the given permission from participants the following To analyze and evaluate the effects of technology - enabled learning and pedagogical environment on the conceptual understanding of medical technology students from Emilio Aguinaldo College-Manila, interventions two were employed in correlation to both the qualitative and quantitative portion of the study. After the conduction of pilot testing, the final survey questionnaires were disseminated to the following 1st - 3rd year Medical Technology students. For the qualitative portion of the study, a semi - constructed interview was performed to randomly selected Medical Technology students from each year level. The aim of this intervention is to determine the benefits of utilizing various learning platforms with regards to students' conceptual understanding and the various challenges they have experienced during their utilization of the platforms. Moreover, the following interview sessions were employed after the dissemination of the survey questionnaire since the participants for the interview will be selected from the population obtained intervention. Due to the current COVID - 19 pandemic, the whole data collection process in both quantitative and qualitative parts of the study was performed through utilization of various online platforms. The

survey questionnaire was employed with the use of Google forms and the following semi - structured interviews were performed through a video conferencing app, specifically Google Meet. Communication with the following participants and instructors are also done through electronic mail or through utilization of social media online platforms such as Messenger. 2.7 Data Analysis In order to analyse the following data obtained from the two interventions conducted in the study, the researchers utilized primarily inferential statistics. Inferential statistics is commonly employed to compare two or more samples to determine their differences and establish their possible correlation. This method is also utilized specifically to test hypotheses (Botti and Endacott, 2008). Primarily, a chi - square test and one - way ANOVA will be utilized in order to determine if there would be a significant difference between the conceptual understanding of Medical Technology students to their year level and gender, and as well to the factors identified in the CBPES questionnaire. The chi square statistic compares survey respondents' actual responses to questions with expected answers to assess the statistical significance of a given hypothesis. (Kothari, 2007). Furthermore, a thematic analysis is employed in order to evaluate the following data obtained from the following semi-constructed interviews. Thematic analysis is considered as the most widely utilized qualitative method to analyze data obtained from interviews. Additionally, this method is used for the determination and analysis of possible patterns within the data. (Braun and Clarke,2006). Moreover, researchers followed the following six steps to properly perform the thematic analysis: familiarizing with the data, assigning preliminary codes to the data in order to describe the content, searching for categories and themes in the codes across multiple interviews,

reviewing the themes, defining and naming the themes, and producing appropriate write-ups.

RESULTS AND DISCUSSION

The data gathered from the two interventions utilized in the study, primarily the CBPES Survey questionnaire and a semi-constructed interview were analyzed using inferential statistics (Chi – square test) and thematic analysis accordingly. The data gathered were sought to perceive the effects of Computer - based learning and pedagogical environment towards the understanding of students on different concepts of medical technology subjects by answering the given statements of the problem.

Quantitative Approach

Through the integration of a chi – square test from the quantitative data gathered using the survey questionnaire, it was revealed that only communication and effective teaching out of the four dimensions identified have a significant relationship, garnering a computed p-value of 0.0059 with students conceptual understanding based on a computer – based learning and its pedagogical environment. Table 4.3 presented the computed p-values and verbal interpretation for each of the following factors. This result suggests the importance of having a good and effective communication between students and professors to improve learning experience and outcome, as well produce a positive learning setup especially for allied health courses while utilizing computer – based learning.

Table 2. Factors that affect the conceptual understanding among Medical Technology students based on Computer-based learning and Pedagogical Environment.

	X^2 computed	X^2 tabular	p-value	df	Interpretation
Equity and Fairness	13.4579	15.5073	0.0970	8	Accept Ho
Pedagogical Environment	5.4719	15.5073	0.7062	8	Accept Ho
Technological Enrichment	12.3245	15.5073	0.1373	8	Accept Ho
Communication and Effective Learning	21.4965	15.5073	0.0059	8	Reject Ho

Furthermore, it was also identified that students' year level has a significant relationship,

garnering a computed value: 0.06166 for the 1st year, 0.047 for the 2nd year and 0.0019 for the 3rd year with their conceptual understanding on medical technology

subjects. This shows that an increasing course difficulty for each proceeding year level and variations in the load of subjects was evident. Moreover, these results also suggest that being unskilled and lack of experience in utilizing the features of online learning platforms such as Brightspace can cause difficulty in adapting to this learning environment thus may negatively affect the students' learning outcomes or performance. (McCool et al., 2015). It was also determined that gender does not show a significant association on students' understanding of the concepts in medical technology. This suggests that there are variations or inconsistencies in learning engagements, learning styles and motivation between male and females. Table 3 presents the computed values using chi-square test in the corresponding year level and gender of the following medical Technology.

Table 3. Relationship between socio-demographic profile and student's understanding of the concepts in medical technology

	Categories	X² computed	X² tabular	p-value	df	Interpretation
Year Level	1st Year	44.1589	15.5073	0.0166	8	Reject Ho
	2nd Year	44.1589	15.5073	0.0047	8	Reject Ho
	3rd Year	44.1589	15.5073	0.0019	8	Reject Ho
Gender	Female	5.9481	5.9481	0.2031	4	Reject Ho
	Male	5.9481	5.9481	0.3570	4	Reject Ho

Qualitative approach

The narratives gathered from the semi – constructed interview have been processed and analyzed using thematic analysis. With that, a total of 4 themes had emerged that correlate to a specific objective of the study.

Two themes had emerged which shows the advantages of utilizing an online learning modality during this covid-19 pandemic. These are Computer – based learning pluses and positive outcomes using online platforms and Significant attributes of various Learning Management Systems. Brightspace is one of the learning management systems that was utilized in a private institution, Emilio Aguinaldo College during this COVID – 19 pandemic. Participants actively stated that this learning modality is an efficient approach in continuing education and providing readily available learning materials to acquire the needed concepts and theories especially for allied health courses despite the ongoing pandemic. Additionally, the different features of Brightspace had helped the participants to efficiently utilize online learning through readily available assessments, organized learning materials, accessible recorded discussion and resources. Most assessments are also timed to help students to monitor the time spent in answering the questions from various examinations

and it was also stated that when students encounter a sudden internet issue, their responses are immediately saved in the assessment.

Only one theme had emerged which demonstrated the challenges that students encountered in utilizing a computer – based learning, mainly Barriers to online learning during the COVID – 19 pandemic. Problems in using Internet connection is one of the main problems participants had encountered since most assessments and learning materials in this modality would not be available without it. Being computer illiterate is also one of the challenges students and even professors encounter that can hinder for them to effectively utilize all the features of a specific online learning management system. Moreover, participants had pointed out that most skill – based learnings which are essential to any allied health courses such as Medical Technology are difficult to understand and comprehend in a virtual setting.

Due to the different challenges and setbacks that students encountered during an online learning setup, different learning strategies had emerged and been utilized that aid students to adapt and grasp different concepts effectively and efficiently. These include Pomodoro techniques, flash cards, advanced studying, summarization strategies and utilization of other online platforms.

CONCLUSIONS

Through the gathered and discussed data found in this paper, researchers were able to perceive the effects of Computer - based learning and pedagogical environment towards the understanding of different concepts of medical technology subjects

integrated in the first semester of school year 2020-2021. As a result, the researchers have come to the following conclusion:

The statistical results from the CBPES questionnaire revealed that only communication and effective teaching, out of the four dimensions, have a significant relationship with conceptual understanding based on Computer – based learning and pedagogical environment. This result suggests the importance of having a good and effective communication between students and professors to improve learning experience and outcome, as well produce a positive learning setup especially for allied health courses while utilizing computer – based learning. Furthermore, it was also identified that students' year level has a significant relationship year with their conceptual understanding on medical technology subjects. This shows that an increasing course difficulty for each proceeding year level and variations in the load of subjects was evident. Moreover, this results also suggest that being unskilled and lack of experience in utilizing the features of online learning platforms such as Brightspace can cause difficulty in adapting to this learning environment thus may negatively affect the students' learning outcomes or performance It was also determined that gender do not shows a significant association on students understanding of the concepts in medical technology.

The narratives gathered from the semi – constructed interview have been processed and analyze using thematic analysis. With that, a total of 4 themes had emerged that correlate to a specific objective of the study. The themes Computer – based learning pluses and positive outcomes using online platforms and significant attributes of various learning

management systems were able to discover several advantages upon utilizing the learning management system. Participants agrees that despite the unexpected and unplanned introduction of online learning, they still agreed that it is an efficient approach in continuing education and providing readily accessible courses. Additionally, the features of the learning platform had also helped the respondents to efficiently utilize online learning through its readily available assessments, the organized learning materials, the accessible recorded discussions and resources. Barriers to online learning during the COVID – 19 pandemic of various learning management systems demonstrate the challenges that students encountered in utilizing a computer – based learning. Problems in using Internet connection and being computer illiterate is one of the main problems participants had encountered while utilizing a learning management system. Moreover, participants had pointed out that most skill – based learnings which are essential to any allied health courses such as Medical Technology are difficult to understand and comprehend in a virtual setting.

Due to the different challenges and setbacks that students encountered during an online learning setup, different learning strategies had emerged and been utilized that aid students to adapt and grasp different concepts effectively and efficiently. These include Pomodoro techniques, flash cards, advanced studying, summarization strategies and utilization of other online platforms.

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