Challenges in Teaching and Learning in an Online set-up: Exploring the abilities and constraints of the 21st-century Learners

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***Abstract*-** Learners need skills such as critical thinking, decision making, innovation, the ability to communicate new knowledge, and the ability to solve complex problems. This study explores the learners' abilities and constraints to describe completely the learner's challenges to the online learning environment. The study utilized a sequential explanatory mixed-methods approach utilizing survey and focus group discussion to address the research question. The population included 59 students enrolled in nursing education in the selected school. Respondents were determined utilizing the set inclusion and exclusion criteria. The study utilized a self-report questionnaire and a focused group discussion (FGD) guide questionnaire. Using a self-report survey tell more than what the participants know or do, and this delimit the findings. This challenge was addressed by explaining to them in detail each of the indicators and the use of methodological triangulation through the qualitative part using FGD. Results shows that the abilities of learners are to a great extent while the constraints of learners are to some extent. Eight themes were generated in the study: Difficult online learning, confusing learning materials, not same as face to face, organizing things, connected to others online, accessible to all, lagging in connection and limited time. The 21st century learners have abilities in online learning however, the use of the internet and the connection online does not guarantee that learners can cope up with the online learning set up. Learners prefer still the traditional way of learning, and that is face to face classes. Continuous improvement of the online learning set-up is recommended so learners can adopt to the challenges.

***Index Terms* –** online learning, teaching, learning process, 21st century learning challenges, learning materials

I. Introduction

The fourth industrial revolution calls for a new model of learning for twenty-first-century learners. The nature of the problems that learners must solve in science courses must be transformed to tackle complex global challenges. Learners need skills such as critical thinking, decision making, innovation, the ability to communicate new knowledge, and the ability to solve complex problems.

The 21st-century learners must not only have acquired knowledge but rather must apply the information and solve complex tasks. This must be the focus of the higher educational institutions to create a learning environment that promotes students interaction that will facilitate the creation of effective lifelong learners.

Recently, COVID 19 has greatly affected our education. All educational institutions have transformed into online learning. With this development, the learners are the most affected and there have been many reports on the learner's challenges. The restrictions in movements and protocol could further aggravate the challenges experienced by the learners. The following studies have investigated this area with a focus on students' mental health (Copeland et al., 2021; Fawaz et al., 2021), home learning (Suryaman et al., 2020), self-regulation (Carter et al., 2020), virtual learning environment (Almaiah et al., 2020; Hew et al., 2020; Tang et al., 2020), and students' overall learning experience (e.g., Adarkwah, 2021; Day et al., 2021; Khalil et al., 2020; Singh et al., 2020, Caballes, & Delos Reyes, 2022), Development of multimedia and technology based instructions(Caballes, & Delos Reyes, 2020, Caballes & Montalbo, 2019, Caballes & Montellano, 2019, Caballes, & Tiria, 2020).

This study explores the learners' abilities and constraints to describe completely the learner's challenges to the online learning environment. These previous studies are concerned with different aspects of the online learning environment, thus this study is of unique to consider. Addressing this area is vital to describe the learner's challenges especially in this time of the pandemic.

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Research Objectives
To determine the challenges of the 21st-century learners of science education in an online set-up.

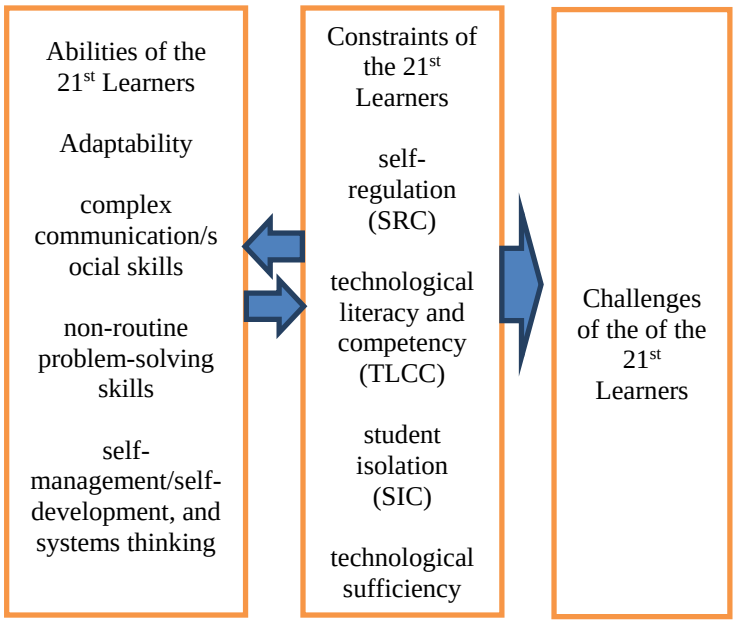
Specific objectives
1.To describe the profile of the learners enrolled in science education according to:
1.1 age,
1.2 gender,
1.3 year level
1.4 online learning mode and platforms
1.5 length of engagement in online classes

2.To identify the abilities of the learners according to the five domains:
2.1 Adaptability
2.2 complex communication/social skills
2.3 non-routine problem-solving skills
2.4 self-management/self-development, and
2.5 systems thinking

3.To recount the constraints of the learners in an online set up according to:
3.1 self-regulation (SRC)
3.2 technological literacy and competency (TLCC)
3.3 student isolation (SIC)
3.4 technological sufficiency (TSC), and
3.5 technological complexity (TCC)

4. To determine themes in the students' responses on their constraints and abilities

Conceptual Framework



Rasheed et al.'s (2020) study of students' experience in an online learning environment will be the framework of this study. These challenges are grouped into five that included self-regulation (SRC), technological literacy and competency (TLCC), student isolation (SIC), technological sufficiency (TSC), and technological complexity (TCC) challenges (Rasheed et al., 2020). SRC is a group of students' behaviors that controls their emotions and thoughts to achieve learning objectives. On the other hand, TLCC is concerned about the ability of students to effectively use technology for learning purposes. The emotional discomfort that the students experience which resulted from separation from their peers is explained in SIC. Accessing available resources in online learning technologies is described as TSC. Further, TCC is the student's experience when they are exposed to complex and over-sufficient technologies (Rasheed, 2020).

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While the learner's abilities were based on the cognitive skills domain according to the study of Doyle (2016) which enumerated the abilities of the learners in 5 cognitive domains namely adaptability, complex communication/social skills, non-routine problem-solving skills, self-management/self-development, and systems thinking. The study will describe the learner's abilities and constraints and will determine the relationship between these two variables to describe the challenges of 21st-century learners. The researchers hypothesized that the two variables (abilities and constraints) are related have an effect on each other.

The identification of the learners' abilities is important for the learners to address their constraints and challenges in online learning education. The results of the study will also be beneficial to educators teaching in science education because they can identify the learners' abilities and constraints and address this by improving the online learning environment. Further, administrators of science education can use the results of the study to plan for the improvement of teaching and learning strategies for 21st-century learners.

II. RESEARCH ELABORATIONS

Education and the COVID 19 pandemic

The World Health Organization (WHO) classified the rapidly growing coronavirus outbreak as a pandemic in March 2020. Since then, the number of those infected around the world has risen at an alarming rate. As of this writing, there are roughly 181.5 million confirmed cases of CoViD-19 worldwide, with 3.93 million deaths reported to WHO (2021). Certainly, the CoViD-19 pandemic has dramatically altered the lives of everyone. Strict enforcement of social distancing, mask-wearing, travel bans, and skeletal work schedules are just a few of the national governments' responses to mitigating the virus's spread (Ferrel, 2020, as cited by Agarwal1 & Kaushik, 2020).

The Educational Sector, like many other aspects of our daily lives, is severely impacted by the CoViD-19. Most of its ramifications specifically impacted students, educators, and educational organizations all around the world. According to Toquero (2020), who was cited by Adnan and Anwar (2020), the pandemic forced several schools, colleges, and even universities around the world to close for students, faculty members, and staff to effectively follow social distancing measures. Many universities have switched from a traditional classroom setup to a fully digitalized mode of pedagogy, recognizing the critical need of this current situation (Dhawan, 2020).

According to McBrien et al. (2009), as cited in Dhawan's (2020) study, the vast advancement of various technologies has made distance learning easy. Dhawan (2020) defined online learning as any tool that can make the teaching-learning process more flexible and innovative. It is widely recognized as a learning experience in both synchronous and asynchronous environments using various devices with internet access (e.g., smartphones, laptops, televisions, etc.). According to a World Bank report (2020), learning platforms such as Moodle and Learning Management System (LMS), as well as Microsoft and Google Applications, are the most popular in countries such as Austria. Furthermore, the national Ministry of Education has made additional efforts to improve the effectiveness of online learning in a variety of settings. At the same time, the Ministry of Education (MoE) in Bhutan launched the "Bhutan e-Learning Program," which allows different schools in the country to access lessons via various technologies. Various telecommunications companies in the country, including Bhutan TelCom (BT) and TashiCell, are collaborating with the government to provide additional data to students. Teachers frequently use applications such as Google Classroom, WeChat, and WhatsApp to assign various tasks to their students, such as specific chapters to read and a set of questions to answer (The World Bank, 2020).

In addition, teachers in China are required to receive guidance on teaching methods using online tutorials viewed via live streams. On top of that, approximately 22 validated course platforms were mobilized to provide free online courses to primary and secondary schools, as well as more than 24, 000 online courses made available to university students nationwide (UNESCO, 2020).

The transition on the modality of learning was also implemented in the Philippines, where the first CoViD-19 death outside of China was recorded. Each learning sector in the country proposed a plethora of innovative programs. According to a statement released by the Department of Education (2020), not only was the start of the school year delayed but certain policies and practices were also modified to fully adapt to the very "new normal." The department emphasized that different modalities are used, so teachers and students are not required to go to school and learn traditionally. Primarily among higher education institutions, virtual classrooms are part of the "new normal". The enhancement of online platforms such as Google Classroom, Messenger, Zoom, Edmodo, Facebook, and Youtube are strongly suggested by the Commission on Higher Education (CHED, 2020 as cited by Tria, 2020). In either case, both will make changes to each academic calendar and deploy multiple learning delivery methods such as face-to-face blended learning, distance learning, homeschooling, and other modes of delivery (CHED, 2020; DepEd, 2020).

Abilities of the 21st Century Learners

The abilities of the 21st-century learners in this study are focused only on cognitive abilities. However, the different studies and literacy abilities of students are not only focused on cognitive but also interpersonal and intrapersonal competencies.

The basic skills that 21st-century learners must include are math and literacy according to Doyle (2016). Doyle further discussed that the school must teach the learners the skills to use this knowledge as active citizens. The following skills according to Doyle are necessary to build and develop communicate effectively and listen actively and use evidence to check for information, the use of one

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language, critical thinking ability to analyze things around them, enable to overcome challenges, and discover opportunities, reason logically, and interpret clearly and become and remain digitally literate. Anderman (2020) explained the abilities of the students in terms of adaptability, complex communication/social skills, non-routine problem-solving skills, self-management/self-development, and systems thinking. Further, he explains that students should be involved in critical thinking skills to deliver their points of view. Adaptability requires the student's willingness to engage in the thinking process. In the 21st century, most of the students work in teams together and contribute knowledge. Communication skills are vital in the field of science, and this is evident in research results.

Challenges of the learners in the online set-up

The start of the new normal brought changes in the education sector and this greatly affect the educators and as well as learners. Studies on the challenges of learners in online learning are explained in different published journals. Learners reported concerns about learning and evaluation methods, overwhelming task loads, technical difficulties, and confinement (Fawaz et al. 2021).

Learners were dissatisfied with online learning in general, especially in the aspect of communication and question-and-answer modes according to Tang et al (2020). This study was conducted among engineering students. Transformation of conventional flipped classrooms into fully online flipped classes using a cloud-based video conferencing app was done in this study of Hew et al (2020). The study findings revealed that the two types of environments were equally effective. In contrast to the two studies a study by Suryaman et al, (2020) studied how learning occurred at home during the pandemic. The findings revealed that students faced many obstacles in a home learning environment, such as lack of mastery of technology, high Internet cost, and limited interaction/ socialization between and among students. (Caballes & Chua, 2020) discussed the challenges of students during the Enhanced community quarantine, with those challenges teaching-learning process must continue. Multimedia is an important factor in an online learning set-up (Caballes & Del Mundo ,2022). Teachers' digital skills is an important factor the teaching learning process (Caballes & Dapitan, 2019, Caballes & Doblada, 2021 Caballes & Abenes, 2020, Caballes et al.2020). Teachers should be aware on his digital skills to manipulate multimedia set-ups that are highly utilized in an online learning environment

The study of Adarkwah (2021) and Day et al. (2021), reveals that the pandemic brought up many inequities in the educational systems. Families from the lower socioeconomic groups have limited learning space at home, access to quality Internet service, and online learning resource. However, the students experienced the least challenge on technological literacy and competency. This is not surprising since the students comprise of GenZ generation (born in 1996) high technological and digital literacy (Barrot, 2018; Ng, 2012; Roblek et al., 2019).

III. METHODOLOGY

The present study utilized a sequential explanatory mixed-methods approach utilizing survey and focus group discussion to address the research questions. This approach will allow the researcher to collect complex data about learners' abilities and constraints in an online setting learning environment.

Study population and sampling technique

The population included all students enrolled in nursing education in the selected schools. Respondents were determined utilizing the set inclusion and exclusion criteria

Inclusion criteria:

1. Students must be a regular student
2. Must be enrolled in nursing course
3. Consented to participate in the study

Exclusion criteria:

1. Irregular students
2. Enrolled in other courses
3. Refused to participate in the study

The total sample included 59 students from the School of Nursing. The total respondents do not represent most of the students in CEU but only representative of the population. Because of the of the limitation of time, the pandemic, and the online set up the researchers had difficulty obtaining majority of the responses from the students online. Respondents who refused to participate in the study or withdraw their participation in the study was excluded from the total respondents of the study.

Ethical Considerations

The research proposal was submitted and approved in the chosen school for the conduct of research for human subjects. Participation in the study was voluntary and the respondents did not receive any financial benefit. The participants have the right to refuse participation or withdraw anytime during the conduct of the study without fear of retribution in terms of money or their employment. For the protection of participants' data privacy, all data was stored in the cloud (Gmail accounts) and accessed only by the researchers involved in the study. The principle of confidentiality and anonymity were safeguarded during the conduct of the study. Students' information was

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coded to ensure the anonymity of data. Further, the researcher ensured that none of the participants' names or personal details was included in the report of the study findings.

Site of the study

The study was conducted in the School of Nursing, Centro Escolar University, Manila campus. The school was chosen as the setting of the study because it caters to learners enrolled in nursing education. Nursing is one of the science educations and this is chosen because the researcher is a nurse and reports of this study was according to her specialization. The accessibility of the setting and the respondents were also considered. The school is also where the researcher is enrolled as a graduate student.

Research Instruments

The study utilized a self-report questionnaire and a focused group discussion (FGD) guide questionnaire. Using a self-report survey tell more than what the participants know or do, and this delimit the findings. This challenge was addressed by explaining to them in detail each of the indicators and the use of methodological triangulation through the qualitative part using FGD.

The questionnaire was divided into three parts: (1) participant's demographic profile section, (2) rating scales for the learner's abilities; and (3) rating scales for the online learner's constraints, The demographic profile section asked about the learner's profile (age, gender, course, year in science education), as well as the online learning mode and platforms used in class, and students' length of engagement in online classes.

The instrument to describe the learner's abilities is a self-made questionnaire that was based on related literature and studies. This included items that relate to the five domains of learners' cognitive abilities: Adaptability, complex communication/social skills, non-routine problem-solving skills, self-management/self-development, and systems thinking. The Likert scale uses six scores (i.e., 5–to a very great extent, 4–to a great extent, 3–to a moderate extent, 2–to some extent, 1–to a small extent, and 0–not at all/negligible).

The instrument to describe the learner's challenges was adopted from the study of Barrot and colleagues in 2021. The rating scale section contained 37 items that relate to SRC (6 items), TLCC (10 items), SIC (4 items), TSC (6 items), TCC (3 items), LRC (4 items), and LEC (4 items). The Likert scale uses six scores (i.e., 5–to a very great extent, 4–to a great extent, 3–to a moderate extent, 2–to some extent, 1–to a small extent, and 0–not at all/negligible) assigned to each of the 37 items.

An open-ended questionnaire was utilized in the conduct of FGD. This contained questions on the abilities and challenges of learners in the online set-up.

Validation of Instrument

The instrument was reviewed by two experienced educators for clarity, accuracy, and content, and face validity. The instruments undergone reliability tests to determine internal consistency using Cronbach Alpha statistics.

Data Collection Process

The data collection process was conducted online via Google survey and zoom. The Google survey was utilized for the questionnaire while Zoom was used in the conduct of FGD. Students was allowed to ask for questions and additional explanations related to the questionnaire contents. Online surveys and interviews were used because of the pandemic and heightened restrictions. For triangulation, an FGD was conducted. Ten randomly selected students were invited to participate in the FGD. The FGD was done by the researcher and assisted by an expert researcher. This is done because the researcher is not very well verse in the Filipino language which the participants used during the FGD. The researcher ensured that the participants was comfortable and open to talk freely during the FGD. These was done by informing the participants that there are no wrong responses and that their identity and responses would be handled with the utmost confidentiality. The FGD was recorded with the permission of the participants to ensure that all relevant information was accurately captured for transcription and analysis.

Data Analysis

To analyze the research variables, the study used both quantitative and qualitative analyses. Mean scores (M) and standard deviations (SD) to determine the abilities and level of challenges experienced by students during online learning were used as quantitative analysis, The mean score for each descriptor was interpreted using the following scales: 4.18 to 5.00 (to a very great extent), 3.34 to 4.17 (to a great extent), 2.51 to 3.33 (to a moderate extent), 1.68 to 2.50 (to some extent), 0.84 to 1.67 (to a small extent), and 0 to 0.83 (not at all/negligible).

For the qualitative data, the student's responses in the open-ended questions and the transcribed FGD was analyzed. Specifically, they used multilevel coding in classifying the codes from the transcripts (Birks & Mills, 2011). The relevant codes from the responses of the participants were categorized into codes based on the similarities or relatedness of their properties and dimensions. Comparison and continuous analysis were done to allow subcategories to emerge.

To ensure the reliability of the analysis, two coders independently analyze the qualitative data. The researchers sought the help of an expert researcher to act as the second coder. Both coders must be knowledgeable on the research questions, research method, and codes and coding scheme of the study. Both coders assessed and discussed how they both analyze the qualitative data. A satisfactory agreement between two coders is necessary to prevent bias. The participants' responses were coded in three layers that includes: structural coding,

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pattern coding and triangulation. Structural coding is the first round of coding is the first coding where the data are coded according to the research questions. While the pattern coding is a way of grouping summaries into a small number of themes. Lastly, triangulation is the cross examination of results. Themes are presented in three general themes according to the research focus of challenges, abilities and constraints of the 21st century learners.

VI. RESULT & DISCSUSSIONS

The study utilized a mixed method technique to effectively capture the challenges of the 21st century learners in an online set-up. Further, constraints and abilities were assessed through survey and FGD.

Quantitative results

Profile of the Respondents

Table 1: Profile of the Respondents (N=59)

Profile	Frequency	Percentage
Age		
18-20 years old	21	35.59
21-25 years old	38	64.40
Gender		
Male	11	18.64
Female	48	81.35
Year Level		
Level 1-	24	40.67
Level 2-	12	20.33
Level 3-	12	20.33
Level 4-	11	18.64
Secondary online learning		
Gmeet	30	50.84
Gmeet and FB messenger	16	27.11
Gmeet, FB messenger and zoom	13	22.03
Length of engagement in class		
>5 months		
6 mos- 1yr	8	13.55
1-2 yrs	4	6.77
	47	79.66

The profile of the respondents is presented in Table 1. Majority of the respondents are 21-25 years old (N=38, P=64.40%), female (N=48, P=81.35%), level 1students (N= 24, P=40.67%), Used Google meet as secondary online learning (N=30, P=50.84%) and have 1-2 years (N=47, P=79.66%) length of engagement in class.

Abilities of learners

Table 2 Abilities of Learners

Criteria	Mean	SD	Verbal Interpretation
Adaptability			
1. When an obstacle arises, I was be able to overcome it smoothly and this could require changing my entire plan for the day on-the-spot.	3.14	1.07	To a moderate extent
2. I can keep up with and understand the new innovations which could be beneficial to me in the online set-up	3.49	0.83	To a moderate extent
3. I can adapt easily to technological change brought about by the online set-up	3.59	0.87	To a great extent
4. I can easily collaborate and communicate with another s(interpersonal) in an online set up	3.27	1.00	To a moderate extent
5. I can respond to different work situations and make decisions and adjustment of my roles to the new online set-up	3.54	0.82	To a great extent

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Average Mean	**3.39**	**0.91**	**To a great extent**
Complex communication/social skills 1. I can articulate thoughts effectively using all forms of communication in a variety of contexts	3.51	0.82	To a great extent
2. I can listen to others to understand meaning, attitude, and intention	4.08	0.84	To a great extent
3. I can communicate for a variety of purposes and audiences	3.54	0.92	To a great extent
4. I can use media and technology to communicate with impact	3.80	0.91	To a great extent
Average Mean	**3.73**	**0.87**	**To a great extent**
Non-routine problem-solving skills 1. I can collect data, understanding and interpreting the meaning of the information	3.80	0.78	To a great extent
2. I can do conceptualization, logical reasoning, applying strategy, analytical thinking, decision making and synthesizing to solve any problem.	3.66	0.82	To a great extent
Average Mean	**3.73**	**0.8**	To a great extent
Self-management/self-development 1. I can adjust easily to the online set-up and my education life	3.25	0.86	To a moderate extent
2. I have effective and efficient learning strategies to access and use knowledge that I gain	3.41	0.77	To a great extent
3. I can motivate myself, and can monitor and change my behaviors when learning does not occur	3.34	1.11	To a great extent
Average Mean	**3.33**	**0.91**	**To a moderate extent**
Systems thinking 1. I can easily solve problems and come up with multiple solutions	3.24	0.80	To a moderate extent
2. I can respond to open-ended questions and formulate solutions to problems	3.46	0.79	To a great extent
3. I can choose and engage in solving authentic problems in a variety of learning activities	3.36	0.78	To a great extent
Average Mean	**3.35**	**0.79**	**To a great extent**

Table 2 presents the abilities of the 21st century learners. Based on the table the learner abilities are divided according to adaptability, complex communication/ social skills, problem solving skills, self-management development and systems thinking.

The adaptability of learners is described as to a great extent with a mean of 3.39 and SD of 0.91. The highest among these criteria is criterion #3 “I can adapt easily to technological change brought about by the online set-up” with a mean of 3.59 and SD of 0.87 which is verbally interpreted as to a great extent. While the lowest among these criteria is criterion # 1 “When an obstacle arises, I was be able to overcome it smoothly and this could require changing my entire plan for the day on-the-spot.” With the mean of 3.14 and SD of 1.07 and verbally interpreted as to a moderate extent.

In terms of complex communication/ social skills, the learners described it as to a great extent with a mean of 3.73 and SD of 0.87. The highest among these criteria is criterion # 2 “I can listen to others to understand meaning, attitude, and intention with a mean of 4.08 and SD of 0.84. The lowest among the criteria is criterion # 1 “I can articulate thoughts effectively using all forms of communication in a variety of contexts” with a mean of 3.51 and SD of 0.82 which is verbally interpreted as to a great extent.

The third abilities of learners is the ability to do non routine problem solving skills. The average mean is 3.73 with the SD of 0.80 and verbally interpreted as to a great extent. The highest among these criteria is criterion # 1 “I can collect data, understanding and interpreting the meaning of the information” with a mean of 3.80 and SD of 0.78 and verbally interpreted as to a great extent.

Self-management or self-development abilities of learners are described as to a moderate extent with a mean of 3.33 and SD of 0.91. The highest among these criteria is “I have effective and efficient learning strategies to access and use knowledge that I gain with a

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mean 3.41 and SD of 0.77 and verbally interpreted as to a great extent. While the lowest is criterion # 1 I can adjust easily to the online set-up and my education life with a mean of 3.25 and SD of 0.86 verbally interpreted as to a moderate extent.

Last of the criteria for the abilities is systems thinking. This ability is described by the respondents as to a great extent with a mean of 3.35 and SD of 0.79. The highest among these criteria is criterion # 2 "I can respond to open-ended questions and formulate solutions to problems" described as also to a great extent with a mean of 3.46 and SD of 0.79.

Constraints of the Learners in in online set-up

Table 3 Constraints of the Learners

Criteria	Mean	SD	Verbal Interpretation
Self-regulation (SRC) 1. I delay tasks related to my studies so that they are either not fully completed by their deadline or had to be rushed to be completed.	1.58	1.50	To a small extent
2. I fail to get appropriate help during online classes.	1.71	1.41	To some extent
3. I lack the ability to control my own thoughts, emotions, and actions during online classes	1.91	1.48	To some extent
4. I have limited preparation before an online class.	2.05	1.41	To some extent
5. I have poor time management skills during online classes.	2.10	1.31	To some extent
6. I fail to properly use online peer learning strategies (i.e., learning from one another to better facilitate learning such as peer tutoring, group discussion, and peer feedback).	1.02	1.58	To a small extent
Average Mean	**1.72**	**1.44**	**To some extent**
Technological literacy and competency (TLCC) 1. I lack competence and proficiency in using various interfaces or systems that allow me to control a computer or another embedded system for studying.	1.31	1.28	To a small extent
2. I resist learning technology.	0.81	1.14	Not at all
3. I am distracted by an overly complex technology.	1.73	1.51	To some extent
4. I have difficulties in learning a new technology.	1.19	1.11	To a small extent
5. I lack the ability to effectively use technology to facilitate learning.	1.14	1.12	To a small extent
6. I lack knowledge and training in the use of technology	0.88	1.00	To a small extent
7. I am intimidated by the technologies used for learning.	1.12	1.30	To a small extent
8. I resist and/or am confused when getting appropriate help during online classes.	1.47	1.42	To a small extent
9. I have poor understanding of directions and expectations during online learning.	1.24	1.19	To a small extent
10. I perceive technology as a barrier to getting help from others during online classes.	1.24	1.32	To a small extent
Average Mean	**1.21**	**1.23**	**To a small extent**
Student isolation (SIC) 1. I feel emotionally disconnected or isolated during online classes.	2.64	1.51	To a moderate extent
2. I feel disinterested during online class.	2.05	1.47	To some extent

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3. I feel unease and uncomfortable in using video projection, microphones, and speakers.	2.36	1.76	To some extent
4. I feel uncomfortable being the center of attention during online classes.	3.05	1.60	To a moderate extent
Average Mean	**2.52**	**1.58**	**To a moderate extent**
Technological sufficiency (TSC)			
1. I have an insufficient access to learning technology.	1.39	1.39	To a small extent
2. I experience inequalities about access to and use of technologies during online classes because of my socioeconomic, physical, and psychological condition.	1.39	1.44	To a small extent
3. I have an outdated technology.	1.41	1.60	To a small extent
4. I do not have Internet access during online classes.	0.73	1.10	Not at all
5. I have low bandwidth and slow processing speeds.	1.76	1.56	To some extent
6. I experience technical difficulties in completing my assignments.	1.93	1.53	To some extent
Average Mean	**1.43**	**1.43**	**To a small extent**
Technological complexity (TCC)			
1. I am distracted by the complexity of the technology during online classes.	1.47	1.28	To a small extent
2. I experience difficulties in using complex technology.	1.58	1.35	To a small extent
3. I experience difficulties when using longer videos for learning.	2.22	1.31	To some extent
Average Mean	**1.75**	**1.31**	**To some extent**
Learning resource challenges (LRC)			
1. I have an insufficient access to library resources.	2.24	1.59	To some extent
2. I have an insufficient access to laboratory equipment and materials.	3.07	1.62	To a great extent
3. I have limited access to textbooks, worksheets, and other instructional materials.	2.36	1.45	To some extent
4. I experience financial challenges when accessing learning resources and technology.	2.47	1.86	To some extent
5. I experience online distractions such as social media during online classes.	3.15	1.54	To a moderate extent
6. I experience distractions at home as a learning environment.	3.53	1.50	To a great extent
7. I have difficulties in selecting the best time and area for learning at home.	2.96	1.66	To a moderate extent
8. Home set-up limits the completion of certain requirements for my subject (e.g., laboratory and physical activities).	3.37	1.35	To a great extent
Average Mean	**3.55**	**1.57**	To a great extent

Table 3 presents the constraints of the 21st century learners in an online set-up. This is described in six criteria which includes self-regulation (SRC), technological literacy and competency (TLCC), student isolation (SIC), technological sufficiency (TSC), technological complexity (TCC), and learning resource challenge (LRC).

The self-regulation challenge is described by the participants as to some extent with an average mean of 1.72 and SD of 1.44. Among the criteria's criterion # 5 is the highest I" have poor time management skills during online classes" with a mean of 1.72 and SD of 1.44

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and verbally interpreted as to some extent. The lowest criteria is rated is criterion # 6 "I fail to properly use online peer learning strategies (i.e., learning from one another to better facilitate learning such as peer tutoring, group discussion, and peer feedback)". with a mean of 1.02 and SD of 1.58 and verbally interpreted as to a small extent.

The second constraints are technological literacy and competency. This is described by the respondents as to a small extent with a mean of 1.21 and SD of 1.23. The highest rated in the criteria's is I am distracted by an overly complex technology" with a mean of 1.73 and SD of 1.51 and verbally interpreted as to some extent. While the lowest rated is criterion # 2 I resist learning technology" with a mean of 0.81 and SD of 1.14 verbally interpreted as not at all.

The constraints of learners in terms of student isolation is described as to a moderate extent with an average mean of 2.52 and SD of 1,.58. The highest among the criteria is I feel uncomfortable being the center of attention during online classes" with a mean of 3.05 and SD of 1.60 verbally interpreted as top a moderate extent. The lowest rated is criterion # 2 "I feel disinterested during online class" with a mean of 2.05 and SD of 1.51 verbally interpreted as to some extent.

The next constraints are technological sufficiency. This is described as to a small extent with a mean of 1.43 and SD of 1.43. The highest in the criteria is criterion # 6 I experience technical difficulties in completing my assignments" with a mean of 1.93 and Sd of 1.53. verbally interpreted as to a small extent. The lowest is criterion # 4 I do not have Internet access during online classes" with a mean of 0.73 and SD of 1.10 verbally interpreted as not at all.

Technological complexity is described as to some extent by the learners with an average mean of 1.75 and SD of 1.31. The highest criteria rated by participants is criterion # 3 I experience difficulties when using longer videos for learning" with a mean of 2.22 and SD of 1.31 verbally inter4preted as to some extent. While lowest rated is criterion # 1 I am distracted by the complexity of the technology during online classes" with a mean of 1.47 and SD of 1.25 verbally interpreted as to a small extent.

The last constraints described by the participants is learning resource challenges with an average mean of 3.55 and Sd of 1.57 verbally interpreted as to a great extent. The highest among these criteria's is criterion # 6 I experience distractions at home as a learning environment" with a mean of 3.53 and SD of 1.50 verbally interpreted as to a great extent. The lowest is criterion # 1 I experience distractions at home as a learning environment" with a mean of 2.24 and SD of 1.59 verbally interpreted as too some extent.

Qualitative results

The FGD results is analyzed using thematic analysis. In this type of analysis, the responses are coded according to three layers of coding that includes: structural coding, pattern coding and triangulation. The following themes are presented below.

General Themes	Sub themes
Challenges of 21st century learners	Difficult online learning Confusing learning materials Not the same as face to face
Abilities of 21st century learners	Organizing things Connected to others online Accessible to all
Constraints of 21st century learners	Lagging in connection Limited Time

Challenges of 21st Century Learners

The challenges of the 21st century learners are described by the participants as "*difficult online learning", "confusing learning materials", and "not the same as face to face"*

Difficult online learning

The participants expressed in the FGD that the online learning are difficult, they cannot cope up, and they struggle in technology. Although they are considered technology savvy and born with computers, the participants still express adjusting in the online learning set up during this pandemic.

S1-" Its tiring, because we are always on screen in our computers, ahmmm because in Fae to face we have our peers with us we can cope up easily with stress, but now we only have our laptop then you will taklk to your firmed still in front of the laptop Then you will

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just inhale and exhale then cry, but I still need to do it. I feel , though not to all professors that they dont have all the time because we cannot ask our professors for support all the time. We are really drained in this online set up because it is hard for us to understand especially for critical analysis, not all professors are available. we have something to ask and clarify but we cannot do it because they may be busy or he will be disturbed"

Confusing learning materials

Participants verbalized that the materials in their online learning are confusing and hard to understand,. Although instructions are posted in their modules online and explained to them by their teachers, still the difficulty of understanding the materials and self- learning is very difficult for them . Most of the time, they received different instructions coming from their teachers.

S1- No mam its confusing hehehe.. I cannot understand the instructions sometimes. Then sometimes the prof needs to ask another prof, then it takes time before it can get back to us. It's just like the connections between CI but there are CIs that doesn't know what to do

Not the same as face to face

The online learning set up for them are not comparable to the face to face classes that they usually have. For them they want to have the Face to Face classes because they have difficulty and cannot understand the learning process. If given a chance they still want to have the face to face classes. But this is not a reality today, where most of the classes are given in the online set-up because of the pandemic.

S2- Not easy mam because its better if hands on rather than watching YouTube videos that we need to perform for ret dem. It's much better if face to face, we can appreciate much better rather than basing on videos that we are not sure if that's the right thing to do in that scene

S5- No mam because sometimes they still see the Face to face contact. Face to face classes is still different

Organizing things

For them to cope up with the tasks and submissions of assignments, they participants need to organize things. According to the FGD they delay answering or search for materials and other resources in the internet. They delay task without deadlines and prioritize task that needs immediate submissions.

S1- Yes mam , if we answer earlier the instructions maybe altered. That's why it is unfair for those students who answers earlier. That's why related to my answer earlier, I delay answering questions.

S2- I make sure I perform first easy tasks like pre task, post task. Because I alot more time for check-in activities so it's easy for us to accomplish

S1- We delay task without deadlines, we wait for the prof to set deadlines it's just like our adrenalin

Connected to others online

One of the perks of the online learning is the connection with each other online. During this time, students can talk to each other and collaborate online to perform tasks. They share things and materials to each other and rely on their peers for support. Collaboration work is also very common to the 21st century learners.

S1- I think it depends on the person, I have a feeling that we are connected but most of the time I am disconnected. Because sometimes I am still craving for the physical presence of my peers. Because it is really different if we are with our peers. because we cannot really coped up with this situation.

S2- There are time we have that, like in oral revalida in our groups we separate the disease then we did the pathophysiology part then share to each other, There are like discord group or study streams that can help us, like we are discussing lessons

S1- Additional to that mam, it will help if we are with our peers because we have the same level of stress and we can relate to each other

Accessible to all

Aside for connected to each persons, all the learning materials are easily accessible online. The internet has a vast of learning materials where students can easily access. And for them this is one of their abilities is to looked into the internet.

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S2- It easy mam since the internet is accessible, it is easy to look for journals that we can look for resources

S1- For me mam ahmmm.. it's easy for us if we already understand what we need to search because it is accessible in the Google

Lagging in connection

One of the requirements of online learning is to have a stable internet access. The problem in the internet is always the connection. Students who are situated in the provinces or rural areas are the most affected. Because most of the time internet access is not stable.

S5- We have mam, since I am located in the province I have slow internet connection then most of the time no electricity

S7- In my case in our house in Cavite, our place is the only one with no signal. So the internet connection is the problem in Cavite. Because the subdivision prohibit other internet providers. So there are many instances that I will be at the coffee shop during online class because we have no signal in our house and too slow internet.

S6- Same with ____ brownout is my problem because in our place we really don't have signal. I still need to go to other place to have signal.

Limited Time

The limitations of time is one of the concerns of online learning and the learners have difficulty performing multiple tasks at the same time. The learners expressed there difficulty in time performing and accomplishing all tasks online.

S4-It is just like me There are times that I need to answer because there are a lot of things to do. It's just like I need to guess the answer, I'll take the luck, I have that thinking

V. Conclusions

The 21st century learners have abilities in online learning however, the use of the internet and the connection online does not guarantee that learners can cope up with the online learning set up. Learners prefer still the traditional way of learning, and that is face to face classes. Continuous improvement of the online learning set-up is recommended so learners can adopt to the challenges.

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