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Vision and Mission of the IJODeL

Vision

To be a leading international academic journal that publishes and disseminates new knowledge and information, and innovative best practices in open and distance e-learning.

Mission

The IJODeL shall publish and disseminate new knowledge and information based on original research, book reviews, critical analyses of ODeL projects and undertakings from various researchers and experts in the Philippines, the ASEAN Region, and the world, and concept articles with the intention of presenting new ideas and innovative approaches to interpreting and implementing best practices in open and distance e-learning as alternative delivery mechanisms for quality education.

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Improving Tertiary Students' Academic Performance and Appreciation of the Life and Works of Jose Rizal Course through Digital-based Biographical Museum Simulation

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Abstract

The study examined the effectiveness of the digital-based biographical museum simulation on the student's academic performance in the Life and Works of Jose Rizal Course using the quasi-experimental research design. A qualitative research design was also employed to determine the effects of the proposed innovative learning tool on the students' appreciation of the said course. The participants were fifty (50) college students who underwent a match-pairing process dividing them into experimental and comparison groups. Eight simulated stories revealing the life journey of Jose Rizal were created. Content presentation was guided by the GAT RISAL appreciative-based instructional planning framework. The data were collected using paper-pencil assessment tools and focus-group discussions. Quantitative data were analyzed using both descriptive and inferential statistics while the qualitative part was examined using content and thematic analyses.

Results indicated that the test mean scores of the experimental group, from pre-test to post-test, significantly increased by 6.96 points, which is higher than the comparison group that exhibited an increase of 4.08 points. On the other hand, the formative test mean scores of the two groups revealed an average level indicating the same level of academic performance. Regarding the research hypotheses, there was a significant difference between the formative test mean scores of the experimental and comparison groups. There were also significant differences between the pre-test and post-test mean scores of both groups. Moreover, the qualitative results highlighted that there was an improvement in the students' appreciation of the Rizal course as an effect of the proposed innovation tool.

***Keywords**: digital learning, Jose Rizal course, biographical museum, simulation*

Introduction

The life and works of national heroes have already been integrated into history learning (Pirzada et al., 2022; Pramono et al., 2019) and used in teaching students with moral principles and values in the classroom (Ahmad, 2014; Warnick, 2023). National heroes were included in textbooks and other reading materials (Jat et al., 2018; Lanjwani et al., 2023), putting a premium on their heroic deeds and values.

José Protacio Rizal Mercado y Alonso Realonda, popularly known as Jose Rizal, is one of the national heroes of the Philippines whose writings empowered many Filipinos to achieve freedom during the Spanish colonial period. His famous literary creations, particularly Noli Me Tangere and El Filibusterismo, are good materials for inculcating a sense of nationalism among students. Hence, Rizal's life and works offer source of inspirations which may help students in building their moral character and patriotism.

In pursuit of planting Filipino values such as love of the country, the course The Life and Works of Jose Rizal was offered in the tertiary education in adherence to Republic Act No. 1425, which mandates the inclusion of the life, works, and writings of Jose Rizal in the curricula of public and private schools, colleges, and universities. However, this course is getting less appreciated among college students nowadays, which has been a pressing dilemma for teachers. In fact, in an extensive study, teachers found that students exhibit a lack of interest in the course, dubbing it as one of the most boring subjects (Deligero-Badilles, 2018).

Deponio and Viray (2022) stressed that it is crucial to consider the approach to be used in the teaching process. In their study, they accentuated that teachers must employ contextual teaching and learning approach (CTL) to induce students to be responsive, interactive, and critical in understanding the life and works of Rizal. As the course encompasses historical information, what students often do is that they tend to memorize dates and other details about Rizal's life and works. Learning the subject this way would be less interesting as it fails to underscore the relevance of Rizal's deeds and ideas to inculcate values among young people such as nationalism, which can be promoted through civic engagement (Camposano, 2019).

Failure to instill into the minds of the students the socio-political relevance of the course would only add up to students' negative attitudes toward learning (Deligero-Badilles, 2018). As such, there is a need for innovative strategies in teaching the life and works of Rizal to Filipino college students. Teachers play a crucial role in making the subject more interesting and relevant to students' personal lives and future endeavors (Salcedo, 2016). Otherwise, students' lack of interest and lack of engagement would remain barriers to teaching and learning the course.

In support, Llamazares de Prado and Arias Gago (2023) mentioned in their study that accessing information using digital tools is continuously gaining importance worldwide; likewise, they indicated that educational institutions should embrace this kind of transformation to promote awareness and accessibility of

information. Evidently, the digitization of teaching and learning is increasingly practiced nowadays with the advent of technological advancements and changing societal demands (Arısoy, 2022). Since almost all people across the globe have already attuned to using digital technologies for various purposes (Andersen et al., 2021; Burbules et al., 2020), it is not surprising at all that educational institutions have presently leveraged digital-based platforms for improving instruction. In fact, studies showed that it is more effective to use digital technologies than traditional instructional methods in terms of improving students' academic performance (Keane et al., 2023; Lewin et al., 2019).

In the context of documenting and preserving the information of a prominent figure through the support of digital technologies, Shakour (2018) stated that putting premium on contemporary biographical museums is a pedagogical innovation as it appeals to the younger generations and can influence them to imitate the good deeds and values of a particular personality during his or her lifetime. This digital-based biographical museum can be used to present the different aspects of life of a famous personality or figure in an innovative and creative way. Unlike the traditional museum, this strategy employs digital tools that make the presentation of information more realistic, interactive, and appealing to the students. Even so, there is still a dearth of studies on whether it improves students' academic performance.

Furthermore, while the use of digital technologies in historical and archaeological museums is widely known (Dunn et al., 2019; Luther et al., 2023), there needs to be more corpus of published articles about the use of digital-based biographical museum simulation in educational contexts. To fill the identified gaps, this study aimed to explore the effectiveness of digital-based biographical museum simulation in improving students' academic performance and appreciation in the Life and Works of Jose Rizal course.

Objectives

The general objective of the study was to examine how the digital-based biographical museum simulation improved the academic performance and appreciation of tertiary students in the Rizal course. The specific objectives were:

1. To compare the pre-test, formative and post-test means scores of the tertiary students in comparison and experimental groups in various assessments;
2. To examine the significant differences between the formative test and post-test scores of the tertiary students in both groups;
3. To analyze the significant difference between the pre-test and post-test of each group; and
4. To examine the effects of the digital-based biographical museum simulation on students' appreciation of the Rizal course.

Review of Related Literature

Innovative Approaches in Teaching Social Science

In the 21st century, education has advanced to a point where people and technology are adapted to open new opportunities. Social science teachers today must create innovative approaches to engage and interact with their students (Plaza, 2021).

The development of information and technology has sped up changes in teaching strategies and the environment in which students learn (Dunwill, 2016). Gen Z students appreciate group conversations and a more engaged learning environment (Kozinskyi, 2017). They can easily access information, and they are not constrained by any particular location or time when it comes to studying. Furthermore, the use of different instructional media helps the students enhance their multiple intelligences which are beneficial to understanding social science courses. The application of unique teaching methods and techniques to social science teaching builds an encouraging learning environment where students can explore their abilities and intelligences (Madhumita, 2016).

Teaching the Life of National Heroes and the Value of Heroism

Planting the value of heroism among students can be best practiced by using national heroes as role models. More than knowing and being aware of the lives of national heroes, students should realize the importance of heroism. As stated in the study by Sun et al. (2023), heroism is a predictor of civic engagement.

Based on the premise that individuals learn emotional and affective behaviors by emulating models (Bandura, 1997), it was claimed that using heroes as role models is effective in values education (Yazici & Aslan, 2011) and moral education (Respess, 2017). Moreover, teaching values displayed by the heroes in the past helps students recognize their importance in present-day situations. It can lead to students' realization of the need to contribute to addressing the present social, economic, political, and environmental struggles.

Furthermore, teaching the life of national heroes allows students to cultivate heroic values that are essential for their character development (Ahmad, 2014). It serves as a strong foundation for them to practice the value of heroism through their active participation in a democratic society (Perrotta, 2017).

Computer-Assisted Simulation and Students' Academic Performance

Improving students' academic performance has been a focal interest of many researchers in the academic world. In fact, plenty of studies have been conducted exploring innovative teaching strategies to address students' learning difficulties and poor academic performance (Khurshid & Ansari, 2012; Setiawan et al., 2021; Yawman & Appiah-Kubi, 2018).

Various research show that computer-based learning and students' academic performance are significantly associated. In the study by Bakaç et al. (2011),

it was found that computer-assisted instruction with simulation is effective in increasing students' achievement in Physics activities. Additionally, Mihindo et al. (2017) revealed that computer-based simulations positively helped students to effectively understand Chemistry concepts which led them to get higher performance in the said subject. The use of computer simulation in teaching and learning Physics was also recommended by Kabigting (2021) since it contributed to students' increased participation and performance.

Technology adoption in the field of education is increasingly practiced among schools as they continue to innovate teaching methods and strategies (Afridi & Chaudhry, 2019; Oyetade et al., 2020). Such a trend has become relevant nowadays since 21st-century students are considered to be tech-savvy (Liao et al., 2016; Sanabria & Arámburo-Lizárraga, 2017). Using traditional methods may no longer be effective in piquing their attention; thus, teachers must integrate technology into the process of teaching and learning.

In terms of digital museums, development originally aimed to copy the traditional museum into web form (Tong & Ma, 2021), but as the process of digitalization has advanced, the exhibition styles have also improved. Digital museums are continuously becoming more modern, incorporating technologies in the design, construction, and production to provide high-quality viewing experiences.

In classroom teaching and learning, digital museums allow teachers to promote cultural heritage even without requiring their students to do an actual museum visit. As stated in the study by Eguz (2020), a digital museum is computer-assisted, which can be used in the classroom as an instructional tool for teachers in helping students internalize cultural content and stimulate their creative thinking. Although it would not provide rich experiences unlike what the actual museum visits could offer, digital museum still has its affordances: immersive experience and no barrier of distance (Mamur et al., 2020).

While there have been studies conducted on the development of digital museums and their applications in the classroom setting, there is still a need to explore how effective a digital-based museum simulation is in improving the students' academic performance and their appreciation towards the life and works of a famous personality or figure such as a national hero.

Theoretical Framework

The first theory that supports this study was the Cone of Experience by Edgar Dale. It is based on the idea that learning experiences progress from concrete to abstract. Digital simulations provide students with a more immersive environment which allows them to better capture real-life contexts. This is a type of experiential learning that enables students to use more of their senses, which can lead to a better appreciation of the life and works of Jose Rizal. In the simulated tool, students perform several challenges that make use of their metacognitive, problem-solving, creative, collaborative, and critical thinking skills. Talan (2021) stated that simulations are effective in developing students' 21st-century skills such as problem-solving and critical thinking.

Furthermore, the Hierarchy of Learning by Robert Gagne was also used as a theoretical foundation for this study. In Gagne's Hierarchy of Learning, problem-solving is the highest level of cognitive process. Rizal's life and works can be used as a medium to develop students' problem-solving skills by relating various socio-political issues nowadays; however, this would not be achieved without prior knowledge and the acquisition of other cognitive skills. In improving problem-solving skills, Sutadji (2020) underlined the importance of prior knowledge as it involves the acquisition of attitude and skills necessary to go through the next learning process.

In the development of a digital-based biographical museum, the study was essentially grounded in the Technology, Pedagogy, and Content Knowledge (TPACK) framework which entails the integration of the technology-based learning into the presentation of content knowledge and the pedagogical execution (Koehler et al., 2014). The theory also explains the cohesive interaction among these three elements namely, technology, pedagogy, and content, encourages interactive learning experiences of the students through deep engagements with technology-based tools. As such, the development of a simulated museum for narrating the life stories of Jose Rizal establishes a context-specific response that transforms the content-based learning course into an interactive content delivery designed to increase students' interest, appreciation, and learning opportunities in the Rizal course.

Furthermore, the GAT RISAL appreciative learning instructional planning framework was anchored on Frederickson's broaden-and-build theory of positive emotion. This theory states that appreciation is reinforced through positive emotions, transforming students to be creative, knowledgeable, and socially aware (Fagley, 2018).

Methodology

The researchers used a quasi-experiment research design to examine the effectiveness of the digital-based biographical museum simulation on the academic performance and appreciation of the Rizal course. The respondents of the study were tertiary students from Kolehiyo ng Lungsod ng Dasmarinas, a locally funded educational institution in Dasmarinas City, Cavite, Philippines.

A total of sixty-eight (68) tertiary students were included in the administration of the pre-test as the first stage of the study. The results of the pre-test were used as a basis for the matching-pairing process, reducing the number of participants from 68 to 50 students. These fifty (50) students were divided into two groups: comparison and experimental groups. Each group had a twenty-five (25) sample size. The comparison group was exposed to the learning tool and activities recommended by the Commission on Higher Education (CHED) syllabus. On the other hand, the experimental group consisted of students who used the biographical museum simulation learning tool created by the researchers using Adobe Flash CS 5.5 and Action Script 2.0, which is a prototype-based object-oriented programming language that builds interactive and gamified learning materials. Some images displayed on the simulated tool were lifted from and credited to various online sources. Eight simulated stories revealing

the life journey of Rizal from his childhood up to the printing of his novel "Noli Me Tangere" were created. Both learning tools were delivered through online modality as part of the distance learning system of the institution.

Before the conduct of the study, the researchers secured permission from the Research Ethics Committee of the institution. The study was granted an "exemption for review" as it would not involve vulnerable populations; however, informed consent and data privacy form were asked to accomplish by the participants indicating their approval of utilization and reporting of the results.

The effectiveness of the learning tool on academic performance was determined through the scores obtained by the tertiary students to the pre-test, formative, and post-test assessment tools. Data were analyzed using both descriptive and inferential statistics. Weighted mean and standard deviation were the descriptive statistics being used while the Independent T-test and Paired t-test were employed to treat the inferential statistics part. Further clarifications and verification of results were done using focus-group discussions (FGD) with the participants of both groups. There were sixteen (16) participants included in the FGD to discuss the learning opportunities, potential biases and disadvantages, course appreciation, and possible improvements in the proposed pedagogical innovation for teaching the Rizal course. They were selected based on the performance from pre-test and post-test as shown below.

Table 1
Distribution of FGD Participants based on their Performance from Pre-test and Post-test Results

Number of Students selected for FGD	Pretest Score	Posttest Score
4	Very Low	Very High
4	Low	Very High
4	Low	Very High
4	Average	Very High

The said criteria for participant selection were employed to ensure equal representation of the students who have shown varied academic performances before and after the proposed intervention. The qualitative data were analyzed using content analysis (Bengtsson, 2016) and thematic analysis (Braun & Clarke, 2006).

On the other hand, the development of the digital-simulated tool was anchored in the ADDIE model, which was originally developed at Florida State University's Center for Educational Technology. ADDIE stands for Analyze, Design, Develop, Implement, and Evaluate; these are all stages that serve as a guide for educators and instructional designers when designing and developing an instructional material or training program. As described by Handrianto et al. (2021), the ADDIE model is a systematic guide for planning, designing, and developing an instructional strategy.

To apply the said model, the researchers first identified the social science courses that gained less student engagement and low cumulative performance in the semester. After comparing the academic grades obtained by the students from different social sciences courses, it was found that The Life, Works and Writings of Rizal course gained low performance. The results of the comparison were further validated by the semi-structured interviews with the instructors. They shared that some students think that they have already had enough knowledge of the life of Rizal since he has been mentioned in history classes since elementary classes which resulted in low appreciation. Moreover, instructors noted that some students were no longer interested in history-related subjects because of the traditional method of learning delivery experienced by them even during the transition to online classes. Although instructors made use of computer applications to connect with students, they still presented the topics in lecture or discussion methods only.

In relation, since strengthening appreciation is the starting point to more engagement and improved performance, the researchers specifically designed an instructional planning framework to enhance the presentation of topics in the Rizal course called “GAT RISAL” which is derived from the name of the Philippine National Hero. This framework consists of the following:

Goal Orientation	This part lays down the lesson objectives that shall be achieved by the students after the learning session.
Abstraction	This part initially introduces the lessons to the students. This also provides an overview of the lessons/topics to be discussed. This can be in the form of a “riddle”, “word hunt”, etc.
Transformation	This part provides thought-provoking questions that students must ponder. Questions must require students to relate the present situation to the past and future and situate the transformations that took place.
Reflection	Grounded in the transformations, this part allows students to have an in-depth analysis of the changes in society from Rizal’s time to the contemporary world. This part must allow students to have critical and reflective insights that can be applied to life.
Innovative Discussion	This part pertains to the discussion proper. This thoroughly explains the concepts using computer technology.
Scrutinization	This part serves as an assessment to examine if the lesson objectives have been attained or not. This part imitates and reintegrates the lessons in the form of a short quiz/formative assessment.

Amplification	This part further determines how far the students have learned the lessons. This can be in the form of extended learning activity, computer-assisted games, or cooperative learning.
Life Integration	This part strengthens the appreciation of the life story of Rizal. This part emphasizes Rizal's experiences can be a learning experience that can be applied to daily endeavors.

The ADDIE model, coupled with the GAT RISAL appreciative learning instructional planning framework, is expected to provide positive effects on the academic performance and appreciation of the students of the Rizal course which will possibly lead to the inculcation of nationalistic values within themselves.

Results and Discussions

Results revealed that the mean score for both groups is 12.40 out of thirty (30) items pre-test with a standard deviation of 4.26 as shown in Table 2. This mean score was interpreted as "low" which means that students have low knowledge or less interest in the Rizal course affecting their performance before the intervention. Since the mean scores for both groups are identical, the selection process used to assign participants to each group was successful. Moreover, the low scores obtained by the students were used as a baseline for improvement after exposure to two learning tools: the CHED-recommended activities and the simulated stories enshrined in the biographical museum. Such a selection technique was employed to ensure that each score of the participant from the comparison group was paired with a corresponding or similar score from the experimental group (Nunez et al., 2023).

Table 2

Performance level of the tertiary students in the comparison and experimental group according to the pre-test mean scores

Group	Mean	Std. Dev.	Descriptive Interpretation
Experimental Group	12.40	4.26	Low
Comparison Group	12.40	4.26	Low

Legend: 27– 30 = Very High; 23 – 26 = High; 15 – 22 = Average; 8 – 14 = Low; 1 – 7 = Very Low

There were three formative tests provided to students to determine their learning progress while exposed to two learning tools as manifested in Table 3. Each test had a total of fifteen (15) items and was constructed in a multiple choices-type of test following the Revised Bloom's Taxonomy. Results indicated that tertiary students from both groups had the same average performance in the first formative test. The experimental group got a mean of 10.00 while

the comparison group obtained a 9.20 mean with a standard deviation of 1.83 and 2.16, respectively. During the FGD with the two groups, they collectively shared that their average scores in the first formative test were the results of adjustments with the new course and the online platform used in school. Similarly, Lamb et al. (2020) underlined that as they adopt new technology into the process of learning, students need time for adjustments, which affects their learning experience and outcomes.

A commendable improvement was documented in the performance of the experimental group in the second formative test with the mean score of 10.84 which is interpreted as "high" with the standard deviation value of 2.41. This is higher than the average performance of the comparison group which got a mean score of 9.04 with the standard deviation value of 2.89. Students from the comparison group mentioned that some of them do not prefer too many paper-pencil activities such as graphic organizers, reflection papers, and essays. They also noted that online learning became even less interactive because of too much and repeatedly used written activities to be done after lectures. The outcome in which the experimental group outperformed the comparison group was also corroborated by Männistö et al. (2019), favoring the use of digital learning in improving students' learning outcomes.

Likewise, the same level of performance was observed in the last formative assessment in which the experimental group performed better than the comparison group. The former got a mean score of 11.20 with a standard deviation value of 1.94 while the latter obtained a mean score of 9.96 with a standard deviation value of 1.46. Results revealed that the experimental group which used the biographical museum simulation maintained their good performance in two formative tests. This was further validated by the comments of the students on the utilized tool stating that the interactive presentation of the topics sustained their interest and excitement in accomplishing the activities. This is in line with what Beckem and Watkins (2012) stated that using digital simulation can increase students' engagement due to its interactive learning environment.

Generally, both groups revealed an average performance after consolidating the scores they obtained from the three formative tests. Despite the high performance exhibited by the experimental group as compared to the comparison group, the mean difference was relatively low.

Table 3
Performance level of the tertiary students in the comparison and experimental group according to the formative test mean scores

Covered Simulations	No. of Items	Group	Mean	Std. Dev.	Descriptive Interpretation
Childhood Years to Early Education of Jose Rizal	15	Experimental	10.00	1.83	Average
		Comparison	9.20	2.16	Average
Education in Ateneo De Manila and Unibersidad De Sto. Tomas	15	Experimental	10.84	2.41	High
		Comparison	9.04	2.89	Average
Life in Spain, Paris, and Noli Me Tangere was published in Berlin	15	Experimental	11.20	1.94	High
		Comparison	9.96	1.46	Average
Overall	45	Experimental	32.04	4.45	**Average**
		Comparison	28.20	4.53	**Average**

Legend: 14 – 15 = Very High; 11 – 13 = High; 8 – 10 = Average; 5 – 7 = Low; 1 – 4 = Very Low
Legend: 41– 45 = Very High; 34 – 40 = High; 23 – 33 = Average; 12 – 21 = Low; 1 – 11 = Very Low

Like the formative test results, both groups had the same average performance in their post-test as shown in Table 4. The experimental group got a mean score of 19.36 while the comparison group obtained a mean score of 16.48 with the standard deviation values of 6.26 and 4.73, respectively. However, it is noticeable from the results that, despite having the same average performance, the experimental group performed better than the comparison as shown in the mean scores. The mean difference of 2.88 indicates that the utilization of the simulated learning tool forwarded certain advantages to the students resulting in improved academic performance. Bello et al. (2016), likewise, found that simulations are effective in improving students' academic performance.

Table 4
Performance level of the tertiary students in the comparison and experimental group according to the post-test mean scores

Group	Mean	Std. Dev.	Descriptive Interpretation
Experimental Group	19.36	6.26	Average
Comparison Group	16.48	4.73	Average

Legend: 27– 30 = Very High; 23 – 26 = High; 15 – 22 = Average; 8 – 14 = Low; 1 – 7 = Very Low

Using the inferential statistics analysis tools, the significant difference between the formative test mean scores of the tertiary students in both groups was examined as shown in Table 5. Results indicated that there was no significant difference between the performance of both groups in the first formative test with a mean difference of 0.80 and t-value of 1.414 indicating that they exhibited a partly identical average performance.

However, in the second formative test, there was a significant difference between the two groups obtaining a mean difference of 1.80 and a t-value of 2.390 at 0.05 level of significance. The same results were generated from the third formative test indicating a mean difference of 1.24 and a t-value of 2.558 at the same level of significance.

Collectively, there was a significant difference between the formative test scores of both groups with a mean difference of 3.84 and a t-value of 3.025 at a 0.01 level of significance. The experimental group got an overall formative mean score of 32.04 which is higher than the 28.20 of the comparison group. This means that there was an accelerated learning progress recorded in the performance of the experimental group in the Rizal course. Such an increase may be derived from sustained interaction, enjoyment, and appreciation. Through the simulation approach with the aid of technology, Luo et al. (2016) revealed in their study that students understood and appreciated concepts, leading to their improved performance.

Table 5
Test of significant difference between the formative test mean scores of the tertiary students in the comparison and experimental groups

Covered Simulations	Group	Mean	Mean Difference	t-value	Remarks
Childhood Years to Early Education of Jose Rizal	Experimental	10.00	0.80	1.414	Not Significant
	Comparison	9.20			

Covered Simulations	Group	Mean	Mean Difference	t-value	Remarks
Education in Ateneo De Manila and Unibersidad De Sto. Tomas	Experimental	10.84	1.80	2.390*	Significant
	Comparison	9.04			
Life in Spain, Paris, and Noli Me Tangere was published in Berlin	Experimental	11.20	1.24	2.558*	Significant
	Comparison	9.96			
Overall	Experimental	32.04	3.84	3.025**	Significant
	Comparison	28.20			

*df = 48; **Significant at .01 level; *Significant at .05 level*

With regard to the post-test mean scores of the students, results revealed that the mean difference between the two groups was 2.88 which is quite small indicating that there was no significant difference between the post-test mean scores of the tertiary students in the comparison and experimental groups. Since both groups obtained the same average performance, there were no documented significant effects that would make them different.

Table 6

Test of significant difference between the post-test mean scores of the tertiary students in the comparison and experimental groups

Test	Group	Mean	Mean Difference	t-value	Remarks
Post-test	Experimental	19.36	2.88	1.836	Not Significant
	Comparison	16.48			

df = 48

Unlike the previous results, there was a recorded significant difference between the pre-test and post-test of each group. The post-test consists of questions similar to the pre-test. A significant difference between the pre-test and post-test mean scores of the experimental group was recorded with a mean difference of -6.96 and a t-value of -7.413. Similarly, there was a significant difference between the pre-test and post-test mean scores of the comparison group with a mean difference of -4.08 and a t-value of -4.309.

Results indicated that the two learning tools provide positive effects on the students' academic performance. While both had identical results, it seems noticeable that the experimental group performed better than the comparison group considering the mean difference. Supporting the number, tertiary students from the experimental group claimed that they were able to sustain their participation in online classes due to the simulated learning stories being used. The biographical museum simulation further supplements the knowledge

gap and boredom in learning history. On the contrary, while they displayed an improvement in their test scores, students from the comparison group argued that there is a tendency to lose their interest and appreciation in learning the Rizal course due to the static lesson presentation and repeated written activities. The same findings were found by Srisawasdi and Panjaburee (2015), revealing that students in the experimental group that used a simulation technique in learning Science concepts performed better than those in the control group.

Table 7

Test of significant difference between the pre-test and post-test mean scores of the tertiary students in each group

Group	Test	Mean	Mean Difference	t-value	Remarks
Experimental	Pre-test	12.40	-6.96	-7.413**	Significant
	Post-test	19.36			
Comparison	Pre-test	12.40	-4.08	-4.309**	Significant
	Post-test	16.48			

*df = 24; **Significant at .01 level*

The results may vary depending on the number of topics that have been simulated, the levels and types of assessment tools, and the number of students involved in the data collection.

Effects of the digital-based biographical museum simulation on students' appreciation of the Rizal course.

Fifteen (15) students from the experimental group were purposely selected for the FGD. Five students were from the group who got very high scores. The same number of students were from the group who got high scores and another five students from the group who obtained average scores in the assessment procedures conducted. During the FGD, participants shared their positive experiences with the digital-based biographical museum simulation and its interactive tools. It was highlighted how the lessons were structured according to the GAT RISAL instructional planning framework, and improvements were noted in the students' academic performance in the Rizal course, which was delivered via distance learning.

Presents multisensory learning. Ten (10) students collectively shared that the biographical museum simulation made them feel that they were in the actual museum as they walked through the corridor of the Rizaliana museum. Each door of the museum presents a challenging activity that must be accomplished by the users before they can proceed to the next door or floor. One of the examples is shown in Figure 1 revealing a scrutinization activity in which users are required to use the direction keys to execute that task in a limited time. They also mentioned that learning activities presented at each door and the interactive storytelling of the tour guide essentially appeal to their auditory, visual, and kinesthetic senses as shown in Figure 2. Participants further emphasized that the application of background music to the animation made

the learning journey more alive and engaging. The results are relative to the study by Taljaard (2016), stating that the use of digital tools in learning appeals to students' multiple senses, which makes the learning process more engaging and interactive.

Figure 1
Scrutinization Activity

Figure 2
Innovative Discussion Activity

Enhances independent acquisition of knowledge. Five (5) students emphasized that biographical museum simulation enables them to work and learn independently as they are required to read the directions and work on the task alone. They also mentioned that the simulated tour guide helps them accomplish each task given as exhibited in Figure 3. Because of the guided learning, it becomes easier for them to navigate the biographical museum properly, meaningfully, and independently. The careful adherence to the directions scaffolds them in task completion which also helps them acquire and produce knowledge independently. Limniou et al. (2021) explained that digital

learning should promote independent acquisition of knowledge to improve students' critical thinking skills.

Figure 3
Goal Orientation Activity

Makes use of authentic assessment. Six (6) students argued that while biographical museum simulation is a computer-assisted learning tool, it can still be relevant to the real-life setting. The reflective questions and life-integration activities allow them to connect the learned knowledge to the actual practice in real life. The performance tasks presented in the simulated tools still allow them to work either independently or collaboratively which strengthens their understanding of the Rizal course and its essence to character building and personal growth. Moreover, they explained that simple reflective journals and essays as activities help them enhance their logical reasoning and locate their learning progress. In connection, Nicola-Richmond and Watchorn (2018) also argued that simulations, as these tend to mimic real-world situations, provide authentic learning experiences for students.

Increases learning engagement. All students mentioned that the interaction between them and the simulated tools allowed them to remember important details of the life story of Jose Rizal. It also helped them create a mental picture that reinforces the understanding and the analysis of the significance of Rizal's experiences and life stories to their learning growth and nationalistic behavior creating a long-lasting impact on their personal life. For instance, the reflection activity through the story of the moth shown in Figure 4 allows them to reflect on and clarify their personal values making them more engaged in the construction of learning. These results can be associated with the study by Wegenera et al. (2017), emphasizing the importance of interactive simulation in increasing students' engagement in the learning process.

Figure 4
Reflection Activity

Discusses Rizal's life in a clear, enjoyable, and interactive manner. All of them stated that the biographical museum simulation presented the life of Jose Rizal in a clear, enjoyable, and interactive manner. Each floor level of the museum presents the life of Jose Rizal in order, from birth up to the time he published his first novel, making the students properly follow the progression of his life. Such resulted in a clear understanding of Rizal's experiences, struggles, and memories. Aside from clarity, the interaction was sustained due to mind games that allow users to think flexibly, enhance mental agility and memory, and improve critical thinking and problem-solving skills. As presented in Figure 5, the implication activity in the form of drag and drop game enhances the user's skills in remembering, organizing, and deliberating factual information which reinforces the use of prior and new knowledge learned. Providing activities that enable students to activate their prior knowledge is important as it reduces students' cognitive load and contributes to their learning performance (Dong et al., 2020).

Figure 5
Amplification Activity

Aside from what were mentioned above, some activities in the intervention also included (1) posing metacognitive and provocative questions that oblige students to know intellectual prowess in analyzing situations related to the life journey of Rizal; (2) relating the ideas with the value and aim of citizenship through short-response essays; and (3) posting situational questions and online commitment energizer games that foster convergent and creative thinking skills, and other activities that enhance higher-order thinking skills of the students.

Conclusion

The study examined how the digital-based biographical museum simulation improved the academic performance and appreciation of tertiary students in the Rizal course. Digital museums as interactive materials are used for teaching art-related courses, historical timelines, and archeology. The teaching of the heroes' biographies in an interactive presentation and the retelling of the life stories, achievements, and struggles in the society contributed to the compendium of innovative strategies in teaching social sciences. Unlike other interactive tools, the proposed innovation builds on the importance of appreciation to sustain their interest in learning the hero's biography.

As an instructional intervention, the digital-based biographical museum simulation effectively helped students appreciate the Life and Works of Jose Rizal course as it provides them with an interactive learning environment and authentic learning experiences. Another key characteristic of digital-based biographical museum simulation is that it promotes multi-sensory learning which makes the students more engaged in the learning process. Consequently, this simulation tool positively affected tertiary students' academic performance and appreciation of the course.

Recommendations

The researchers highly recommend that social sciences instructors utilize a biographical museum simulation in teaching the life stories of national heroes. They may also pursue creating simulated learning tools that enhance students' metacognitive, reflective, creative, critical, and problem-solving thinking skills. The utilization of biographical museum simulation may also be extended to other learning areas and topics that need an interactive walking through the museum of learning.

To solidify the claims regarding its positive effects on student's academic performance and appreciation, conducting research with the use of mixed methods research designs may be pursued by future researchers to produce wide sets of quantitative and qualitative data for examining the effects of biographical museum simulation or similar simulated tools. Additionally, the inculcation of social issues, problems, and challenges into the biographical museum simulation may be done to further increase students' understanding of the contemporary world and how past events influenced the present and the future.

Aside from the tool itself, it is also suggested that the "GAT RISAL", the researcher-developed appreciation learning instructional planning approach, be employed to the contextualization of learning materials to enhance the student's appreciation of topics being discussed. As digitalization is continuously developing, future researchers may also consider looking at strategies for utilizing new tools for innovating digital-based biographical simulation.

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Prospects of Open and Distance Learning at the Open University of Tanzania Post-COVID-19 Pandemic

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Abstract

The rise of the COVID-19 pandemic created a paradox in the continuity of education among students all over the world. Open and Distance Learning (ODL) has become a vital solution to overcome barriers to education access associated with the pandemic. This paper analyzed the prospects of ODL at the Open University of Tanzania (OUT) after the emergence of the COVID-19 pandemic to avail potential opportunities for learning irrespective of emerging challenges. The study employs a qualitative research approach and an exploratory case study design. A sample of fifteen participants was purposively selected, and five ODL technical staff were conveniently sampled for the study. Findings showed that, following the COVID-19 pandemic, future plans and prospects of the ODL at OUT focus on increasing community awareness towards ODL, increasing flexibility for learning, and expanding enrollment rates. Furthermore, the OUT strives to increase accessibility for ODL by strengthening internet bandwidth to sustain distance learning and engaging financial institutions in supporting students' learning at the OUT. Based on the findings, the study recommends government organizations including the Tanzania Commission for Universities (TCU) to establish ODL policies that will serve as guidelines for ODL operations and place equal promotion for learners' opportunities to education utilizing flexible ODL platforms at the OUT.

***Keywords**: open and distance learning, online learning, blended learning, flexibility*

Introduction

Open and Distance Learning (ODL) has become significant globally as an alternative mode to address the huge unmet demand for access to higher education (Nyandara, 2012). ODL is gaining importance in African Universities and globally, as universities use distance learning to increase people's access to education opportunities. Barriers such as household tasks, time constraints, and geographical boundaries are then reduced leading people to pursue education (Mathew & Iloanya, 2016). With the growing need for knowledge and skills for societal and economic transformation, people of all ages must have access to quality education to accomplish their career objectives and advance at work. Additionally, the rise of the COVID-19 pandemic created an increasing demand for distance and online learning at different levels of education to maintain smooth learning irrespective of teachers' physical absence (Pregowska et al., 2021). To attain 21st century skills, the use of technology for online learning

has been emerging and gaining increased attention among higher education institutions (HEIs). The occurrence of the COVID-19 pandemic created a crisis in HEIs at large because the traditional mode of education delivery experienced for several decades required students physical contact with course instructiors for lecture sessions (Onojah & Onojah, 2020; Toquero, 2020). This created an increasing need for strengthening educational services offered through ODL to continue learning as per structured course programs. ODL is a learning modality where the learners and course facilitators do not meet for physical classes, but they interact with each other through the use of media (Godrick, 2017). The concept of ODL was further defined by Biao (2012) as a means of knowledge acquisition in which educational actors create technology-enhanced learning environments that enhance learning at convenient periods and locations that satisfy their situations. The ODL is enhanced by the creation of learning possibilities that overcome barriers for the acquisition of education. The impediments to education can be attributed to geographical remoteness, personal responsibilities, or unsuitable courses offered to satisfy people's demands (Bozkurt, 2019). Omari and Kefiloe (2022) argued that ODL bridges the gap in the delivery and access to education by increasing and maximizing interaction among students, learning resources, course facilitators, and media interface. The main advantages of adopting ODL are linked to its flexibility, accessibility, affordability, and provision of practical education as deemed necessary by the students as per context. Similarly, ODL allows an expansion of enrollments at little cost when compared to the popular residential campus system (Musingafi et al., 2015).

In the context of ODL, flexibility denotes students' freedom of choice in terms of the time, place, and pace of learning and teaching (Bergene et al, 2023; Naidu, 2017). At the heart of ODL, flexibility allows students to schedule a convenient time to learn and choose the course most relevant to the knowledge and skills needed. ODL fosters students' flexibility to have access to higher education through online learning. Similarly, online learning is a form of distance education that is enhanced through e-learning resources (Sadiku et al., 2018). In order to facilitate ODL, electronic resources and activies can be useful in ensuring students' interactions in the absence of course instructors.

Towards increasing people's access to education, ODL in the context of Tanzania has capitalized on the regular use of blended learning. Blended learning is a form of educational delivery that involves face-to-face and online instruction or learning (Hrastinski, 2019). Blended learning involves combining pedagogical approaches and a wide range of instructional technologies to optimize the learning process (Cronje, 2020). When students learn utilizing blended learning, they require both offline and online participations in the learning process. Similarly, online learning makes use of internet services to access and retrieve materials (Hoi et al., 2018). Education programs through Zoom, Telegram, or other video conferencing applications require stable internet for effective strong connectivity. Through ODL, students irrespective of not being in atraditional learning environment acquire knowledge and skills through distance education (Cronje, 2020). By comparing these learning modes, it can be asserted that ODL is an umbrella learning strategy that embeds other forms of learning to maximize its flexibility and adaptability to a wider scope

of access to higher education. In these perspectives, the OUT configures the use of blended learning to make effective use of available digital resources for students' flexibility in access to education.

Worldwide, the demand for a highly skilled workforce to drive the competitive, knowledge-based economy, fueled by scientific innovations and the effects of globalization, has continually increased the need for ODL (Godrick, 2017; Manson, 2016). On this basis, the provision of education services by means of ODL in HEIs has continued to improve in many countries. For example, in China, the Open University of China (OUC) which was established in 1978 had over 2900 HEI offering diploma and degree programs employing ODL in 2017 (Zawacki-Richter & Qayyum, 2019). In Germany, HEIs are committed to the provision of education in a wide range of online education programs. Collective initiatives for strengthening opportunites for ODL have resulted in an increased youth admission in HEIs. In South Korea, the provision of education has constantly responded to increased technological innovation by digitalizing teaching and learning practices thus, promoting ODL as a strategic goal for economic growth and invention (Zawacki-Richter & Qayyum, 2019).

In Africa, notable efforts to increase the provision of education through ODL have been experienced in different countries. For example, the University of South Africa (UNISA) emerged as the first African distance HEI in 1873 (Craven, 2019; Manson, 2016; Maritim et al., 2012). In Nigeria, the National Open University of Nigeria (NOUN), established in 1983 and with campuses in Lagos, Adamawa, Borno, and Kan accepted 32,400 pioneer students in 50 education programs (Eyisi et al., 2021). These initiatives for the establishment of ODL captivated a great number of qualified youths to benefit from higher education. Strategically, there is a progressive move in the education sector as ODL is currently transforming higher education in Africa. For example, Oladejo and Gesinde (2014) argue that the ODL revolution across the African continent was evidenced in the countries of Nigeria, Tanzania, South Africa, Sudan, Rwanda, Ghana, Zimbabwe, and Kenya. These countries are at present offering ODL by means of a single or dual modes, consequently, reducing obstacles for people being admitted for higher education. ODL has contributed significantly to an increased education opportunity for people in Sub-Saharan countries. For example, from 1992 to 2003, Malawi had 18,000 graduate teachers through ODL, a significant achievement as it would usually take 12 years to train this number of teachers using traditional methods in colleges (Oladejo & Gesinde, 2014).

The Relevance of Open and Distance Learning in Tanzania

The provision of ODL in developing countries including Tanzania is vital for increasing the knowledge and skills that people need in order to master their environment (Godrick, 2017). In 1992, the Parliament recommended the establishment of the Open University of Tanzania (OUT) which began to offer higher education through distance learning in 1994 (Kagugu, 2011; Mhache, 2013; Msoffe, 2016). As asserted by Mbwette and Kazungu (2012), the primary purpose for the establishment of OUT was to expand the scope of adult learners' accessibility to higher education. The OUT is an accredited

government institution that offers a broad range of degree programs through blended learning. ODL aims to lessen barriers to education and expand the scope for increased education opportunities regardless of their societal, cultural, and political backgrounds and time constraints. During the beginning of its operations in 1994, OUT had an initial enrollment of 766 students (Mbwette & Kazungu, 2012). By 2008, OUT had already admitted 40,146 students into various education programs (Mnyanyi & Mbwette, 2009). However, low enrollment of students pursuing higher education at OUT was observed and was ascribed to people's perceived negative attitude towards OUT as an HEI exclusive only to adults. The establishment of OUT fostered the inclusion of course programs with knowledge and skills relevant to the world of work for adult learners. One of the initiatives involved removing barriers to people with the least prerequisite of joining directly to the university (Sanga, 2013). ODL also provides chances for the personnel in the profession to proceed with learning while earning (Msoffe, 2016; Sanga, 2013).

Education at OUT is offered through blended learning (OUT, 2016). Blended learning is a learning mode that involves the combination of online and direct instructions (Moskal et al., 2013). The blended mode of learning encourages the use of various platforms which include online applications, mobile technologies, and resources that exist in the cloud. The blended mode of education delivery involves the utilization of various means of technologies such as Zoom and Moodle and video and teleconferencing (Mathew & Iloanya, 2016). Students enrolled at OUT are obliged to become proactive in using different sources of information for the construction of new knowledge in constructivist learning. In this view, students undertaking studies through ODL are likely to develop a sense of independent learning by reading and taking critical reflections on what they learn.

Presently, the OUT has 32 centers with 89,056 students being registered in various education programs. Blended learning has become the popular mode of education delivery for the purpose of increasing flexibility for students' access to education irrespective of their geographical boundaries. Among these 32 centers, there is one center registered at the headquarters to accommodate all international students pursuing their studies in different programs at the OUT. With technological advancements in teaching, sessions for face-to-face learning sessions between students and instructors have decreased drastically. The use of learning platforms such as Moodle and Zoom with adequate internet services has enhanced the operations of ODL.

ODL has continued to become a flexible means of equitably enhancing education delivery by removing barriers to geographically marginalized individuals and women with domestic duties, enhancing their empowerment (Bergene et al., 2023). Perraton et al. (2002) and Komba (2009) stated that ODL provides a venue for teachers to advance the knowledge and skills related to their job performance. In addition, it catalyzes teachers' continual professional growth regardless of their context and professional responsibilities (Moore & Benson, 2012). The ODL also fosters lifelong learning by enabling people to explore all possible learning opportunities and enhance the knowledge development of teachers in inaccessible areas through increased education opportunities

(Alvarez et al., 2020; Leopold, 2017). The operation of ODL therefore addresses the challenges to conventional teaching and learning practices in terms of cost, access, and quality of education by increasing education opportunities for geographically marginalized individuals. Gupta (2008) claimed that, because of the increased demand for students' enrollment in HEIs, ODL is the means to overcome the amplified massive enrollment in higher education.

Future success and goal attainment for the provision of ODL depends on various strategies that various HEIs will put into action. The epistemological stance towards ODL is recognized for its significant contribution to an improved economy if all its vested potentials are realized (Godrick, 2017). While reflecting on the effects of the COVID-19 pandemic on HEIs, the promising future for the ODL in Tanzania is viewed in its capacity to increase opportunities for higher education (Mbwette & Kazungu, 2012; Mirata et al., 2022). This will be made possible by transforming ways of ODL institutional operations to align with new technological innovations that create interactive, effective, and quality education services (Mbwette & Kazungu, 2012; Sife et al., 2007). One of the transformations involved making use of the available resources to improve education delivery through ODL and reduce physical barriers.

At the broader ambit of distance education, the OUT has been identified as having conducive learning platforms similar to some notably developed countries in terms of technological innovation for learning. For example, a comparative study by Nyandara (2012) on the provision of ODL between Tanzania and the Center for Continuing and Distance Education (CCDE-China) explored the similar use of technological devices in the delivery of education. However, China went the extra mile by adopting the use of e-mails in education services. In response to the global COVID-19 pandemic, OUT like other ODL institutions in the world expanded and strengthened access to education with the support of digital resources (Mirata et al., 2022).

Objectives

Specifically, the study intended to analyze the prospects of the ODL at the OUT after the emergence of the COVID-19 pandemic to increase community understanding of the flexible HEI available. The findings of the study will add knowledge about the relevance of ODL in Tanzania. By analyzing prospects for OUT, education actors will be informed on adapting the use of ODL for sustainability and continuity in education irrespective of lockdowns that might arise as a result of a pandemic.

Theoretical Underpinning of Open and Distance Learning and its Implications

ODL is underpinned by the constructivist framework. Constructivism is an instructional approach that is student-centered in the construction of knowledge with students having control of their own learning (Tenenbaum et al., 2001). According to Tenenbaum et al. (2001), the constructivist theory recognizes that students' learning is not strictly limited within the boundaries of the formal educational institution, but rather, takes a broader context of their academic lives through the use of social media and the vast potential of the technology

involved in teaching. In a constructivist learning theory, the gap between formal education institutions and the broader community becomes narrower as a unique set of learning opportunities are created (Reid-Martinez & Grooms, 2015). The use of telecommunication technologies in ODL is congruent with the use of constructivist perspectives by giving students chances to connect themselves with other people all over the world. As a result of interactions, students can carry out research and discuss subject matter content through a collaborative and interactive learning environment (Tam, 2000). Similarly, teaching technologies such as computer-mediated communications, computer-supported collaborative assignments and e-resources create a supportive, collaborative, and social learning environment that aligns with the constructivist learning perspective (Chen et al., 2018; Lazou & Tsinakos, 2022; Rosé & Ferschke, 2016). Constructivism pushes for active, collaborative, and responsible learning as consistent with the ODL principle of independent learners.

Methodology

The study employed a qualitative research approach and exploratory case study design in order to explore the phenomena and the participants' view in their natural setting (Creswell, 2014). Creswell (2014) argues that using exploratory design in a case study enables the researcher to immerse in the participants' context to explore their lived experiences of the topic under investigation. Furthermore, Yin (2009) asserts that the use of an exploratory case study provides the researcher with an opportunity to explore phenomena in their natural context, consequently, facilitating an in-depth analysis of the research topic. Data for the study were collected by using interviews with fifteen (15) academic staff from OUT who were purposively selected. Similarly, five technical staff were conveniently selected to be involved in the study. Documentary review was also carried out in order to capture essential information and enhance the triangulation of findings. Data were thematically analyzed in six stages. The stages for thematic analysis involve familiarizing with the data, creating initial codes, searching, revising, defining and naming themes, and producing the report (Braun & Clarke, 2006).

Discussion

Findings from the study indicated that there are six prospects of the ODL at OUT vested following the emergence of COVID-19. These prospects include deliberately executing the institutional vision and mission at OUT, raising community awareness of the presence of OUT, increasing flexibility in the enrollment rate to utilize available ODL learning facilities, engaging financial institutions in the provisions of students' loans, strengthening the integration of ICT in education delivery, and enriching courses and programs as per market demand. Each of these themes is discussed in the subsequent sections:

Deliberate Execution of Institutional Vision and Mission at OUT

Commitment to the operation of ODL at OUT based on its vision and mission was the focus of the institution in realization of future operation of the ODL. Document

analysis showed that the institution's efforts and performance aligned with its mission and vision. OUT's vision of becoming "*A leading open online University in knowledge creation and application*" and its mission is, "*To provide relevant, quality, flexible, accessible and affordable open online education, research and services to community for social economic development of Tanzania and the rest of the world*" were visibly reflected.

It was revealed that daily operations at the OUT are prompted by institutional vision and mission which guides the organization's culture and practices. The enactment of central functions of the OUT and its strategic plans best describes operational procedures reflected in its mission and vision. Consequently, the mission and vision play a role by guiding the institutional operations and practices for the promotion of ODL in Tanzania. As asserted by Siakas et al. (2005), mission and vision articulate the main purpose and responsibilities of the organization and lead to the attainment of the plans. In addition, leaders' continual commitment to OUT's mission and vision enhances strategic planning and management of institutional processes (Maleka, 2014).

Raising Community Awareness of the Presence of Open and Distance Learning in Tanzania

Community awareness is vital for understanding potential opportunities related to learning through ODL. Awareness creation enables people to make choices on the type of education to pursue by considering the knowledge and skills an individual needs and the country's priorities. Findings revealed that increasing the community awareness of the presence of ODL as an accredited learning institution was among the future opportunities to be reinforced. It was reported that the OUT intends to strengthen institutional posters for prospective students on the presence of educational opportunities at OUT by creating awareness for students who are still in secondary schools. The plan intended to involve educational coordinators commonly known as Ward Educational Officers (WEO) so that students become knowledgeable of its existence and possibly, opt to advance their studies through OUT as an accredited and equally reputable HEI. For instance, once a participant clarified:

> We are continuing with marketing of the OUT. Currently we have established Regional Advisory Committee (RAC) in each region. The Regional Commissioner by position holding become the chairperson of the advisory committee to the Open University in place on matters related to institutional visibility and its operations because we have complete institutional structure in each region. Also, we have decentralized issues of graduation ceremony into regions so as to keep on promoting the visibility of the OUT. (Interview, P4 from OUT)

Community understanding of ODL as a flexible learning opportunity depends on the extent to which individuals are familiar with its existence and benefits. In transforming people's mindset about ODL, Sanga (2013) asserts that initiatives are required to publicize OUT and course programs offered through outreach activities in remote areas. According to Sanga (2013), the government and the general public intends to increase people's awareness and provide support in

the promotion of OUT. Knowledge of the ODL philosophy and mode of delivery increases understanding of opportunities for learning, the value of existing technology, and its capability to support learning for bridging the knowledge gap and understanding alternative approaches to learning regardless of age and location (Liu et al., 2007; Pant, 2008). Furthermore, through documentary analysis, it was noticed the presence of brochures with various degree programs offered at OUT were prepared for visitors and dissemination in different schools for the creation of awareness of the opportunities at OUT.

Increasing Flexibility in Enrollment Rate to Utilize Available ODL Learning Facilities

The creation of a flexible learning environment is one of the attributes mostly considered in the delivery of education through ODL so that learners are provided with diverse ways of learning (Oladejo & Gesinde, 2014). Findings through interviews revealed that an increased flexibility of the learning environment would lead to an increased enrollment. In addition, it was observed that OUT had adequate facilities to accommodate whatever increase in the number of students because in most cases the available facilities are underutilized. In emphasizing plans to increase enrollment at OUT, one participant highlighted:

> We are planning to increase students' enrollment rate from 89,056 to 150,000 by enrolling each year at least 15,000 students. The target candidates are those from the formal system due to massively enrollment resulting from fee-free education and increased classroom enrollment through "(UVICO-19)" classes. Furthermore, increasing enrollment is a country's response to Sustainable Development Goals by 2030 and World Bank projects which address the promotion of education for all. (Interview, P1 from OUT)

With the adequate learning infrastructure being underutilized, another participant supplemented on the potential opportunity of using the resources available by articulating that:

> We intend to promote flexibility in terms of enrollment time by increasing number of intakes from November first intake to the second intake in April. In addition, flexibility will be more improved in matters related to certification where upon successful completion and approval by the responsible authority, the graduate will be awarded the certificate so that they can use to request for promotion at work or securing jobs rather than waiting for graduation. (Interview, P3 from OUT)

These findings provide relevant evidence for the future commitment towards increasing students' enrollment and therefore widening the opportunity to access higher education which conventional institutions could not manage. This strategy is likely to contribute to the massive increase of people with relevant skills to serve the country from local, regional, and global perspectives and contribute to social and economic reforms. The OUT's prospects in improving education delivery utilizing ODL correspond with the 1997 SADC Procedure on Education and Training Development that recognizes ODL as a means for

intensifying opportunities for education for people with limited chances to attend face-to-face classes (Maritim et al., 2012). It is further asserted that, by using ODL, a vast number of learners are equipped with skills for the implementation of a multifaceted regional developmental agenda.

Engaging Financial Institutions in the Provisions of Students' Loans

It was found that few students are enrolled at OUT because of financial constraints encountered as compared to those admitted in conventional higher learning institutions. It was realized that plans of the OUT to increase students' enrollment should involves engaging financial institutions that are eligible to provide loans for students upon their admission at OUT. For example, one of the senior staff at OUT said that:

> The OUT intends to involve financial institutions such as Banks (National Microfinance Bank in particular) in giving students' loans when being admitted at OUT under specific contractual agreements between students and the bank in which the OUT will make confirmation of students' admission status to the bank. (Interview, P1 from OUT)

Students' financial support for pursuing higher education and institutional support services are imperative for their smooth learning. In Tanzania, for example, the Higher Education Students' Loans Board (HESLB) plays a vital role in ensuring that many Tanzanian students get access to higher education. The current financial support indicates that many students especially those enrolled at the OUT are less considered for financial support. Nyahende (2013) stated that financing higher education in Tanzania increases enrollment of students in higher learning institutions. A response to the funding crisis involves increasing the significant scale of private funding of higher education. This strategy of engaging financial institutions in provisions of funds among students was also supported by Guille (2000) who argues that the World Bank, non-governmental organizations and other financial institutions are entitled to support students equitably to have access to higher education. Additionally, Guri-Rosenblit (2019) and Garrett (2016) suggested that administrators can strategize to identify possible target groups with challenging social and economic backgrounds in terms of education access. Financial support through provisions of loans to students admitted at OUT can increase students' enrollment rate and motivate more people to seek admission similarly.

Strengthening the Integration of ICT in Education Delivery

ICT integration in teaching and learning, research, and administrative purposes is imperative for successful and efficient ODL operations. Findings revealed that OUT has adequate ICT infrastructures which are underutilized due to the small number of students enrolled. On such grounds, great emphasis is on promoting its maximum utilization through increased enrollment in different programs. To underscore this point, one of the participants said that:

> We have sustainable ICT infrastructures. During COVID-19, we thought of having home-based assessment and we started conducting

> online Oral Examination (OREX) and managed to assess almost 2,000 students at their home place without coming to our regional centers. Currently, we have established On Demand Examination (ODEX) which provides great flexibility for our students to request for examination independently upon completion of the courses. (interview, P1 from OUT)

In addition, another technical staff added some important issues related to the process of strengthening ICT integration in the delivery of education by means of ODL by articulating that:

> ICT is the major technology for OUT operations that supports the continued transformation of the teaching and learning process from using CD to Moodle, Zoom, and video conferencing. Therefore, we are very keen in ensuring stable internet and use of modern learning facilities. (Interview, P5 from OUT)

Based on the participants' responses, the prospects of the OUT in ensuring maximum and efficient ODL operations potentially rest on strengthening the bandwidth of internet service capacities. Through documentary analysis and observation of ICT internet setting, it was found that, currently, the OUT has 20 established systems of interconnected internet which are stable to help education delivery through ODL by using various learning programs which can include Moodle and Zoom that require highly stable internet services. These findings are supported by Guri-Rosenblit (2019) who argued that ODL institutions require digital technology from local and global perspectives to enable staff to deliver the courses effectively, be involved in research fellows' teams, and collaborate with other HEI. To support the idea, Perraton et al. (2002) assert that ICT plays a great role in ODL by facilitating two-way computer-mediated learning through networked computers and diversified resource-based learning. Alvarez et al. (2020) supported that the introduction of the internet and technology changed the way in which teaching and learning in ODL are upheld. Increasing internet capacity can improve the effectiveness of digital learning tools and platforms such as Zoom, and Moodle. The increased bandwidth leads to smoother video conferencing and better access to computer mediated programs, optimizing the learning in ODL.

Enriching Courses and Programs as per Market Demand

Continuing enrichment of courses and programs as per market demand is one of the prospects of OUT in ensuring sustained expansion of students' access to higher education. Findings indicated that students registered at OUT have the freedom to choose programs and courses based on job market demand and affordability. In addition, findings indicated that students with admission at OUT can register and pay for courses based on their financial ability until course requirements are accomplished. For instance, OUT introduced a curriculum for entrepreneurship education to provide students with skills highly required for self-employment. One of the participants mentioned that:

> Apart from teaching development studies and communication skills as

> university-wide courses, we also teach entrepreneurship course. This course has its own respective department. We offer entrepreneurship courses at all levels. Also, we have a diploma course using the NACTE curriculum particularly for the ICT courses. All these are referred to as non-degree programmes. Even when you see our graduation book, we have all these courses and we are thinking of developing them for Diploma, Bachelor, Masters and PhD levels. (Interview, P1from OUT)

The argument by the participant indicates that market demand for skills determines the nature of course programs offered at OUT. With an increased need for job-related skills in the 21st century, the process of learning becomes learner-centered with adequate student flexibility in choosing courses and/or programs as per their demand. The aim is to ensure that individuals explore the maximum learning opportunities available through ODL. As evidenced by Sanga (2022), the OUT provides various courses based on students' needs to strengthen their competencies at work and promote efficiency in job performance. Gumpot (2000) asserted that course restructuring in ODL higher education institutions should rely on market discourse for people to demonstrate skills that are market responsive.

The prospects of ODL can be further analyzed in its flexible nature of education delivery. The ODL offers freedom for students to choose a convenient time for learning and serves as a means for improving knowledge and skills for those who did not acquire it in conventional institutions (Sanga, 2022). Mbwette and Kazungu (2012) assert that ODL provides adult learners with a broad range of choices for courses useful in job-related skills because various degrees and non-degree programs are offered by OUT through various means of communication including correspondence, e-learning, and some on-campus sessions. Commonly, blended learning mode which combines two or more modes of teaching and learning is frequently used. In Africa and Tanzania in particular, educational operation by means of ODL at OUT depends on the institutional mission and vision. Most ODL institutions operations in Sub-Sahara are not informed by their corresponding national ODL policy to govern the general provision of education (Mathew & Iloanya, 2016; Oladejo & Gesinde, 2014; Sanga, 2022).

ODL provision at OUT is potentially an opportunity to provide higher education to a wider population while they remain in their employment and other services (Sanga, 2022). It further creates opportunities for gender equality in access to education particularly for women who are overwhelmed with family responsibilities (Nyangarika & Mtani, 2020). Towards the realization of a knowledge-based economy, the OUT can make use of advanced technology-based instructions to increase learners' interaction in the process of learning despite existing geographical barriers among students (Nyangarika & Mtani, 2020; Sanga, 2022).

Conclusion

The findings of the study have demonstrated that the future operation of ODL is a function of various strategies that cover the deliberate execution of institutional vision and mission at OUT: raising community awareness for the

presence of OUT, increasing flexibility in enrolment rate to utilize available ODL learning facilities, engaging financial institutions in the provisions of students' loans, strengthening the integration of ICT in education delivery, and enriching courses and programs as per market demand. Based on these findings, it can be concluded that the OUT has a rich learning repertoire of prospects that need to be fully utilized in an attempt to promote education access. With due increase of the population in Tanzania and other developing countries, the prominence of ODL will continue to increase in order to increase people's access to higher education. Increasing awareness of ODL will create interest and upsurge in education access among the people in need of higher education.

Recommendations

Drawing on the conclusion of the study, this paper recommends that, together with the government establishing ODL policy, the OUT is required to have a greater commitment to its mission, vision, and other strategic rolling plans to efficiently manage institutional operations. Deliberate efforts to advertise learning opportunities through ODL should be made through social media in order to capture a massive number of needy people. Similarly, the institution responsible for monitoring admissions as well as provisions of student's loans should place equal priorities in terms of students' admission and financial support for students at OUT. Likewise, OUT should strengthen the band of internet connectivity to extend access to higher education as a result of the increased population.

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Quality of Study Life During the COVID-19 Pandemic of UPLB Students

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Abstract

The University of the Philippines Los Baños (UPLB) met an unprecedented health crisis as it faced the global COVID-19 pandemic. Academic institutions including UPLB were forced to adjust to a sudden change in the mode of learning through a remote distance learning (RDL) setup. This study, guided by the Four Pillars of Supporting Student Success framework (Roddy et al., 2017), aimed to investigate the remote learning experiences of UPLB students to recommend gender-sensitive policies. A total of 350 randomly selected UPLB students were surveyed on the challenges, coping mechanisms, and views on RDL.

Similarities and differences were observed in several areas. It is worth noting that, regardless of sex, most of the respondents felt uncertain about the future and that they needed information and services that could help them cope with these feelings of uncertainty. Both male and female respondents thought that counseling could help but only female respondents were willing to attend counseling sessions.

Respondents reported academics as their main source of stress with workload and lack of consideration by the professors as the main issues. Most respondents indicated the need for orientations about academic and library services. There was a strong association between sex and feeling comfortable with remote learning as female respondents were more comfortable with the RDL setup compared to the male respondents.

***Keywords**: gender, policy, higher education, student support, remote learning*

Introduction

The global COVID-19 pandemic brought an unprecedented health crisis and the University of the Philippines Los Baños, as an academic institution, was not spared of its negative impacts. Experienced in countries all over the world, the pandemic negatively affected the Philippine educational system as schools were unprepared for this scenario. Given the uncertainties and vulnerabilities created by the pandemic, it is important to understand the various situations and experiences of students at home and the implications of various gender factors during online or remote learning, whether synchronous or asynchronous mode.

The pandemic has brought the country under quarantine which greatly affected the students. The change of teaching and learning to an online format or into Remote Distance Learning (RDL) has impacted many. The predominant concerns and issues that arise are the lack of equipment to participate in online or blended learning for students to engage in such learning activities (Plakhotnik, et al., 2021). In addition, the students may have been placed in a learning environment whereby they would have to engage in different roles, such as participating in doing house chores on top of their classes and other distractions that may be barriers to doing their classes online (Locion, et al., 2022).

Objectives

This study investigated the status of UPLB students on RDL during the pandemic and determined the factors affecting the quality of study during RDL implementation. In particular, the study aimed to:

1. Describe the socio-demographic characteristics of UPLB students;
2. Document the experiences, challenges and coping strategies of UPLB students on remote learning;
3. Analyze the perspectives of UPLB students on RDL within the context of the Four Pillars of Supporting Student Success; and
4. Investigate gender-related factors that affect study and productivity during the RDL implementation.

Review of Related Literature

Academic Needs and Situation

With the transition to remote learning, students began accessing educational resources delivered via digital platforms, posing novel challenges for both students and educational institutions. Despite encountering technological barriers, Indian students were reported to effectively utilize online learning resources (Khan et al., 2021), a trend similarly observed among students in Saudi Arabia (Mahyoob, 2020). Concurrently, students sought academic services online, with particular emphasis on library resources. A study involving Chinese and Italian students found that the majority utilized library services more frequently during quarantine, predominantly for accessing free educational content, instructions on network library services, and off-campus

digital resources. Many students acknowledged the crucial role of libraries in facilitating distance learning (Zhou, 2021). However, there was a possibility that students were not fully cognizant of available library services. In a comparative analysis of library usage across three American universities, Connell et al. (2021) contended that the upsurge in digital library resource utilization during the pandemic was partially hindered by students' lack of awareness. Similar observations were made among Chinese students, who expressed a desire for enhanced support from libraries to fulfill their academic requirements. Moreover, students encountered difficulties in navigating library resources due to technology-related obstacles (Shi et al., 2021).

In addition to library services, university students encountered challenges in seeking academic guidance and tutorials for their courses. While seeking assistance from teachers and utilizing university tutorial services was relatively straightforward before the pandemic, the shift to remote learning exacerbated the difficulty in accessing such support, particularly for students from low-income backgrounds (Salmi, 2020). A survey among university students in Spain revealed that tutoring models requiring minimal bandwidth, such as email and instant messaging applications like WhatsApp, were most frequently utilized. Despite the availability of video conferencing applications for tutorials, which necessitated better internet connectivity, students still preferred face-to-face tutorials. Video conferencing was deemed the least satisfactory among tutorial models, with students reporting it as less effective in enhancing awareness of university resources, study habits, motivation, sense of inclusion, academic and professional planning, and teacher-student relationships compared to other tutoring methods (Perez-Jorge et al., 2020).

Interacting with peers or fellow students proved to be as crucial as engaging with teachers in the educational setting. At Indiana University, students experienced reduced interactions with both teachers and peers during the transition to remote learning, resulting in detrimental effects on their academic performance and sense of belonging (Indiana University Pervasive Technology Institute, e-Learning Research and Practice Lab, 2020 as cited in Cavinato et al., 2021). Beyond the decreased frequency of interaction, the absence of peer-to-peer engagement limited opportunities for collaborative learning through inquiry and clarification (Gillis & Krull, 2020). Moreover, the quality of communication among peers raised concerns. Students in Hong Kong reported difficulties in meeting group requirements due to the necessity for active feedback from peers, which was hindered by technical constraints and functional limitations of video teleconferencing. Establishing connections with peers and leveraging peer learning in a virtual classroom environment proved to be challenging (Wut & Xu, 2021).

Technological Needs and Situation

Addressing technology-related needs and understanding students' situations concerning technology emerged as a paramount concern in the context of remote learning during the COVID-19 pandemic (Kelley & Columbus, 2020). A survey conducted among medical students in the Philippines revealed that one out of five students did not possess a laptop, and reliance on prepaid internet

for connectivity remained prevalent. While a majority had access to postpaid internet, the availability of learning materials was still affected by inadequate infrastructure, power outages, and internet expenses (Baticulon et al., 2021).

Technological barriers were particularly pronounced among students in rural areas of the Philippines. Gocotano et al. (2021) observed that the majority of students in rural settings owned only smartphones and relied primarily on mobile data. Consequently, they faced challenges in fully engaging with remote learning due to intermittent network availability and uncertain economic circumstances affecting their ability to purchase mobile data. Additionally, many students lacked the digital literacy skills and proficiency required to effectively utilize remote learning applications.

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Health and Wellbeing Needs and Situations

Amidst the pandemic, concerns regarding both physical and mental health emerged prominently across various age demographics. A global survey conducted among academic staff and students across 41 countries identified COVID-19-induced lack of motivation and social isolation as primary concerns (Filho et al., 2021). Similarly, students at an American university reported experiencing diminished motivation to engage in discussions, interactions, and academic pursuits (Shin & Hickey, 20210). Beyond issues of motivation, students expressed feelings of uncertainty regarding their future prospects (Sahu, 2020). Notably, students from a university in the Philippines voiced apprehensions about their career prospects in light of perceived employer biases against remote learning compared to traditional methods (Cleofas, 2021). Furthermore, the implementation of lockdown measures contributed to heightened anxiety and depression among Italian university students (Villani et al., 2021).

Likewise, Omani students reported experiencing moderate to high levels of stress associated with e-learning, with stress levels showing a significant inverse correlation with academic performance (Malik & Javed, 2021). Similarly, American university students experienced heightened pandemic-related stress and anxiety, stemming from fears of contracting the virus, disruptions to sleep patterns, reduced social interactions, and academic concerns (Son et al., 2020). Conversely, the majority of students from Hubei Province, China, reported normal anxiety levels during the earlier stages of the pandemic when COVID-19 was still considered an epidemic. However, anxiety levels were found to be significantly correlated with economic status, concerns about academic delays,

and disruptions to daily life. Factors such as residing in urban areas, living with parents, having stable family income, and receiving social support were associated with lower levels of anxiety symptoms (Cao et al., 2020).

College students expressed significant impacts of COVID-19 on various aspects of their lives, including heightened stress or anxiety, feelings of disappointment or sadness, experiences of loneliness or isolation, financial setbacks, and relocations. Additionally, they struggled to maintain adequate levels of physical activity. Despite these challenges, many students remained hopeful or extremely hopeful about the future (Active Minds, 2020a; Active Minds, 2020b). This sentiment was echoed in interviews with Filipino students conducted by Cleofas (2021), who expressed optimism and hopefulness despite the challenges posed by the pandemic, reflecting a common theme of resilience and self-reflection among respondents.

Sense of Community

According to a survey conducted among university students in the United States, the majority expressed feelings of disconnection and a lack of attachment to their institution. They also noted a greater sense of connection with teachers compared to fellow students (Blankstein et al., 2020). As remote learning was perceived as less engaging and inferior to traditional face-to-face instruction by American students, they appreciated the efforts made by their universities and professors to enhance the quality of the remote learning experience (Top Hat, 2020 as cited in Kelley & Columbus, 2020). Students emphasized the importance of various avenues for connection, including virtual events, digital gatherings, phone conversations, and even face-to-face interactions, as well as the creation and maintenance of virtual social networks and involvement in campus groups, as essential means to cope with and support their mental well-being during the pandemic (Active Minds, 2020a; Active Minds, 2020b).

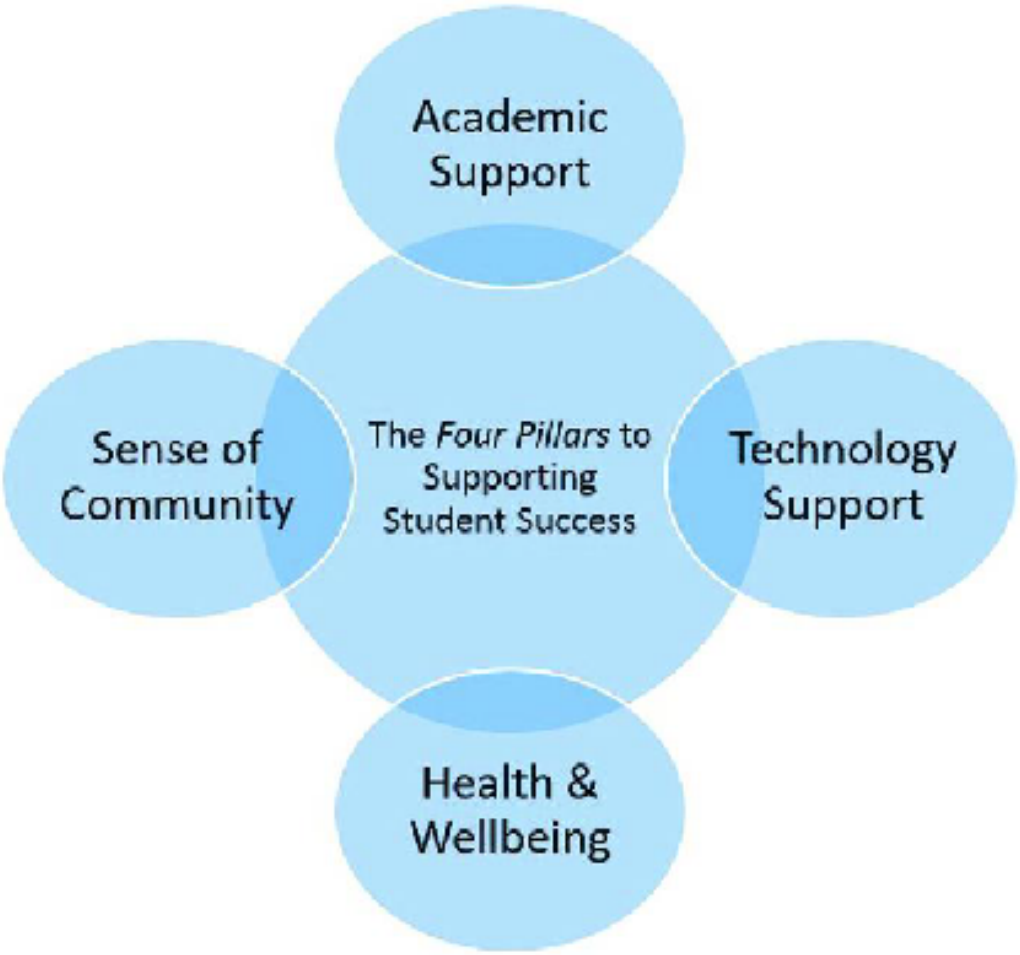
Conceptual/Theoretical Framework

The basis of the study is Roddy and colleagues' (2017) Four Pillars of Supporting Student Success.

Considering student support services is paramount in an online environment where technology interruptions and lack of support services can be significant barriers to student involvement in learning. Students who are enrolled in remote learning face more challenges in accessing support services than students who are on campus with fewer barriers to avail university services (Lee, 2010).

The "Four Pillars" that support student success (Figure 1) are often intangible assets that educators take for granted when offering complete online courses. These pillars include online friendly academic support (Coonin et al., 2011; Huwiler, 2015), navigation technology support (Lee, 2010), health and wellness facilities (Anderson, 2008), and attribution or community (Kumar & Heathcock, 2014).

Figure 1
Four Pillars of Supporting Student Success



The first pillar, and perhaps the most important support that any institution can provide to students online, revolves around online-friendly academic resources and opportunities for student teacher interaction (Cannady, 2015). Obtaining an online higher education degree depends largely on the ability of students to work independently and manage their time effectively (Wang et al., 2013). As mentioned earlier, in addition to the personal qualities students need to have to succeed in an online course, the institution offering the course must have a suitable online-friendly academic scaffolding that can accommodate and support students throughout their learning (Lee & Choi, 2011). This includes detailed orientation offers and a wealth of library resources. Providing orientation services, especially for online students, is essential for the proper integration of incoming cohorts into the new online learning environment (Cho, 2012).

The second pillar is one of the most direct and unique hurdles faced by online students, providing the right technical framework to enable students to study in an online-only environment (Shea et al., 2005). Universities that offer fully online courses need to clearly inform students of all technology requirements before starting the course and provide ongoing technical support to reduce delays in meeting the expectations of the course. This is especially important for intensive forms of online learning. Evaluation deadlines leave little or no

room for technical hurdles. A strong correlation between student technology adoption and their perceived satisfaction with online courses is also important. This is because it may present additional hurdles to the next cohort that is unfamiliar with learning in an online environment (Lee, 2010). The lack of professional skills required on the part of students or faculty presents significant and sometimes insurmountable barriers that can contribute to student dropouts. Therefore, introducing an easy-to-use learning environment and flexible online technical support for intensive online courses is important for increasing student retention and engagement.

Apart from the need to overcome technical barriers, academic performance pressure, transition to college life, and time management are also concerns. Everyone benefits from the third pillar of health and welfare support. College student groups were found to have worrying rates of mental health problems (Andrews & Wilding, 2004; Bayram & Bilgel, 2008; Hjeltnes et al., 2015), and online student groups, especially those adapted to the intensive learning regime, face challenges. In response, universities have worked to support students and promote positive mental health and well-being in order to combat the growing psychological distress (Regehr et al., 2013). One example is an effort to expand the online student support programs which are already available to students on campus, such as personal and career counseling. (Dare et al., 2005; Lapadula, 2010). However, this solution often bypasses the large number of online students who are not in the geographic area to access these services, in person because of such these are done by phone.

The final pillar needed to support student success is that in a fully online cohort, attribution and community are priorities. Facilitating open dialogue between students, faculty and staff, and fellow students is essential for online learning. This is often taken for granted when conducting online courses (Coomey & Stephenson, 2001).

Methodology

To address the research objectives, the questionnaire was structured into 13 sections: informed consent, socio-demographic information, socio-economic information, home set-up, academic support, mode of learning preferences, class interaction and orientation, technological support, connectivity and equipment, health and wellbeing, UPLB support during the pandemic, sense of belonging, ways to communicate, and feedback. The questionnaire was designed to incorporate the conceptual framework of Rody's (2017) four pillars of supporting student success. These pillars served as the basis for structuring the questionnaire, ensuring a comprehensive exploration of the challenges and experiences faced by UPLB students during the pandemic.

Data gathering was conducted through the distribution and administration of the survey questionnaire utilizing the online platform Qualtrics. Participants were given the option to respond either visibly through emails directly sent to them or anonymously through links disseminated by their respective offices across various communication platforms. The questionnaire consisted of 146 questions presented in diverse formats such as open-ended, multiple-choice,

multiple-choice matrix, checkboxes, and linear scales. Pre-testing of the survey questionnaire was conducted before the beginning of the survey enumeration period.

A two-way stratified random sampling design was used to ensure the widespread data collection across the different colleges of UPLB while also ensuring the representation of students at different academic levels. In the first stage of the stratification, the student population was divided into high school, undergraduate, and graduate levels. The high school student population included the UP Rural High School (UPRHS) students, which was further stratified by grade level. The undergraduate students were stratified by college and year level, and the graduate students were stratified by degree program. The questionnaire was distributed to 1,557 randomly selected students – 142 high school students, 1,105 undergraduate students, and 310 graduate students. However, following the end of the survey enumeration period, data cleaning, and verification of responses, only 350 were considered viable. Such responses include only those who completed answering at least 94% of the questionnaire.

Given the extremely low response rate equating to only about 5%, the survey results were considered as deriving from a non-probability sample. Consequently, the findings drawn from the data were considered applicable solely to the respondents and not representative of the entire UPLB student population.

Results and Discussion

Socio-demographics

The study took into account the socio-demographics of the respondents in terms of age, sex at birth as well as other variables such as health insurance coverage and membership in student organizations.

Most respondents (64%) were female while only 36% were male. The highest number of male and female respondents were between the age range of 18 to 24 years old, accounting for over 70% of the respondents. Meanwhile, there were very few male and female respondents aged 35 to 64 years old or graduate students, accounting for less than 10%. Thus, there were more undergraduate student respondents and very few graduate student respondents. More male respondents reported having health insurance coverage, while more female respondents did not have such coverage.

The majority of both male and female respondents were members of at least one student organization in UPLB. Further analysis also revealed that there is a weak relationship ($V = 0.0186$) between sex and membership in a student organization. This suggests that sex may not be a good determinant of whether a student is a member of a student organization.

During the pandemic, the recruitment activities of most student organizations were conducted online. For many students, extracurricular activities were not prioritized, particularly given the challenges of remote learning and the overall

impact of the pandemic. The demands of the current situation were deemed overwhelming, leaving little room for additional commitments.

However, for a few students, joining an organization served as a means to socialize and cope with the challenges posed by the pandemic. Some organizations adapted by conducting virtual activities to engage members during this period.

Socio-economic Status

The socio-economic status of the students such as scholarship, thesis support, and employment were also profiled. Regardless of sex, the majority of respondents did not have scholarships aside from those provided by Republic Act 10931, also known as the Universal Access to Quality Tertiary Education Act. Under RA 10931, students can afford college without needing additional scholarships, especially with the shift to remote learning which allows them to save on expenses like dormitory or apartment fees, food, transportation, and other costs. Only a small number of students availed scholarships or other financial assistance specifically for internet/Wi-Fi, computers, or laptops needed for remote learning.

Similarly, the majority of respondents did not receive thesis support. Due to the pandemic, thesis activities were suspended for many students, resulting in a lack of thesis support. Approval for thesis grants was typically based on the quality of research proposals, but students faced challenges in crafting their research proposals or adjusting their methodologies due to limitations on fieldwork. Further, travel restrictions and other requirements (such as insurance and medical certificates), led students to pursue research projects that did not require experimentation, field observations, or interviews for data collection. Among the few respondents who were employed, more females have full-time jobs, while more male respondents engaged in freelance work. Additionally, only a relatively small proportion of respondents reported having part-time jobs. Those students who needed to work often came from families heavily impacted by the pandemic. Many families experienced reduced income when a parent or guardian lost their job, which was rampant during the pandemic as most companies either downsized or were forced to close.

Home Setup

Examining students' home setups can provide insights into the environments they experienced during RDL. Based on the survey, most respondents reported residing in Region 4A, followed by NCR and Region 3. The majority of the respondents were living with their parents and only 20% were not staying in the same house as their parents. While many respondents reported not living with other relatives, most of them were living with siblings. It is worth noting that most of both male and female respondents reported that they have their own room or space for RDL in their respective houses. This means that they have a quiet study environment, even in shared living situations.

Furthermore, this study also sought to understand the gender roles during

RDL. Survey results revealed that washing dishes, cleaning the house, and running errands were the most common household tasks undertaken by male respondents, whereas a little more than 50% report doing these chores most of the time or always. Similarly, more than half of the female respondents reported that they were also washing the dishes, cleaning the house, and running errands most of the time or always. Additionally, they were also regularly taking care of their pets. These findings suggest that students, regardless of sex, tend to contribute to household chores.

Academic Support

The majority of male respondents had access to course materials in the Learning Management Systems (LMS) and learning resources from online platforms, as instructed by the faculty-in-charge. However, they had limited access to UPLB's academic and library resources and services, which were primarily available in face-to-face settings. Similarly, the majority of female respondents could access course materials in the LMS and learning materials outside the LMS. They also reported having access to UPLB's academic and library resources and services.

The data for academic support show that regardless of sex, respondents could access academic resources online. This aligns with findings among university students in India (Khan et al., 2021) and Saudi Arabia (Mahyoob, 2020). Additionally, there may be room for improvement in awareness about services offered by UPLB's Learning Resource Center, Interactive Learning Center, and library services, as a lack of familiarity with these services could lead to underutilization, consistent with the findings of Shi and colleagues (2021) among Chinese university students.

Mode of Learning Preference

Respondents were also asked about their preferred mode during RDL, and it showed that both male and female respondents preferred a blend of synchronous and asynchronous delivery across different types of courses.

The preference to have both synchronous and asynchronous sessions for classes regardless of sex could be attributed to technological barriers. Similar to Spanish university students (Perez-Jorge et al., 2020), respondents likely acknowledged that synchronous sessions using video-conferencing applications required a reliable and high-speed internet connection. If done all the time, this could be challenging, especially for those belonging to low-income households (Salmi, 2020), where access to high-end equipment may be limited. Hence, respondents would also appreciate having asynchronous sessions that did not demand too much bandwidth.

Class Interaction and Orientations

Class interactions that students experienced during RDL and the interactions they would want to happen were also examined. A majority of the respondents expressed a desire for reorientations about academic and library resources and

services, with around half of them indicating a need for reorientation regarding their plan of study. Moreover, while male respondents were able to have interactions with their classmates and professors, the majority also reported difficulties with group work. Most students also studied their learning materials independently during RDL.

Students expressed a need for assistance in navigating virtual library services, especially considering that some were not very familiar with online library access even before the pandemic. With limited access to physical libraries, students relied heavily on online library resources (databases, e-books, journal subscriptions) and services (iLib, Open Athens, Turnitin).

Curricular changes and adjustments affected the students' plans of study. Courses were adjusted in terms of their offering and mode (e.g., from lecture-recitation to lecture only). Also, the regular academic load was adjusted from 15 to 12 units to cope with remote learning. This prompted the students to revise their plans (e.g., changing their electives and choosing those without fieldwork or taking midyear courses to fulfill the total number of academic units required for timely graduation).

Regardless of sex, interactions between students and their classmates and instructors/professors are necessary for academic support as fewer interactions could possibly affect academic performance and sense of belonging (Indiana University Pervasive Technology Institute, e-Learning Research and Practice Lab, 2020 as cited in Cavinato et al., 2021). Moreover, respondents having a hard time dealing with group work and their preference to digest learning materials on their own resonated with the findings of Wut and Xu (2021) among university students in Hong Kong. Moreover, the need for reorientation about academic and learning services, plan of study, and scholarships could be attributed to the adoption of remote learning which drove Italian and Chinese university students to seek and use services, particularly library services, more than usual (Zhou, 2021).

Technological Support

The perceived technical support available to students was also examined. A majority of respondents reported using at least two gadgets for RDL, with smartphones and laptops being the most commonly used devices. Over 80% of the respondents owned the gadgets that they used for RDL, aligning with findings from a survey among Filipino medical students (Baticulon et al., 2021).

About 65% of male respondents reported having fiber-optic internet. Around 45% also utilized mobile data, either as an alternative or as their primary internet connection. While fiber-optic internet is preferred for its speed and reliability, some areas may not have access to upgraded internet resources, leading students to rely on mobile data. The majority of the female respondents also had access to Wi-Fi connections, although some still relied on mobile data. These results were in contrast with the results of the survey conducted by Gocotano et al. (2021) among rural university students wherein majority relied on mobile data for remote learning.

Connectivity and Equipment

As shown in Figures 2 and 3, the majority of both male and female respondents answered positively for most of the questions, except for navigating Moodle with ease wherein most respondents were neutral. However, male and female respondents differ in their perspectives regarding the current remote learning setup, wherein female respondents were more comfortable in this setup than male respondents.

Figure 2
Status of connectivity and equipment of male students

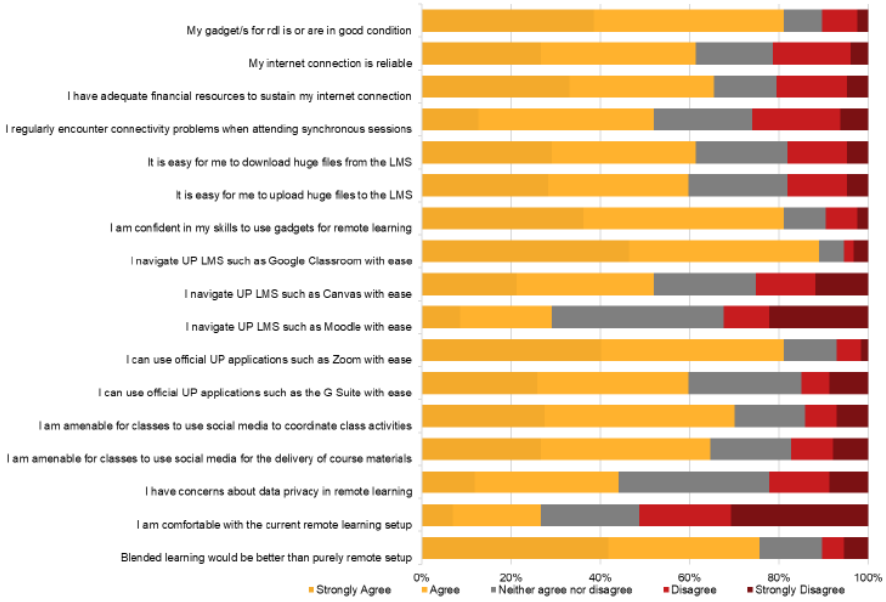
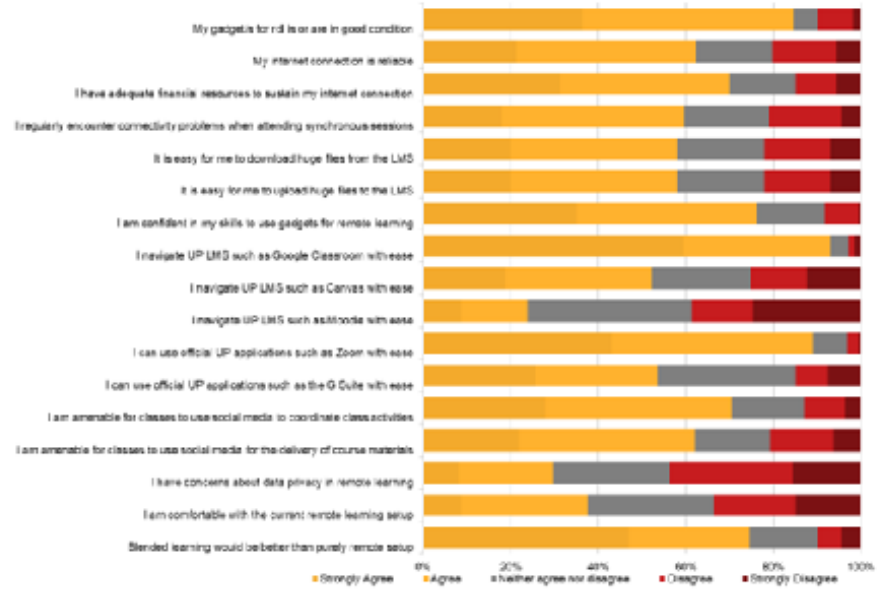


Figure 3
Status of connectivity and equipment of female students



Compared with rural university students, the respondents considered themselves proficient in the use of technology and official university remote learning applications except for Moodle. This could be attributed to the fact that Moodle was the least used LMS in UPLB as the Office of the Vice Chancellor for Academic Affairs encouraged the use of Google Classroom and Canvas. Meanwhile, female respondents were less concerned about data privacy in remote learning. Further analysis revealed that a strong association exists between sex and data privacy concerns. A study by Alnjadat et al. (2019), revealed that females have fewer data privacy concerns and social media platforms tend to influence their academic performance.

Health and Wellbeing

In terms of health and wellbeing, more than 80% of male respondents and more than 90% of female respondents reported that they lost motivation to do academic work in the past academic year. For male students, around 75% were looking for information about possible sources of income and felt uncertain about their future. Meanwhile, 65% said they needed information about health services available for students and wanted to learn ways to cope with the pandemic. While around 50% of male respondents thought that counseling could help, only around 40% would want to attend a counseling session and were able to manage their stress and anxiety.

Most female respondents (80%) also felt uncertain about their future. About 70% would also want access to information about possible sources of income and health services available for students. Similar to the male respondents, around half of the female respondents thought that counseling could help them. However, in contrast with the male respondents, most female respondents reported that they would want to attend counseling sessions. Only around 40 percent can manage their stress and anxiety well.

Source of Stress

Academics in general remained the main source of stress for both male and female respondents. Both male and female respondents reported that workload and lack of consideration of the professors were the main sources of stress. For male respondents, other sources of stress were difficulty of courses and isolation from the class. Female respondents, on the other hand, reported more sources of stress including difficulty in accessing resources, lack of interest in the course, pressure from peers, scholarship, lack of field work and difficulty in the conduct of thesis, lack of slots in some courses, and inadequate performance.

Male respondents voiced concerns that they could not understand the course materials and felt like they were not learning at all. In relation to academics, their environment was considered not conducive for learning. These coupled with erratic weather conditions that could affect the quality of internet connection were sources of stress.

Unreliable gadgets were a significant stressor noted by respondents, impacting

both academic performance and daily routines. For male respondents, additional stress stemmed from various sources including unrealistic expectations, financial issues, family obligations, and family problems. Work obligations also contributed to their stress levels, particularly in balancing work with other responsibilities. Physical and mental health concerns were prevalent, with burnout and fear of COVID-19 exacerbating these issues. Emotions played a crucial role in stress, as male respondents reported feelings of doubt, insecurity, being overwhelmed, uncertainty, lack of confidence, and perceived lack of progress. General life stressors included poor time management, exposure to other people's toxic positivity, excessive smartphone use, and broader societal issues such as government and pandemic-related politics. Some male respondents were unable to pinpoint specific stressors, simply stating they were stressed by personal matters or were uncertain about the sources of their stress.

Female respondents identified additional stressors related to their educational experiences. Independent learning, lack of interaction in class, and learning difficulties were significant sources of stress. Outside the virtual classroom, extracurricular activities, particularly those related to student organizations, added to their stress. The remote learning setup, heavily reliant on the internet, exacerbated stress due to power outages, unreliable internet connections, and malfunctioning gadgets.

Family-related stress was more explicitly detailed by female respondents. They emphasized their obligations to take care of their families, including children, aging parents, and pets. Some female respondents were also primary breadwinners, adding another layer of financial and emotional stress. Like their male counterparts, female respondents also faced stress from work obligations and financial issues.

Stress was also surfaced by health-related concerns. Female respondents pointed out that COVID-19 in the family was quite stressful, along with mental health concerns, burnout, and fatigue. In addition to these, female respondents were stressed by their feelings of overwhelm, sadness, isolation, and uncertainty about their future careers. Aside from these emotions, female respondents' lack of coping skills, focus, motivation, and time management also cause them stress. There was also a female respondent who said that comparison was her main source of stress, while others cited overthinking or personal stuff that they would rather not mention as well as uncontrollable issues pertaining to the government, politics, and pandemic.

Stressors for both male and female respondents were multifaceted, encompassing technological challenges, family and work obligations, financial issues, and emotional health concerns. These stressors were compounded by the unique pressures of remote learning and the broader impacts of the COVID-19 pandemic, highlighting the need for comprehensive support systems to address these diverse and intersecting sources of stress.

Challenges Encountered due to RDL

Male respondents considered academics in general as challenging, but they also emphasized inadequate or lack of access to academic resources and laboratories, lack of clear implementation of remote learning policies, communication-related problems (i.e., lack of feedback from professors and classmates), and the mediated nature of remote learning). Likewise, they found it difficult to consult advisers, deal with inconsiderate professors, and work in groups. They also said that the quality of modules made it challenging for them to digest the lessons and that they were not learning. Moreover, thesis-related concerns, workload, and performance preoccupied male respondents. Adding to the challenges were their inadequate high school background and stress. Aside from these academic-specific challenges, male respondents also had to deal with lack of a conducive environment for learning, poor internet connection, unreliable gadgets, inclement weather, and power outages.

Some male respondents mentioned that the status of their health could be challenging to deal with. They were mindful of COVID-19 and COVID-19-related concerns, mental health issues, burnout, sedentary lifestyle, insomnia, and stress. More than the health-related challenges, male respondents also reiterated on emotional toll in the past academic year as they experienced fear, grief, motivation loss, laziness, and uncertainty. They also lacked focus, routine, discipline, clarity, and balance between school. Aside from these, male respondents specified lack of social interaction, support system, and time management. Many of them also had to work on family problems and obligations, finances, and legal issues.

Similarities could be observed between female and male respondents. Female respondents were also challenged by academics in general. Some female respondents could not adjust well to remote learning and found independent learning and asynchronous activities to be difficult. Likewise, they also cited communication-related issues (lack of feedback from classmates and professors), group work, difficult courses, and access to academic resources and libraries as common challenges. Aside from these, female respondents also dealt with an immense amount of workload, thesis-related issues, performance, unclear policies and instruction, as well as not learning in general. The environment also remained a big issue as female respondents had to make do with the lack of conducive space, natural disasters, and relatedly, poor internet connection and power outages.

Like male respondents, it was challenging for female respondents to tackle their health concerns, particularly COVID-19, those related to COVID-19, burnout, stress, and sedentary lifestyle. Mental health also became paramount for female respondents. They lost their sense of time and day and felt isolated, anxious, avoidant, restless, stuck, unmotivated, lonely, and lazy. They were also trying their best to process repressed emotions and stop overthinking. Female respondents found it challenging to be lacking in discipline, time management, work-school balance, home-school balance, and social interactions.

Female respondents also cited difficulty in dealing with family obligations and problems, finances, miscommunication, and work in general. In contrast with male respondents, female respondents said that the government and politics made the past year even more challenging for them. Nonetheless, there were also female respondents who opted not to specify personal problems, while others also mentioned that they did not have challenges or were spared from difficulty specifically because they were already in the thesis stage of their respective programs.

Female respondents reiterated that remote learning was ineffective, and scholarship programs were unreliable. It was also important to know the degree program well, extend understanding toward professors, and recognize the role of privilege in the current remote learning setup. Lastly, female respondents focused on physical health, mental health, and wellbeing. They recognized the need for boundaries and mental health services on campus.

It could be said that despite the high levels of stress, motivation loss, and challenges experienced by respondents, they were still prompted to reflect and learn from the pandemic much like those who participated in the Active Minds surveys (2020a; 2020b) and those interviewed by Cleofas (2021).

Sense of Belonging

Being in a remote setup, over 70% of the respondents felt that the support provided by family and friends was enough for them to succeed, while only 50% felt that the support of their college and the university was enough for them to succeed. Less than 50% wished to join organizations, but both male and female students thought that there should be non-academic activities and information on extracurricular activities for students. Lastly, just around half of the respondents felt that they were part of their college community during the remote setup.

According to the data, the majority of the respondents regardless of sex already had organizations prior to the administration of survey questionnaires. This could explain why fewer respondents were interested in joining a new organization. Although, around an equal number of students felt they were part of a college community less than half felt that the support given at the university was enough. This mimics the findings from Blankstein and colleagues (2020) among American university students who did not feel a sense of belonging toward their institution at the height of the pandemic.

Since there was also no significant difference in the sense of belonging of male and female respondents, the results differed from those found among Irish students were male students who did not identify as part of a minority group showed a significant drop in their sense of belonging (Mooney & Becker, 2021).

Conclusions and Recommendations

Through a cross-sectional survey guided by Roddy et al.'s (2017) Four Pillars of Supporting Student Success, this study sought to determine the remote

learning experiences of UPLB students. Questions particularly centered on challenges, coping mechanisms, and views of remote learning. Likewise, the data were also disaggregated based on students' sex at birth to recommend gender-sensitive policies. A total of 350 randomly selected UPLB students served as respondents.

By delving into the experiences, challenges, and coping mechanisms of students during the pandemic, UPLB can gain a deeper understanding of their needs and concerns. This understanding can inform the development of support systems and resources tailored to address specific challenges faced by students, both during the pandemic and in the post-pandemic period.

Similarities and differences were noted in several areas. It was found that regardless of sex, respondents indicated the need for orientations about academic and library services. There was a moderate association between sex and knowledge of library services as well as the respondents' ability to tap the services of the Learning Resource Center and their need for orientation about these services. A higher proportion of female responders compared to male respondents reported being employed full-time while enrolled but despite these, more female respondents said they were comfortable with remote learning. Moderate association was found between sex and class interactions particularly in terms of consulting with instructors synchronously, consulting with instructors asynchronously, synchronously interacting with classmates outside of class, having difficulty in doing group work, studying materials alone, and liking to interact with instructors outside of class and consultations. Likewise, moderate association was also noted between sex and the need for financial resources for internet, skills to use gadgets, proficiency, and ease of use of learning management systems, Meanwhile, there was a strong association between sex and feeling comfortable with remote learning as well as having concerns with data privacy.

For students to succeed in remote learning, their academic, technological, health and well-being, and sense of belonging needs should be determined and understood, and policy recommendations should be crafted based on the data provided by the students.

Given that respondents' awareness of services could still be improved, it is recommended for the University Library and the Learning Resource Center to continue their information and dissemination activities about their services and how these could be availed as students adapt to blended learning. Moreover, the Interactive Learning Center could continue training students on learning management systems, while at the same time, they could also emphasize on the need to protect privacy and confidentiality of information. The use of social media to complement face-to-face learning must be explored, and its effects must be studied. While the majority of the respondents said they were already equipped with the knowledge and tools to support remote learning (and blended learning), attention should also be given to outliers relying on mobile phones and mobile data connection. Strengthening UPLB's policy on safe online spaces is also recommended. Understanding students' preferences for modes of learning, as explored in the study, can inform decisions regarding

instructional delivery methods. While UPLB may primarily offer face-to-face classes, insights from the study can support the implementation of hybrid or blended learning approaches that incorporate elements of both face-to-face and remote instruction. This can provide students with greater flexibility and accommodate diverse learning preferences and circumstances.

Likewise, the Office of the Vice Chancellor for Student Affairs could consider separate programs for male and female students. The office could further expand its Oplan Kumustahan and other initiatives under the Office of Guidance and Counseling since health and wellbeing concerns such as motivation loss, high levels of stress, physical and mental health problems, and others surfaced during the pandemic. Programs must have gender-sensitivity at the forefront. These will help address the issues and challenges in the students' health and well-being. Financial literacy workshops and networking activities could also be conducted, especially for students in need of income and financial support. Programs tackling finances, income, and scholarship could also be rethought to introduce gender components so that gender-based nuances could be considered in providing financial support and awarding of scholarships. Scholarship criteria could also consider familial obligations to support students, mostly women.

This paper provided insights and recommendations based on the results, but more could still be done in future research studies. Actual academic performance and, physical and mental health measures, among others could be tested in relation to other factors. Having a larger sample size would also pave the way for generalization. While this paper took on a more quantitative approach, future research studies could use qualitative methods to come up with thick descriptions. Narratives and participant observations could enrich the knowledge of students' needs and further improve student support guided by gender perspectives. Overall, while conceptual and methodological improvements could be made, this paper showed that students' success in remote learning must have a more holistic approach that all pillars support students' success. Support across pillars would be more beneficial. The conduct of surveys like these must also be done periodically to document changes in students' needs. Investigating student life during the pandemic can serve as a catalyst for UPLB to enhance its support systems, infrastructure, and instructional approaches, ultimately contributing to the overall well-being and academic success of its student population.

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Digital Literacy and Technical Competence: Assessing the Competence and Performance of Senior High School Physical Education Teachers in Online Distance Learning

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Abstract

The transition to online distance learning during the COVID-19 pandemic highlighted the importance of teachers' digital literacy and technical competence for effective virtual instruction. This quantitative study investigated the teaching competence and performance of 61 senior high school Physical Education (PE) teachers from Davao City, Philippines in implementing online learning delivery modalities. Data was collected through a structured questionnaire assessing digital literacy, technical competence, and teaching performance based on the Department of Education's standards for content delivery, pedagogy, and assessment. Results showed that respondents generally agreed on possessing digital literacy skills like utilizing ICT for learning and collaborating online (mean=4.06). However, they exhibited moderate technical competence in video editing and navigating learning management systems (mean=3.97). Regarding teaching performance, respondents were highly proficient in content delivery by establishing aligned goals and acknowledging learners' backgrounds (mean=3.28). They were also highly skilled in pedagogy through clear communication and designing advanced learning experiences (mean=3.31) and in assessment by implementing reliable evaluation methods and providing timely feedback (mean=3.29). The study found significant positive correlations between digital literacy and technical competence with teaching performance in pedagogy and assessment, but not content delivery. These findings suggest that while teachers demonstrate strong content knowledge, enhancing their technological skills could improve virtual pedagogy and assessment strategies. Targeted professional development focusing on emerging technologies and integrating them into instruction is recommended.

Keywords: *Distance Learning, Learning Delivery modes, Teaching competence, Teaching performance, Senior High School*

Introduction

School closures due to the COVID-19 pandemic have affected students, educators, educational organizations, and many other aspects of society globally. According to Adnan and Anwar (2020), academic institutions worldwide adopted a range of approaches and delivery methods to continue educating students. As a result, the ability to access information and instruction anytime and anywhere has contributed to the rising popularity of online distance learning.

The Department of Education (DepEd) in the Philippines issued DepEd Order No. 12 series of 2020 to develop new modalities of learning delivery for all levels. To maintain learning continuity while safeguarding the health, safety, and well-being of all teachers, staff, and other workers, the DepEd Order implemented the Learning Continuity Plan (LCP) for the school year 2020–2021. Accordingly, the Learning Enrollment and Survey Form (LESF) was distributed by DepEd and accomplished before the planned start of the school year. It was discovered that the most practical option for most Filipino students was modular learning, which uses self-learning modules (Govph, 2020). Most teachers, students, and staff in remote areas lacked access to technology, which hindered the DepEd's initiative to fully implement online distance teaching and learning (DepEd, 2020).

Locally, teachers were prepared for the commencement of the school year 2020-2021 under the "new normal" system. Despite obstacles and other concerns with their preparation, they were educated to manage a variety of modalities, such as remote learning. However, there was also a lack of preparation for re-opening public schools in the Davao region. He asserted that postponing the re-opening allowed them more time to prepare as the school year would soon begin in only two months (Llemit, 2020). In the senate panel, an official said that only 300,000 out of the 800,000 (40%) public school teachers nationwide had received training in remote learning (Magsambol, 2020). Furthermore, these teachers could still have digital and technological difficulties, such as a lack of or difficulty obtaining equipment and poor internet connectivity (Llemit, (2020).

Statement of the Problem

This study sought to assess the competence and performance of senior high school Physical Education (PE) teachers utilizing online learning delivery modalities (LDMs). It focused on evaluating their adaptability to online learning, providing valuable insights into potential support strategies. Specifically, the study examined their proficiency in digital literacy and technical skills, which are crucial for effective online instruction. The study examined their performance in content delivery, pedagogy, and student assessment during remote PE classes, analyzed variations based on teacher profiles, explored correlations between competence and performance, and proposed recommendations to improve training and support for online PE teaching. The study assessed the proficiency and effectiveness of the senior high schools PE teachers in Davao City public schools through the following research questions:

1. What is the level of teaching competence in terms of Digital Literacy and Technical Competence?
2. What is the level of teaching performance in terms of content, pedagogy, and assessment?
3. Is there a significant effect on teaching competence and teaching performance?

Hypothesis:

HO_1. There is no indication of a substantial correlation between teaching competency and teaching performance.

Review of Related Studies

Various disciplines and geographical areas have done thorough investigations on the influence of technology on teacher proficiency in the context of online distance learning (Yünkül, 2022). The University of Alberta's Distance Learning Program has researched on the impact of technological advancements on the effectiveness of teaching and learning during the shift from traditional in-person instruction to online distance learning (Branch-Mueller, 2021). The significance of teachers' digital competency, which includes their ability to utilize technology in the classroom ethically and skillfully, is further supported by this study (Falloon, 2020). Furthermore, Vahey and Vanides's study (2020) showed that there are still several barriers to technical and digital skills that provide more suitable learning environments. However, Vasilezhenko (2021) states that putting distance learning into the classroom requires changing the curriculum and creating new methodological resources to explore educators' online learning competencies, particularly when instructing students via online distance learning delivery. Applying these in practical situations might be difficult, as Dias-Trindade (2020) pointed out.

The use of conventional technology for task-oriented and result-oriented instruction during online distance learning is increasingly common for assessing teacher's proficiency in digital literacy and technical skills. Digital literacy encompasses an individual's proficiency to effectively use information technology and the internet to conduct searches, assess credibility, use, distribute, and create material (Walton, 2016). The European Commission (EC) has identified technical competence as one of the eight fundamental talents. Cyber literacy refers to the astute and wise use of digital technology for acquiring information, communicating, and addressing significant issues in many areas of life. According to the EC's 2015 Digital Agenda, inadequate technological proficiency affects 40% of the European Union (EU) population, including 22% of non-Internet users. The Philippine Institute for Development Studies (PIDS) investigated the gaps in digital skills. The findings indicate a deficiency in digital competency among the Filipino populace, with fewer than half of them skilled in at least one of the six tested ICT skills needed to meet the Sustainable Development Goals (Albert, 2021).

Furthermore, Albert (2021) stated that expanding access to ICTs will be possible by enhancing the ICT infrastructure in marginalized communities living in remote and rural locations. The study recommended allocating funds for digital skill development and assessment to ensure Filipinos can effectively use ICTs and their numerous applications. One reason for this is that the education sector faced challenges related to computer availability, high-speed internet, and digital literacy throughout the pandemic. Implementing a "digital inclusion" approach could help underprivileged populations by giving them access to ICT and the necessary skills (Ragnedda & Mutsvairo, 2018). However, Henebery (2015) emphasized that there are conflicts between those who commit to improving education and those who use traditional teaching methods. Education experts should examine problems that could prevent curricular changes. According to recent studies, it is recommended to encourage students to use technology, explore, collaborate, build social connections, and connect their

digital experiences to their academic pursuits. Furthermore, Lisenbee (2016) suggested that technology can benefit educational training.

The Philippines is the most recent nation in Southeast Asia to adopt a new educational system that extends primary education by two more years, providing students with more outstanding possibilities worldwide (Garcia et al., 2020). The 2013 Enhanced Basic Education Act (Republic Act 10533), which the Philippine Congress enacted, brought about this upgraded educational system. The Department of Education then implemented it with DepEd Order 31 s—2012, which set up a 13-year basic education transition that students must complete to graduate from high school. Physical Education teachers would teach Physical Education as one of the subjects included in the Basic Education Curriculum of senior high school from Grades 11 and 12. Araujo et al. (2016) stated that less than three years of experience impacts teachers' ability to impart knowledge. As a result, it is crucial to assess their performance to identify their training quality and degree of competence in accomplishing the intended competencies in all instructional strands. It would serve as the foundation for developing teacher development plans and forming the necessary interventions to help teachers reach the expected level.

Following the Philippine Professional Standards for Teachers (PPST), DepEd created the Results-Based Performance Management System (RPMS) to systematically review, monitor, and track teachers' performance. The necessary abilities and skills for qualified teachers are outlined in the PPST. Moreover, Philippine educational institutions and organizations have worked together to create and verify the RPMS-PPST instruments used to measure and track teachers' performance (DepEd, 2018).

In summary, several educational institutions are incorporating digital technology into physical classrooms. However, the proficiency and effectiveness of senior high school teachers in using online distance learning delivery create a significant obstacle for their students, mainly due to the traditional learning setting (Bandalaria, 2007). Moreover, the Philippines is behind developed countries in ICT affordability, accessibility, inclusivity of educational technology curriculum, innovation, implementation, and evaluation (Acosta, 2016). The study's results are expected to contribute to a thorough knowledge of teachers' competence and performance for the educational system to succeed.

Theoretical Framework

The study employed the framework of pedagogical content knowledge (Shulman, 1986) and the paradigm of technology-pedagogical content knowledge (TPACK) which aimed to investigate the organization, transformation, and presentation of subject matter for teaching purposes (Mishra & Koehler, 2006). Furthermore, the TPACK framework built upon Shulman's characterization of teacher knowledge from 1986 by including the importance of technology knowledge in successful teaching.

The TPACK paradigm asserts that teachers must profoundly comprehend each piece of knowledge mentioned above to effectively integrate and synchronize

technology, pedagogy, and content in their teaching. The TPACK framework is a complex, evolving knowledge that surpasses individual understanding of subject, pedagogy, and technology as it resides within a dynamic and interactive interaction.

Methodology

Research Design and Participants

This research investigated the effectiveness and competence of physical education (PE) teachers in online distance learning. The investigation focused on the demographic characteristics of the teachers teaching PE to grades 11 or 12 students, including their age, specialization, teaching experience, and highest degree of education. The study used a quantitative research approach to gather data. A total of sixty-one (61) Davao City PE teachers were included in the research. The participants must teach physical education subjects during the data collection process, which was gathered using a simple random sampling approach.

Ethical Considerations

This investigation was carried out following the specified guidelines. Before commencing the study, the researcher explicitly informed the respondents that their participation was entirely optional and would be kept anonymous. Participation in the research was restricted to responders who agreed and signed the informed consent form.

Instrument and Data Collection

The main instrument for collecting data was a structured questionnaire with scales modified from earlier instruments that had been verified. Teacher profiles, including years of experience, years of education, and age, were gathered in the first section. In the next section, participants were asked to indicate whether online distance learning modalities—online, modular, television/radio-based, or blended—were used at their institution.

Two items were included in the teaching competency section: a 10-item technical competence scale from Penn State University and a 10-item digital literacy scale developed by Ng (2012). Both made use of 5-point Likert scales with the options "never" to "always" for technical skill and "strongly disagree" to "strongly agree" for digital literacy.

The National Competency-Based Teacher Standards framework (2018) from DepEd included 28 questions to assess teaching effectiveness. These items covered content delivery (7 items), pedagogy (12 items), and assessment (9 items). The five points on the scale went from "below basic" to "highly proficient."

Experts verified the tool to ensure content validity and authenticity. Cronbach's alpha for technical competence was 0.892. For digital literacy it was 0.886; and for instructional performance, it was 0.991, according to a reliability study

conducted during pilot testing. Over a month, Google Forms questionnaires were sent to the instructors. Respondents were made aware of their anonymity and confidentiality.

Data Analysis

The data collected was analyzed using IBM SPSS v26. Descriptive statistics including frequency, percentage, mean, and standard deviation were used to characterize profiles, competence, and performance levels. The Analysis of Variance (ANOVA) analysis revealed substantial differences in competence levels when participants were categorized based on teacher variables such as age, educational degree, and experience. The Pearson correlation analysis revealed associations between competency and performance measurements. The survey results yielded quantitative findings that offered a comprehensive assessment of PE teachers' competence, performance, and correlations.

Results and Discussions

On the demographic profile of the respondents

Table 1 presents the characteristics of the participants, including their age, field of expertise, length of teaching experience, and highest level of education achieved.

Table 1
Profile of the respondents

Profile	Category	*f*	%
Age	18-24 years old	20	32.8
	25-38 years old	36	59.0
	39 years old and above	5	8.2
Specialization	PE	28	45.9
	Non-PE	33	54.1
Teaching Experience	0-5 years	31	50.8
	6-10 years	10	16.4
	11-15 years	8	13.1
	More than 15 years	12	19.7
Educational Highest Attainment	BA/BS Degree	47	77.0
	MA/MS Degree	12	19.7
	EdD/PhD Degree	2	3.3

As observed in Table 1, the majority of senior high school teachers in Davao City DepEd schools who took part in the survey were between the ages of 28 and 43. According to TechTarget (2021), these ages are technologically competent in creating online activities and worksheets and are open to embracing new technologies. They are comfortable and effective in creating activities and worksheets online.

In terms of specialization, data revealed that only 28 or 45.9% of respondents have a degree in physical education and allied fields. In comparison, about 33 or 54.1% of the respondents did not specialize in physical education. Therefore, these teachers need to adapt to the new modality and the subject. Aguinaldo (2021) asserted that during online distance education, the curriculum redefined and reduced the performance and practical skills necessary for delivering effective PE classes. This result followed the findings of Daum and Buschner (2014) in which a considerable number of distance PE teachers from senior high schools redesigned the PE curriculum to focus on philosophical and core components in delivering the PE subject using the chosen learning delivery mode. Thus, the result showed that teachers had to focus more on the fundamental aspects of physical education since physical interaction is temporarily restricted.

Moreover, most participants have 0-5 years of teaching experience (31 or 50.8%) as a result of the senior high school program's first implementation in S.Y 2016–2017 under the requirements of the Enhanced Basic Education Act of 2013 (RA 10533). Most participants (77.0%) have obtained a bachelor's degree as their highest level of education, while 19.7% have a master's degree. Only (3.3%) of teachers have a doctoral degree. The results indicated that a bachelor's degree in education is the minimum required for senior high school teaching.

Level of Teaching Competence

Table 2 presents the mean and the corresponding interpretation of the level of teaching competence in terms of digital literacy. The section presents the mean rating distribution of the level of teaching competence in terms of digital literacy and technical competence, which are presented in the following tables. The frequency of the respondents who rated each teaching competence indicator for Digital Literacy with SA (Strongly Agree), A (Agree), N (Neutral), D (Disagree), or SD (Strongly Disagree) and the description Rating Scale (Appendices p.111). Technical Competence with A (Always), O (Often), S (Sometimes), R (Rarely), or N (Never). Furthermore, each indication has a verbal interpretation to see how they influence teaching competence's overall mean rating distribution.

Table 2
Level of Teaching Competence in terms of Digital Literacy

Indicators	Mean	Verbal Interpretation
Acquire the knowledge and skills necessary to resolve my issues with digital literacy	4.11	Agree
Have the ability to rapidly acquire proficiency in emerging technologies	4.18	Agree
Stay updated with essential emerging technology	4.31	Strongly Agree

Indicators	Mean	Verbal Interpretation
Possess a deep understanding of various technologies	3.77	Agree
Digitally literate, able to utilize ICT for learning and produce artifacts that show my grasp of the material being studied	3.97	Agree
Possess proficient ICT and digital literacy abilities	3.84	Agree
Proficient at using search and evaluation abilities to get information from the Internet	4.02	Agree
Proficient in matters pertaining to web-based activities, such as cyber safety, search concerns, and plagiarism	4.03	Agree
Digital proficiency will enhance collaboration with colleagues on projects and other educational endeavors	4.31	Strongly Agree
Regularly seek assistance for academic tasks from online acquaintances, such as via platforms like Skype, Facebook, and blogs	4.08	Agree
General Mean	4.06	Agree

Range

4.20 – 5.00 = Strongly Agree *1.80 – 2.59 = Disagree* *2.60 – 3.39 = Neutral*

3.40 – 4.19 = Agree *1.00 – 1.79 = Strongly Disagree*

As presented in Table 2, the respondents generally "Agree" with most indicators related to digital literacy competence. They agreed on acquiring the necessary skills, understanding technologies, utilizing ICT for learning, proficiency in web-based activities, and working effectively with others using digital tools. The overall mean of 4.06 suggests a relatively high level of digital literacy competence. These findings align with Pettersson's (2018) components of digital competence, including technical skills and cognitive abilities, as well as the European Framework for the Digital Competence of Educators (Redecker & Punie, 2017) which emphasizes proficiency in areas like digital resources and facilitating learners' digital competence.

In an interview with SunStar Davao during the Kolokabildo 2020 virtual forum of the Holy Cross of Davao College Mass Communication Program, DepEd-Davao Regional Assistant Supervisor for Action Emma Camporedondo emphasized that "*They have done training for teachers on learning management systems as well as Microsoft Software*" (Llemit, 2020). Thus, these numerous training sessions could provide teachers with basic knowledge of various software skills.

However, the respondents had relatively lower mean scores for indicators like possessing a deep understanding of various technologies (3.77) and having proficient ICT abilities (3.84). Instefjord and Munthe (2017) emphasize the importance of continuing professional development in order to stay updated

with technological advancements. In addition, although the participants have a relatively high level of digital literacy skills, specific professional development and training initiatives could assist them in keeping current on emerging technologies and enhancing their comprehension and expertise in different digital tools and resources.

Table 3
Level of Teaching Competence in terms of Technical Competence

Indicators	Mean	Verbal Interpretation
Possess proficiency in performing fundamental computer tasks	4.49	Always
Proficient in navigating the learning management system	3.90	Often
Ability to form teams or groups using the learning management system's course roster	3.66	Often
Capable of using web-based collaboration tools	4.21	Always
Proficient in video creation and editing	3.69	Often
Able to exchange publicly available learning materials	3.95	Often
Able to use the tools and online help desk for support	3.89	Often
General Mean	**3.97**	**Often**

Range

4.20 – 5.00 = Always *2.60 – 3.39 = Sometimes* *1.00 – 1.79 = Never*

3.40 – 4.19 = Often *1.80 – 2.59 = Rarely*

According to Table 3, respondents who chose "Always" are proficient in both fundamental computer activities (4.49) and web-based collaborative tools (4.21). This supports the findings of Pettersson (2018) showing more technologically proficient teachers. A moderate level of skill is indicated by the mean scores on other criteria, which fall into the "Often" group. The capacity to interact with the learning management system (3.90), trade publicly available learning resources (3.95), form teams or groups using the course roster (3.66), make and edit films (3.69), and use the tools and online help desk (3.89). As such, the average mean score of 3.97, which indicates modest technical competence, represents the "Often" category. Data analysis suggests that the PE teachers are computer literate and have access to DepEd collaboration tools. The nation's technological expansion and the computerization of education have been driven by teachers' enhanced technical proficiency acquired through webinar seminars and training sessions.

However, they could become more tech-savvy by utilizing learning management systems, video editing software, and online help tools. It can be possible to improve their technical competency by offering them targeted training or professional development in certain areas. Potential obstacles to teachers'

technical competence in these domains should also be investigated.

On the Level of Teaching Performance

The information covers the content, pedagogy, and assessment mean rating distribution for the Teaching Performance level. The mean rating distributions of various levels of teaching performance in terms of content, pedagogy, and assessment are presented in Table 4. The frequency of the respondents who rated each teaching performance with Highly Proficient (HP), Proficient (P), Basic (B), or Below Basic (BB), Furthermore, each indication has a verbal interpretation to see how they influence teaching performance overall mean rating distribution.

Table 4
Level of Teaching Performance in terms of Content

Indicators	Mean	Verbal Interpretation
Establish goals that align with the learners' experiences and abilities	3.26	Highly Proficient
Employ diverse designs, methodologies, and exercises that catered to the many types of learners	3.21	Proficient
Systematic instruction tailored to the specific requirements and challenges of learners	3.28	Highly Proficient
Implement suitable intervention strategies for learners who are at a higher risk of academic challenges	3.16	Proficient
Acknowledge the many cultural backgrounds of learners while offering learning opportunities	3.28	Highly Proficient
Execute strategies to meet the needs of students with limitations	3.34	Highly Proficient
Exhibit objectivity and care for all students, regardless of their socioeconomic background	3.44	Highly Proficient
General Mean	**3.28**	**Highly Proficient**

Range

3.25 – 4.00 = Highly Proficient *1.75 – 2.49 = Basic*

2.50 – 3.24 = Proficient *1.00 – 1.74 = Below Basic*

According to Table 4, most content knowledge factors about teaching performance show that the respondents are "Highly proficient" overall. As per Shulman's (1986) definition of pedagogical subject knowledge, the high ratings in areas like adapting instruction, acknowledging cultural backgrounds, and catering to various learners imply great content understanding and ability to adjust teaching. These results are also consistent with differentiated instruction (Tomlinson, 2001) and culturally responsive teaching (Gay, 2018). However, using a variety of approaches and implementing interventions for at-risk learners,

the teachers' mean ratings were somewhat lower (3.16, though still proficient). This aligns with the conclusions drawn by Hill et al. (2005), who observed that teachers often struggle to adapt classes and provide targeted interventions while possessing an extensive understanding of the subject matter.

Darling-Hammond et al. (2020) propose enhancing teaching through professional development focused on differentiated instruction, culturally relevant pedagogy, and interventions for struggling learners. By incorporating the TPACK framework (Koehler et al., 2013), physical education teachers can create goals that align with learners' experiences and effectively utilize technology and other instructional approaches. TPACK and focused professional development can enhance educators' comprehension of the subject matter and improve their teaching effectiveness. By incorporating the solutions proposed by students at risk of falling behind academically, teachers can enhance their teaching methods and promote better student learning outcomes.

Table 5
Level of Teaching Performance in terms of Pedagogy

Indicators	Mean	Verbal Interpretation
Provide precise and up-to-date information utilizing suitable procedures, tactics, and strategies	3.30	Highly Proficient
Implement the integration of language, literacy, numeracy skills, and values in the educational process	3.28	Highly Proficient
Effectively communicated learning objectives, instructional methodologies, and subject matter with clarity and precision to students	3.38	Highly Proficient
Establish a connection between the present subject and previous and upcoming classes	3.28	Highly Proficient
Ensure that the lesson goals, teaching techniques, learning activities, and instructional materials or resources are appropriately matched to the learners	3.36	Highly Proficient
Design learning experiences that promote the use of advanced cognitive abilities by learners, using the native language, if necessary	3.36	Highly Proficient
Captivate and maintained learners' attention by ensuring the information was significant and relevant to their needs	3.34	Highly Proficient
Incorporate academic literature and concepts to enhance the lesson	3.28	Highly Proficient
Create systematic and standardized protocols to optimize the use of teaching time	3.30	Highly Proficient

Indicators	Mean	Verbal Interpretation
Choose, organize, and use suitable technology and instructional resources appropriate for the learners and the learning goals	3.28	Highly Proficient
Offer suitable educational assignments, portfolios, and projects that facilitate the development of effective study routines	3.28	Highly Proficient
Use Information and Communication Technology (ICT) resources to strategize and create teaching-learning activities	3.26	Highly Proficient
General Mean	**3.31**	**Highly Proficient**

Range

3.25 – 4.00 = Highly Proficient *1.75 – 2.49 = Basic*

2.50 – 3.24 = Proficient *1.00 – 1.74 = Below Basic*

The teacher has demonstrated a proficient mastery of pedagogical performance on modular distance learning, as seen by the overall mean of 3.31. It was adequately delivered across all significant responsibility areas, which consistently exceeded performance.

Table 6
Level of Teaching Performance in terms of Assessment

Indicators	Mean	Verbal Interpretation
Design and implement formative and summative assessments that were both accurate and dependable	3.28	Highly Proficient
Implement suitable alternative evaluation methods such as portfolios, notebooks, and rubrics	3.30	Highly Proficient
Analyze and use test outcomes to enhance pedagogy and educational outcomes	3.25	Highly Proficient
Assess educational challenges and any underlying factors	3.28	Highly Proficient
Supervise and organize educational interventions to address learning difficulties	3.18	Proficient
Utilize methodologies for evaluating substantial learning	3.34	Highly Proficient
Deliver prompt and precise feedback to learners, fostering their ability to assess and contemplate their own progress in learning	3.31	Highly Proficient
Maintain precise documentation of learners' grades and performance levels	3.39	Highly Proficient

Indicators	Mean	Verbal Interpretation
Organize regular meetings with students and parents to provide updates on students' academic progress	3.28	Highly Proficient
General Mean	**3.29**	**Highly Proficient**

Range

3.25 – 4.00 = Highly Proficient *1.75 – 2.49 = Basic*

2.50 – 3.24 = Proficient *1.00 – 1.74 = Below Basic*

Table 6 presents the level of teaching performance in terms of assessment. The data revealed that the highest weight mean (3.39) showed that the teachers were driven enough to monitor and document the student performance outcomes to have a complete record and evaluation of each student. The overall mean (3.29) showed that teachers had exceedingly accomplished and contributed to students' assessment and feedback by providing appropriate tools for assessing authentic learning evaluation for students to keep track of their student's performance levels. This indicated that the teacher consistently exceeds performance in terms of assessment.

Effects of Teaching Competence on Teaching Performance

The data presents the impact of teaching competence in terms of digital literacy and technical competence on teaching performance in terms of content, pedagogy, and assessment using a Pearson correlation, indicating whether there is any significant relationship between teaching competence and teaching performance.

Table 7
Significant effect on teaching competence and teaching performance

Competence	Performance	*r-value*	*p-value*	Conclusion	Decision
Digital Literacy	Content	0.226	0.080	Not Significant	Accept H_o
	Pedagogy	0.362	0.004	Significant	Reject H_o
	Assessment	0.341	0.007	Significant	Reject H_o
Technical Competence	Content	0.247	0.055	Not Significant	Accept H_o
	Pedagogy	0.294	0.022	Significant	Reject H_o
	Assessment	0.318	0.012	Significant	Reject H_o

***p<0.00 *p>0.05*

Table 7 reveals the correlation coefficient values between teaching competence

and teaching performance. In both aspects of competence, digital literacy, and technical competence, data showed no significant difference between teaching competence and teaching performance in terms of content (p= 0.080 and p=0.055, respectively).

However, when pedagogy and assessment were considered, the data in Table 7 demonstrate a significant correlation between teaching skills and teaching performance. The relationship between digital literacy and pedagogy was substantial and positive ($r=0.362$, $p<0.05$). Similarly, digital literacy and assessment had a strong and positive correlation ($r=0.341$, $p<0.05$). There were consistent findings indicating a positive correlation between technical competence and pedagogy ($r=0.294$, $p<0.05$) as well as evaluation ($r=0.318$, $p<0.05$). This implies digital and technical skills enable proficient teaching strategies and student evaluations in the online setting.

Moreover, enhanced comprehension, discovery, utilization, and generation of knowledge using digital technologies correlate with senior high teachers' proficiency in utilizing fundamental computer functions in their teaching practices. Teachers need to demonstrate various technologies necessary for pedagogy and assessment effectively. The result correlated in Table 1, which shows that most respondents between 25-38 years old were competent in digital and technical skills. This suggests that teachers who possess a higher level of technical proficiency are more adept at using computer technology to offer teaching and evaluate online learning.

Conclusions

This research evaluated the competence and performance of Physical Education senior high school teachers utilizing online distance learning during the COVID-19 pandemic in Davao City.

The study concluded that the senior high school PE teachers in Davao City generally possessed a relatively high level of digital literacy competence, agreeing on indicators related to acquiring necessary skills, understanding technologies, utilizing ICT for learning, and working effectively with digital tools. However, continuous professional development is needed to deepen their understanding and proficiency in various technologies. Regarding technical competence, the teachers exhibited proficiency in performing fundamental computer tasks and using web-based collaboration tools. Still, their competence was moderate in areas like navigating learning management systems, video creation and editing, and leveraging online resources and support tools.

In terms of teaching performance, the teachers demonstrated highly proficient performance in content knowledge, exhibiting strengths in tailoring instruction, acknowledging cultural backgrounds, and catering to diverse learners, although further development is needed in implementing interventions for at-risk learners and employing diverse methodologies. The teachers performed exceptionally well in terms of pedagogy, effectively conveying learning objectives, adapting instructional methods to the requirements of students, and effectively employing resources and technology. Additionally, the teachers demonstrated exceptional

proficiency in formative and summative assessment design and implementation, alternate assessment techniques utilization, feedback provision, and accurate student performance documentation.

Moreover, the study discovered that teaching performance in pedagogy and evaluation positively correlated with digital literacy. Similarly, technical competence also correlated favorably with pedagogy and assessments. However, teaching competency and content knowledge performance were not significantly correlated. Although the teachers had good technical proficiency and digital literacy, they might still benefit from focused professional development to improve their proficiency in particular areas. Furthermore, their pedagogical practices and assessment tactics in the online learning environment were clearly influenced by their digital literacy and technical competence, demonstrating their highly proficient teaching performance in content, pedagogy, and assessment.

Recommendations

Based on the findings, the following are recommended.

1. Establish inclusive and extensive professional development initiatives to improve teachers' digital literacy and technical competence. Prioritize areas of improvement, such as proficiency in navigating learning management systems, video editing, and effectively utilizing online resources and support tools.

2. Offer focused instruction on using a variety of teaching approaches, customizing how content is delivered to meet the needs of various learning styles, and putting in place efficient intervention plans for students who are struggling or academically at risk.

3. Encourage teachers to collaborate through professional learning communities, mentoring programs, and peer observation to share their digital tools for online teaching and learning best practices and partner with educational technology providers and researchers.

4. Future researchers must conduct similar studies using a larger population and different levels of competencies, including SUCs, CHED, and TESDA teaching Physical Education subjects.

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Learning Transitions in Studying Development: Design, Methodologies/Approaches, Tools in the Digital and Hybrid Platforms

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Abstract

Post-pandemic realities paved the way for certain innovative learning approaches to address the risks associated with traditional educational settings, inefficiencies in mobility, limited access to facilities and resources, and vulnerability to disease of student and teaching population, among others. Learning interactions in digital space remain to be further explored, requiring adjustments in the design of courses, pedagogical approaches, methodologies, and tools employed. The adjustments were seen as imperative at all levels of education and across mainstream fields of studies but even more pronounced, in multidisciplinary and interdisciplinary research study areas, such as Development Studies. Development research underwent learning transitions to retain its relevance as an important academic field. The combined online and in-site learning settings still have effective and efficient modalities of studying development, as argued in prevailing literature. This paper aims to find rationality in course design and structure, given the learners' background and academic program tracks, as well as the teaching tools and instruments necessary in a combined learning modality. The challenge is how learners can be more engaged in discussions and provide participatory feedback. Another objective of this work is to provide documented experience of the issues and challenges in hybrid platforms as seen from the lens of development studies. Pedagogical approaches conform to the changes through case presentations that otherwise solicit lesser attention span and absorption. Teaching methods should complement the approaches by ensuring that the lessons from thematic discussions are reinforced through a learning synthesis. Synthesizing the discussions on development issues consolidates salient points that usually emerge from cross-cutting concerns that are characteristics of multidisciplinary and interdisciplinary studies. Recent studies explored how innovation may translate into the creative use of tools and their application in digital space learning, from which institutions of higher education and government may draw lessons from.

***Keywords**: Development studies, learning, online, distance education*

Introduction

Learning environments continue to evolve as a result of many factors including

unforeseen occurrences such as a pandemic outbreak. Not only do adjustments in learning settings need to be configured, but also the associated teaching content, methodologies and approaches, tools, and even the platforms. These innovative adjustments are even more imperative in study areas that embrace several disciplines and require interdisciplinary learning such as development. Even before the pandemic, the challenge in development studies and its pedagogy has been on how theoretical concepts may be translated to field applications, especially because these concepts are not constant and change over time. This challenge became more pronounced at the onset of the pandemic, when field learning became more limited, and access to both documented and undocumented resources constrained.

The problem in learning transitions in studying development found gradual solutions through a reconfiguration of the design of courses with a greater focus on contents that are more relatable and current, teaching methodologies that provide a premium to case analysis, and tools and instruments that can be more effective in both digital space application and in-site. These adjustments may not be unique to studying development, but imperative across all levels of education, from primary level to postgraduate and even mainstream study areas. Distance education has become increasingly popular globally, and its critical role in higher education has become the subject of many studies. The impact of this modality of learning has been assessed in the works of Luyt (2013) and Li and Irby (2008), where the widespread access to the internet, and the ease of online learning created the demand for different higher education platforms. In many less-developed and even developing economies, however, digital infrastructure remains in a less-progressive state, which limits internet access to many geographical areas. This became evident when hybrid platforms in learning were adopted, even more so during the pandemic era, when a purely online modality was imposed. This situation is not unique to primary and secondary education, but the reality affects both the student and teaching population, and the institutions of learning and government. The problems resulted in the schools' investing in facilities and network subscriptions because of greater demand to shift to digital platforms (Limperos et al., 2015). In the Philippines, such cost to additional capital investment is often negated by many schools because of the significant decline in enrolment. Such decline was attributed to the learners' difficulty to conform to the abrupt shift. Therefore, learning demand has seen a divided segment between students who have online access and want to capitalize more on digital learning vis-à-vis the students deciding to delay their engagement under the prevailing set-ups.

Experimental learning set-up combining both online and hybrid platforms in the conduct of development studies provides many key lessons learned on how to balance efficiency versus effectiveness. The discussion in this paper aims to draw the interventions on how learning transitions may resonate with the needs of the learners and the ability of educational institutions to respond to the demands while sustaining the viability of their operations, and for the government to extend the needed infrastructure and policy support.

The learning environment for development studies and research illustrates how

the transition in study content, course structure, pedagogical approaches, and tools may take place taking into account the nature of the study areas and optimizing the resources that both digital and non-digital space can offer.

Objectives

Several literature have devoted studies on distance education per se during the pre-pandemic period, from which many issues provide useful groundwork for this study. The primary aim of this paper is to explore the learning transition in a field or discipline such as development and examine how a learning model can be structured in terms of design, methodologies, approaches, teaching tools, and assessment instruments may be structured.

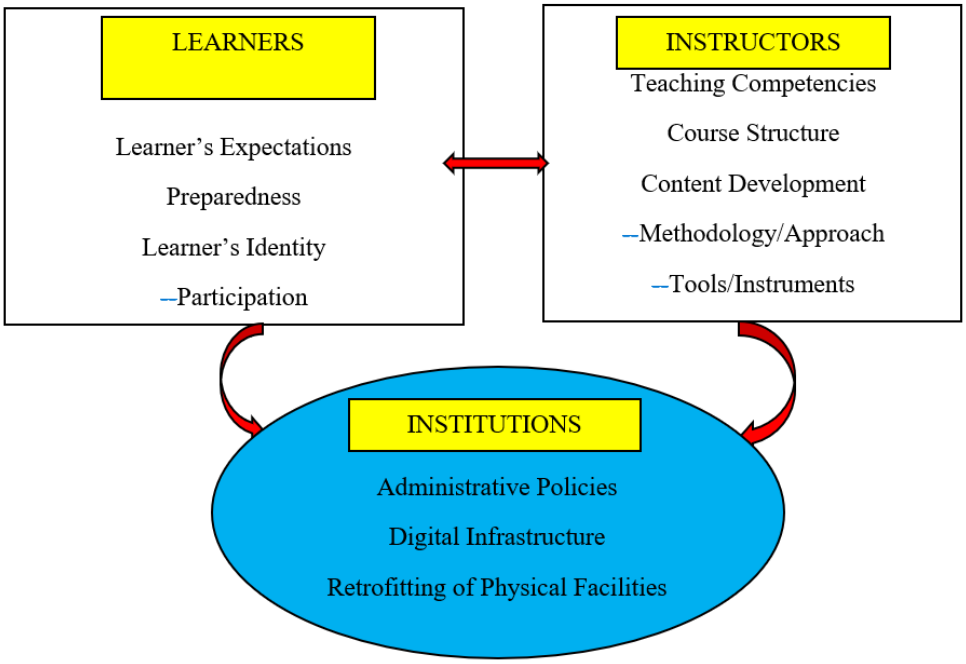
One of the specific objectives of this work is to provide a documented experience of combined in-site and online learning environments, as well as the issues and constraints in the adoption of such hybrid platforms. More specifically, the learning settings in the courses that include Regional Integration in Asia; Design and Evaluation of Development Projects; Industrialization and Urbanization; Special Problems in Philippine Development; and Readings in Development were assessed. These courses were taught during the first and second semesters of academic years 2022-2023. Careful attention was given to how online group exercises, and presentation of case studies were effectively delivered and responded to in both purely online and hybrid learning environments. The quality of synthesis papers submitted was evaluated, as well as the student feedback on the areas that require enhancement or further adjustments.

In the discussion process, the paper also hopes to shed light on how learning transition addresses the problem of efficiency vs. effectiveness, and how measures can be drawn to align the evolving educational set-up to the actual needs and demands in higher education by institutions of learning and government.

Review of Related Studies

An attempt to find the extent of how online education is integrated in higher education was embodied in the work of Kebritchi et al. (2017). In this work, a literature review was synthesized to explore the issues and major challenges in online education. This involved data analyses and evaluation of empirical data on learning and teaching issues, excluding institutional issues that relate to administrative policies, budgets, and program development. Although the review was systematic, its scope was non-exhaustive. Institutional consideration is a necessary element to make a comprehensive discussion in the learning transitions, especially in specific study disciplines such as development. This will allow a better appreciation of how the integration of online education may best be achieved. Figure 1 illustrates how a cluster of issues affects the tripartite process in a cycle, which governs the conceptual framework of this study.

Figure 1
Conceptual Framework in the Analysis of Clustered Issues



It is particularly interesting to note in some studies that learners' expectations to include immediate feedback or real-time guidance on assignments, and even expectations on the grading basis, and adherence to assignment deadlines (Li & Irby, 2008; Lyons, 2004) were probed. The readiness of students, particularly the compliance to consistently attend course classes was tackled in the works of Hung et al. (2010) and Smith et al. (2003). Ensuring class participation through attendance was a dominant issue at the onset of the pandemic because of the lack of mental preparation to deal with an entirely robust set-up, notwithstanding the accompanying technical constraints that learners are confronted with, arising from poor or unstable network connections, unfamiliarity to digital exchange platforms, power outages, etc. The physical environment for online learning proved to be a major consideration such as the onslaught of typhoons and climate conditions, and spatial factors conducive to learning, among others. This is a consideration in the employ of effective tools and instruments, and even in the methodologies of teaching. The preparedness of learners is also shaped by their competence in computer skills, adeptness to the internet cultural and language backgrounds (Luyt, 2013), and even their time management abilities (Hill, 2002; Roper, 2007). The needed preparation of students proved to be universal in the aforementioned conditions. In development studies, and in other disciplines, access to different types of online references is a crucial element of learning, and the preparedness of learners on the aspect of optimally utilizing the digital space becomes not only a sufficient but also a necessary condition.

In contrast to purely distance education, hybrid platforms or combined in-site learning balance the effects of a complete departure from traditional learning modalities. This proved to be very effective in development studies where interaction, sharing, and plenary discussions are useful teaching approaches.

Koole (2014) explained the importance of building a sense of identity among learners by affiliating themselves with a community of learners. This is what separates distance education from in-site learning, in a way that the latter develops a sense of belonging, purpose, and norms, as argued by Koole, and in another study by Lapadat in 2007. Kazu and Yalcin (2022) conducted a comprehensive meta-analysis of 44 quantitative studies that were undertaken between the years 2010 to 2020 to verify the assertion that a hybrid learning environment has an overall effect on students' academic achievements. The studies were classified according to a control group of courses taught in a traditional method, and another experimental set of courses administered through a hybrid learning set-up. The analyses exhibited the pronounced effect of hybrid learning settings on biology or science courses in general. Toward the close of the pandemic era, learning experiments in graduate work including the teaching of development studies in a hybrid format suggests that more is desired to strike the balance between effectiveness and efficiency. However, based on students' feedback, the gradual return of classroom discussions is a welcome development. The opportunity to socially interact reinforces the sense of identity among students, especially when learning exchanges are relatable to them such as discussion of common issues in development.

To complete the major issues in learning transitions, learners' expectations, preparedness, and identity are identified to be crucial in learners' participation in an online setting. Participation of learners and engaging them in the exchange are two different concerns using electronic platforms. Hrastinski (2008; 2009) distinguishes engagement in learning, in terms of both reading and writing, while participation comes largely through online listening and observing (Wise et al., 2013). Romozowski and Mason (2004) on the other hand, challenged the notion that passive participation is construed as mere participation, and later studies by Hrastinski (2009) considered even online listening and observing as a form of active learning. Therefore, it may be too conclusive to state that the effectiveness of online learning in hybrid platforms may be assessed based on the extent of online participation. Given this, it becomes an immense task for teachers to consider the discipline or field of study and carefully examine other tools and instruments that are key to extracting learners' participation. For example, in the development studies, online team exercises allow each student to provide insightful or qualitative responses to assigned questions that may be interconnected to the responses of other learners. Using this as a teaching tool, the instructor is able to assess the depth and uniqueness of thought, and the ability of the learner to build on the insights of others, rather than judging participation on the length or quantity of their responses or online postings. This is similar to the concept of vicarious learning gained by observing the active dialogue of others (Kolb, 1984; Mclendree et al., 1998).

The pandemic era compelled many educational institutions and governments to introduce necessary measures that will enable learners to maximize the benefits of combined e-learning and in-site instruction. The combination caused an inevitable strain on the delivery of infrastructure, tools modification, facility arrangements, administrative policies, and even the skills and competence of teaching staff. It has become a realization that learning in the post-pandemic era will require reconfiguring traditional in-site set-up and exploring what

hybrid platforms can offer in specific disciplines or fields of study. It should be recognized that there is uniqueness in each of these disciplines in which the utilization of online and in-site learning should be carefully assessed.

Research Methodology and Design

The research methodology of this study involves a qualitative analysis of the content design and structure of five development courses conducted at the Asian Center namely, Regional Integration in Asia; Design and Evaluation of Development Projects; Industrialization and Urbanization; Special Problems in Philippine Development; and Readings in Development. These courses were conducted during the first and second semesters of the academic year 2022-2023. During this period, the first three courses were administered purely online, while the last two courses were in a hybrid learning format. A total of 16 students were evaluated based on the frequency and quality of their participation, interactions, and written outputs. The findings of this study are anchored on the qualitative evaluation while contrasting the teaching methodologies and approach, as well as the tools and instruments adopted in these courses. Evaluation of case study presentations, quality of synthesis papers submitted, and results from online group discussions were utilized to support the findings in this work.

Discussions

Development studies as a discipline requires more than just a discussion of theoretical concepts. It needs to be related to actual field practices and applications, in which documented references may take the form of discussion papers, technical reports by institutions, policy documents, working proceedings, project reports, and program evaluations and assessments. The effectiveness of hybrid learning platforms would vary according to disciplines. This was established in a meta-analysis study conducted by Kazu and Yalcin (2022) that examined the integration of both distance and face-to-face learning in hybrid learning. In this study, where experimental groups across ten disciplines were organized in the meta-analysis, it was found that certain disciplines appear to be most effective in hybrid learning based on the academic achievements of the participants. The findings suggest that among the disciplines subject of study, the medicine course with the lowest effect size (ES) appears to be least responsive under the hybrid setting.

This indicates that hybrid learning platforms should be accompanied with reconfiguration so they may render effective in different disciplines. In learning development studies, such reconfiguration in the course design and content, teaching methodology and approach, tools, and instruments are integral adjustments in the transition to a hybrid platform. Kazu and Yalcin's (2022) findings further support that, while science courses taught under a hybrid learning set-up appear to be less effective and responsive, other disciplines may follow the same outcomes.

Course Design/Structure and Content Development

The structure of a course in development studies should not be static to enable

the differing interactions generated by learners during face-to-face and online learning. To avoid being static, this means that the course may be designed to allow learners to make presentations of varying types of literature. Case studies provide illustrative examples of development issues that are interestingly tackled during in-site discussions. Policy literature on the other hand, requires detailed analyses to be presented online, drawing some contrasting perspectives from historical references. Development involves a study of the progression of events which can be drawn from historical narratives and relating this to current and more updated literature. During online presentations, students are encouraged not to limit themselves in discussing the assigned reading but to contrast this to specific periods in development. There are two reasons for encouraging learners to build on the given readings indicated in the course syllabus. First, this is an opportunity for learners to have a hand in further improving the course, which Evrim et al. (2011) called designing course content by adopting an active and autonomous role. Li and Irby (2008) acknowledged the challenging role instructors assume in identifying and adjusting the materials that should be used in hybrid platforms. Creativity and innovativeness are skills that may be exercised with experimentation in this case, which can be the subject of capacity-building or training, which schools should extend to improve teaching competence. These training and support were also recognized by Kyei-Blankson and Keengwe (2011), particularly in the aspect of transitioning course content from online to in-site learning.

Instruction Methodology/Approach

Unlike other disciplines, development studies are inter-disciplinary and multi-disciplinary, enabling instruction to take innovative methodologies and non-traditional approaches. During online discussions, the participation of learners may be solicited through real-time exercises that may involve each student responding to an assigned item in the exercise. In a Project Evaluation course, to solicit the participation of all students, they are given time to identify the elements of project evaluation in sample projects. While each student will have to work independently online, the consolidated responses will be integrated in a plenary discussion with facilitated guidance by the instructor. The extent of interactions and the quality measured in terms of engaged participation of all students in five group exercises were compared to two other courses on Special Problems in Philippine Development and Readings on Development, which were taught under a hybrid learning environment. The marked difference in the quality of student participation of a total of 16 students, and their interactions between the two sets of environments suggest a similar experimental outcome to that of Kazu and Yalcin's (2022) research findings.

The online classes also allow instructors to supplement the readings with lectures on technical information that students may not readily grasp from readings because of their diverse academic backgrounds, especially at the graduate level. Mathematical or empirical modeling, for example, may not be comprehensible for some participants requiring a separate lecture by the instructor to supplement how this may be explained in the reading. Such may be discussed online as this may be more visually appreciated through a presentation. At the outset, these students' backgrounds should be assessed

carefully by the instructor so that course design, content, and even instruction approach may be calibrated.

Emphasis should be given to the importance of peer-to-peer interaction during online discussions. In graduate work, one of the more popular formats to encourage interactive learning is through student presentation of assigned reference materials, incorporating a critical analysis rendered by another student. This format stimulates more in-depth exchanges among learners, with the instructor facilitating the process. This may be covered in one of the six principles of effective instruction referred to by Miller (2014) in his study of teaching strategies differentiated between online and in-site formats.

Tools/Instruments

Strategic use of multimedia presentations such as videos, simulations, films, and documentaries serves their purpose during online learning, but they should be employed with caution. The type of multimedia presentations should not replace the lesson itself, but should provide learners with opportunities for critical thinking or complement assigned reading topics. This should enhance the engagement of students in online discussions. In his 2013 work, Hathaway encouraged multiple types of multimedia learning tools to reinforce engagement. In contrast, peer collaboration was seen as another strategy to enhance this engagement according to Niess and Gillow-Wiles (2013), and hybrid platforms provide greater opportunities for such during in-site learning. Issues on development are very dynamic and current, they require students to be abreast of updated information generated from social and mainstream media. Based on class experiments, these are best discussed face-to-face further strengthening peer discussion and collaboration.

An important instrument involves the combined use of types of literature in development. In a development reading course, students are oriented to develop their analysis from historical narratives and documents that need updating through more current literature. Policy literatures in the form of laws, statutes, policies, and regulatory guidelines may be contrasted between governance periods to enable learners to explore the gaps, successes, and failures of development approaches. Presentation of case studies by students using a diverse set of literature, as an instrument of learning was assessed according to the generated interactions during the question-and-answer segment during the plenary discussion.

Conclusions

Given the findings from the consolidated literature review and the modeling of learning in a hybrid platform using development studies as a discipline, it can be concluded that effectiveness may vary in such platforms. This means that adjustments may be made in the design and structure of the course, methodologies and approaches in instruction, and the tools and instruments that may be employed. Moreover, it is not sufficient that the adjustments happen only from the side of learners and instructors. Institutions of learning and governments should provide support by way of administrative policies,

infrastructure support, retrofitting of facilities, and re-tooling of educational personnel.

In the examination of issues, we find that a cluster of interventions should address these issues. The hybrid learning modality appears to be an inevitable yet viable feature of learning transition across disciplines in the future. Learning strategies should be actively pursued based on some basic principles. Ex-post evaluation on effectiveness based on outcomes from student output and feedback must be institutionalized after close consideration of in-site and online environments. School administrations should ensure that these are tracked, to establish that hybrid learning platforms for certain disciplines may not only be efficient but also effective.

After taking into account the learners' expectations, preparedness, identity, and perceived extent of participation, the structure of a development course may find alignment. Creativity and innovativeness in teaching methods may be exercised, as well as the tools and instruments to employ. Modeling these concerns to specific disciplines meant consideration of best practices that may serve as a possible guidepost for other areas or fields of study.

Recommendations

It is made more apparent that the hybrid learning platform will be a future modality for many study disciplines. However, differing models of hybrid learning should be aligned to the salient features of the study areas within a discipline. A tripartite process involving the learner, instructor, and learning institution should shape the learning environment under a hybrid platform. It is difficult to prescribe which recommended measures should be satisfied first, explaining why the clustering of issues in Figure 1 is illustrated as cyclical.

First, a close examination of the areas of study should determine what thematic discussions can be facilitated through online and in-site settings. The factors taken into consideration would be the perceived participation of learners in particular themes. Such perceived participation may be stimulated by the characteristics of instruments such as reference materials used. If these learning materials are too technical and rich in concepts, it has been studied that online learning allows learners better control over these materials. On the other hand, exchanges that involve experiences and narratives are better facilitated through in-person interactions. The diverse types of literature used as references in the study of development allow instruction to proceed in combination with two settings thus, enabling experimentation in the deployment of topics. This allows for re-calibration of the course structure and design. As argued earlier, pedagogical methods and approaches may also vary to include real-time exercises online to solicit universal participation by every learner. Synthesis of class discussions may also be required in lieu of research papers with assigned themes. Synthesizing the discussions reinforces the learning by documenting the exchanges. The discussions are more relatable to each participant, encouraging everyone to listen and participate. Synthesis papers are also less likely to be plagiarized, as the content is unique to the class exchanges. It also gives the students an opportunity to build on the structure of

discussions in the course. It would be ideal for a course profile on a program's webpage to reflect some of these students' inputs to give prospective students an idea of what to expect from a course. Thus, the synthesis also serves as a form of student feedback and appreciation of the directions of discussions in a course. In development studies, the integration of lessons learned from various readings is very essential and the thought processes generated from the synthesis of discussions may be considered a contribution to the existing body of knowledge. The exercise also trains the learners to engage in critical thinking, especially in addressing development issues.

Second, the learners' expectations should be a primary consideration in the learning transition. This translates to satisfying the demand by supplying a course that best responds to their needs. Student's background—academic, work, professional engagements, physical location, and even personal circumstances proved to be very important considerations in online learning, and even the ability to attend in-site sessions. These may also be partly addressed by adjustments in the administrative rules that include setting the frequency of mandatory face-to-face learning sessions, maximum allowable absences, and the like. All these contribute to the preparedness of the learner to fully satisfy the requirements of the course. This is part of what Knowles (1975) referred to as self-directed learning where the student needs to take control of understanding his learning needs, establishing learning goals, and implementing learning strategies. Autonomy in learning is best achieved in online settings, but the learner needs to make the necessary preparations and access to infrastructure. The adeptness to traditional in-site learning by most learners enables them to readily adjust to in-person discussions, but the shift from an online setting also needs planning and preparation on the part of the instructors and school administrations. In-site learning is crucial to a learner's identity who may find distance education isolating. The social interaction derived from this setting helps them to alleviate the feeling of being disconnected.

Lastly, the institutions in higher education need to take several measures to ensure that the hybrid platform will be efficient and effective. As earlier mentioned, alignment in administrative and academic policies must be pursued. The post-pandemic reality saw the importance of retrofitting the physical facilities and network infrastructure, as well as systemic changes in the electronic platforms for registration and course information for students' evaluation, apart from what program advising can provide. Likewise, capacity-building measures of both administrative and academic staff should complement any learning transition in disciplines.

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The Design and Evaluation of a Conference Exhibit in the Metaverse

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Abstract

Restrictions brought about by the pandemic have compelled numerous institutions to hold the usual face-to-face conferences online. Such is the case with the biennial National Conference for Open and Distance eLearning (NCODeL) of the University of the Philippines Open University (UPOU), held last November 23-25, 2022. The university developed its user portal and utilized Zoom as the video conferencing software. Similar to any form of interaction, online conferences have their own set of advantages and drawbacks. One notable advantage is the potential for utilizing virtual environments, in our case, using FrameVR as the metaverse exhibit platform. This web-based immersive collaborative space greatly contributed to the virtual experience of participants. However, it is important to note a major drawback, which is the non-provision of in-person interactions. This paper delves into its design and the evaluation of the experiences of exhibit visitors. Factors such as participant enjoyment, interest, ease of use, and sense of presence were collected through a comprehensive online survey and analyzed using Pearson's Correlation Test and reflexive thematic analysis. Findings indicate a positive correlation between situational interest and sense of presence in virtual exhibits, suggesting that enhancing immersive qualities and interactive elements of such exhibits can improve user engagement.

Keywords*: metaverse, virtual exhibit, VR-user experience, situational interest*

Introduction

Background

The University of the Philippines Open University (UPOU) is a pioneer in the field of online teaching and learning and has been instrumental in promoting open and distance education in the Philippines. Annually, the university hosts a conference that is dedicated to open and distance e-learning, a practice that dates to the inaugural National Conference on Open and Distance e-Learning (NCODeL) in 1998. Following this milestone, the first International Conference on Open and Distance e-Learning (ICODeL) was launched in 2012. These

conferences provided a platform for policymakers, professionals in open and distance learning, and e-learning scholars to share their experiences, exchange ideas, and explore new possibilities for ODeL development.

In 2021, the UP Open University held ICODeL entirely online due to pandemic restrictions. VFairs (Figure 1) was used to allow participants to communicate, collaborate, and engage in the conference. However, while this solution offered notable advantages, it was not able to provide an immersive metaverse experience and came at a high cost to the university. Notably, visitors were confined to a static view where they could not move nor look left and right. To navigate, users can only click on the text where they will be redirected to the room of that presentation.

Figure 1
The lobby of the ICODeL 2021 VFairs platform

Recognizing these limitations, NCODeL 2022 observed a strategic shift in approach. The university opted for an in-house user portal coupled with Zoom as the conferencing software, and integrated FrameVR as the metaverse exhibit platform. Within this virtual world, conference sponsor materials and the university's select projects and other learning materials were displayed. This study aims to understand how this metaverse exhibit was perceived by conference participants and the public, as it represents a new frontier in conference technology.

Virtual Exhibits

Despite the growing interest in virtual exhibits, there is a notable gap in understanding how specific factors influence user engagement and satisfaction in these digital environments. Previous studies have primarily focused on the technical aspects and general usability of virtual reality (VR) applications in cultural and educational settings. However, there is limited research exploring the relationship between situational interest and the sense of presence in virtual exhibits, and how these elements contribute to overall user engagement.

This study aims to fill this gap by examining the correlation between situational interest and the sense of presence and identifying key features that enhance the user experience in virtual exhibits. By addressing these aspects, this research provides valuable insights for the design and development of more engaging and effective virtual experiences.

Purpose of the Study

This research seeks insights into metaverse virtual experiences, emphasizing navigation, engagement, and collaborative design, focusing on exhibit attendees' situational interest and sense of presence in the absence of a VR Head-mounted Display (HMD). To achieve these objectives, the following research questions were formulated:

1. What is the relationship between the sense of presence experienced by participants and their situational interest in navigating the virtual exhibit without the use of VR HMDs?
2. Based on participant comments, what specific points, areas, or features of the virtual exhibit were considered interesting or noteworthy?

Review of Related Literature

The definition of the metaverse is evolving as new domains discover its utility and contextualize this emerging technology. However, this definition enumerates the various layers and elements that are usually present in the metaverse (Mystakidis, 2022):

> The Metaverse is the post-reality universe, a perpetual and persistent multiuser environment merging physical reality with digital virtuality. It is based on the convergence of technologies that enable multisensory interactions with virtual environments, digital objects and people such as virtual reality and augmented reality (AR). Hence, the Metaverse is an interconnected web of social, networked immersive environments in persistent multiuser platforms. It enables seamless embodied user communication in real-time and dynamic interactions with digital artifacts. Its first iteration was a web of virtual worlds where avatars were able to teleport among them. The contemporary iteration of the Metaverse features social, immersive VR platforms compatible with massive multiplayer online video games, open game worlds, and AR collaborative spaces.

According to Kai Liao et al. (2021), the metaverse connects physical and virtual in a world where social, financial, and cultural sports end. It means that the metaverse, which is often associated with immersive digital environments and interactions, is shaping our world in ways that affect multiple aspects of life, especially in education.

Metaverse in Education

The metaverse is ideal for schools that focus on e-learning and offer all their training online, as it enhances the educational experience (Contreras et al., 2022). The learning process can be humanized by incorporating the metaverse into these educational systems, encouraging greater involvement and interaction between students and teachers. This transition toward a metaverse education could alter how we learn and develop our talents, providing a more engaging and dynamic approach to learning.

As the world advances, the presence of the metaverse in education offers a fresh perspective on educational technology. Through the metaverse, training programs and project initiatives that are not feasible in the real world can be conducted without the constraints of time, space, or unpredictable circumstances. Its features provide programs with effective learning support. However, the lack of relevant technological infrastructure can pose significant challenges throughout the learning process. With the increasing amount of research and development regarding the metaverse in today's generation, these challenges can be brought to light (Hwang & Chien, 2022).

According to Azoury and Hajj (2023), while the concept of the metaverse is not new, its widespread adoption in education gained momentum with the onset of the COVID-19 pandemic. Institutions are now keen to enhance the educational system through the metaverse due to the numerous opportunities it presents. Technologies like AR and VR have the potential to help students improve their knowledge. These technologies can create a sense of presence in an unusual frame (a phenomenon known as digital frame possession) and foster a feeling of being present with others (known as co-presence).

Khalil et al. (2023) investigated the adoption of an educational metaverse in the context of higher education in Pakistan. The researchers used a mixed-methods approach, employing questionnaires and interviews to gather data from both students and teachers. Their findings indicated a positive reception among teachers and students toward integrating the educational metaverse into their teaching and learning practices. NVivo software was employed to code and extract thematic insights from the interview data.

Evaluating Virtual Exhibits

Recent studies have emphasized the importance of usability and user experience in VR applications for digital museums and cultural heritage exhibitions. Othman et al. (2021) conducted a usability evaluation of a VR and non-VR virtual tour application for a living museum, finding that the VR version had higher mean scores in usability. The study also highlighted the need for a nuanced understanding of how different user demographics interact with VR applications. Further exploring the user experience in VR settings, Chung et al. (2024) compared user experiences in reality-based (high representational fidelity level) and virtuality-based (surreal, low representational fidelity level) VR exhibition environments, finding that while the familiarity of the reality-based environment provided more comfort and concentration for participants,

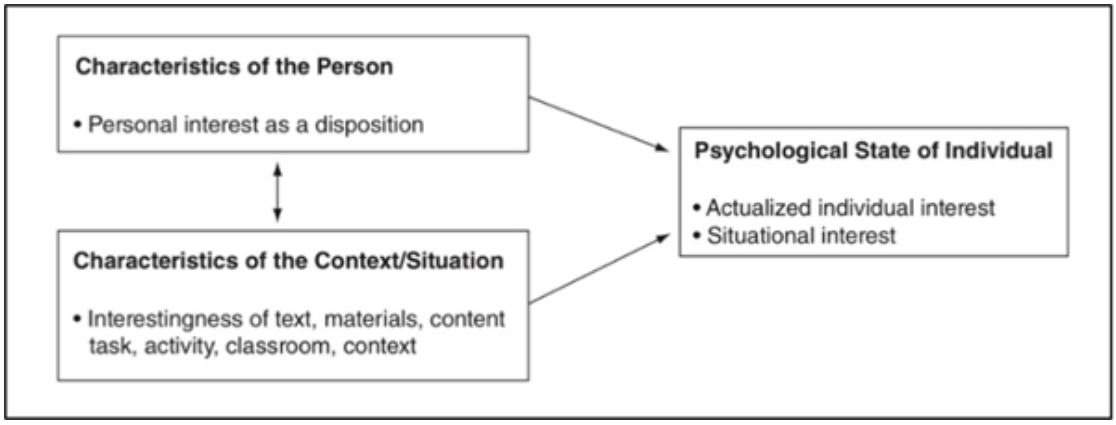
the newness and openness of the virtuality-based environment caused active movement.

Li et al. (2022) focused on online virtual museum tours and established a heuristic evaluation scale to assess aspects like authenticity, interaction, and navigation. Their findings suggested that while visual authenticity was high, behavioral authenticity and navigation needed improvement to enhance the overall user experience. Similarly, Pei et al. (2023) developed a comprehensive framework to evaluate user experience in VR-based digital museums, revealing that VR significantly enhances learning effectiveness compared to traditional desktop interfaces. This reinforces the notion that immersive technologies can significantly impact educational outcomes, providing a more engaging user experience. Complementing these insights, Gong et al. (2024) proposed a detailed user experience model for VR cultural heritage exhibitions, using grounded theory to combine qualitative and quantitative approaches. They emphasized the importance of designing user experiences that account for the unique interactions in VR environments. Together, these studies underscore the critical role of well-designed VR interfaces in enhancing user engagement and educational effectiveness in virtual exhibits.

Situational Interest and Presence

Literature in educational media cited relationships between spatial presence and various motivational variables. One motivational construct that has been extensively researched is situational interest. In the initial stages of research in motivation, interest was greatly overlooked. Recently, however, this focus has shifted. In 1999, Krapp categorized two primary types of interest: personal and situational. Figure 2 depicts the three approaches to interest research as outlined by Schunk et al (2014).

Figure 2
Approaches to interest research from Schunk et al. (2014)



Among these variables, situational interest was used as a motivational variable in a theoretical framework proposed by Figueroa in 2023.

Methodology

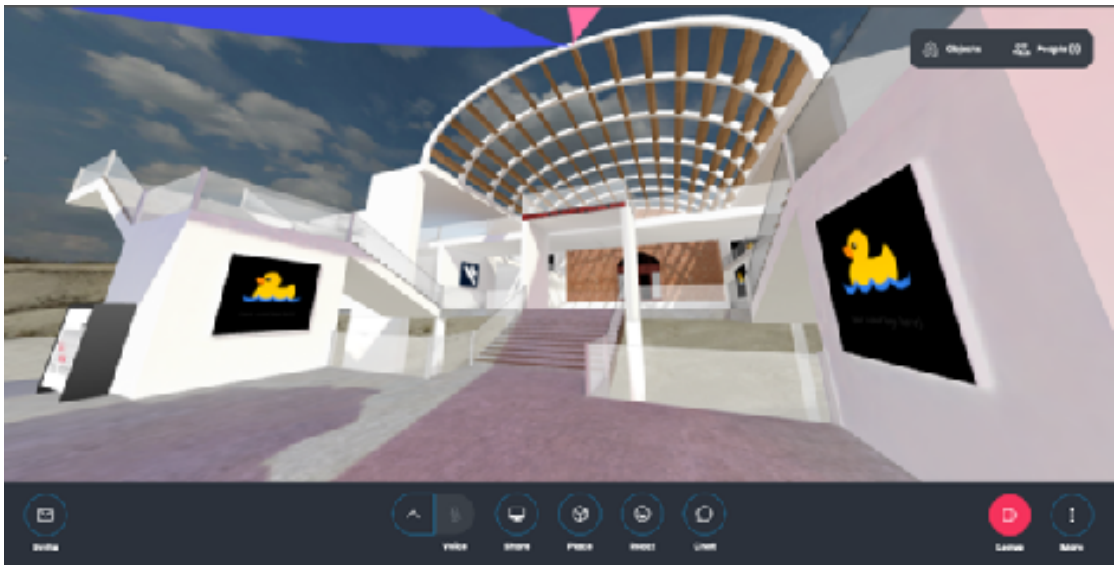
Selecting the Platform

There has recently been a rise in the development of virtual reality technologies, specifically in the realm of virtual collaborative spaces. Such technologies also gained significant traction during the pandemic.

One such platform considered for the virtual exhibit was Sansar, a social VR platform developed by Linden Lab. However, it was determined that Sansar presented certain limitations for our purposes. Firstly, it requires users to download and install the software on a Windows computer, thereby excluding potential participants using operating systems other than Windows. Additionally, Sansar's minimum system specifications require a dedicated GPU due to its higher graphical demands, potentially posing a barrier for individuals with less powerful setups. This would potentially restrict inclusivity compared to platforms that can be accessed directly through a web browser.

Another option was Mozilla Hubs (Figure 3), a versatile and browser-based virtual collaboration platform. Unlike Sansar, users can join directly through their web browsers, eliminating the need for software downloads or specific operating system requirements. This allowed participants to engage with the virtual exhibit on a wider range of devices. However, at the time of development, Mozilla Hubs had a limitation in that it could only accommodate up to 25 visitors at one time, potentially impacting its suitability for larger gatherings.

Figure 3
The user interface of Mozilla Hubs in desktop mode



Ultimately, the university opted to use FrameVR, a browser-based immersive multi-user virtual platform created by Virbela, and has been used by reputable institutions such as Microsoft, University of Massachusetts, and MIT Media Lab. Its cost-effective features and web browser compatibility provided several advantages. At the time of development, it could be accessed by up to 40

users, and the prebuilt worlds and allowed files were suited to the needs of the virtual exhibit.

Building the Exhibit in the Metaverse

The exhibit was created collaboratively in the Metaverse using FrameVR. Each team member was granted editor access to the space to work on. The team worked together to build the entire environment, starting with the selection of a space to build the exhibit. FrameVR offers different template spaces that users can choose from, as seen in Figure 3, which shows the initial environment of the exhibit.

Designing the Environment

The team assigned zones to each space in the Metaverse and began adding assets to the environment, including images, texts, video materials, and 3D models. However, as the team added more big assets like video materials and 3D models, they noticed that the site became laggy. To reduce the server load, the team decided to link the video materials directly to their thumbnail instead of embedding them in the environment. This was a valuable lesson learned during the exhibit-building process.

Integrating the Content

A dedicated area was allocated for sponsors and partner organizations to showcase their materials. Previous issues of the university's journal, the International Journal on Open and Distance e-Learning (IJODeL), were available to be read in the metaverse, serving as a valuable knowledge resource for visitors.

The exhibit also highlighted the creativity of UPOU students, featuring the videos and artworks they created in their multimedia courses. Additionally, visitors can watch educational video resources produced by the UPOU Multimedia Center (now Educational Media Production). VR tours created by the Immersive Open Pedagogies Program (IOP) are also featured, allowing visitors to visit various locations in the Philippines virtually.

To enhance the users' immersive experiences, interactive features and activities were added. Visitors could vote for their favorite student-submitted posters. They could also express their creativity on a collaborative drawing board. Conference sessions were streamed for virtual attendees to watch together (Figure 4), and they could even share their own screens. This thorough planning and inclusion of interactive elements made the educational experience enjoyable and enriching for everyone in the metaverse exhibit.

Figure 4
Streaming the conference presentations in the virtual exhibit

Participants

The study participants were NCODeL 2022 conference attendees and UP Open University students. After exploring the Metaverse virtual exhibit, they were requested to complete a questionnaire via Google Forms. The participants who consented to the survey are considered to be the participants of the study.

Data Collection and Analysis

The quantitative and qualitative data were collected using Google Forms. Participants were asked to answer the survey upon visiting the conference exhibit. The form aims to gather the situational interest, sense of presence, and the features of the exhibit that attract the participants the most. A total of 44 respondents participated in the study.

The quantitative data were then run through JASP, an open-source software that runs through R-code. To know about the relationship between sense of presence and situational interest, Pearson's Correlation Test was used. To identify features and aspects from which the participants are attracted the most, the qualitative data went through reflexive thematic analysis following Braun and Clarke's approach (Byrne, 2022).

Findings

Relationship between Sense of Presence and Situational Interest

Table 1
Items Used for Measuring the Situational Interest and Presence

Item	Mean	SD
Situational Interest		
The exhibit was entertaining	4.591	0.583
I did not enjoy navigating the exhibit	2.023 (-) 3.997 (+)	1.338
I liked the exhibit	3.997	1.338
The topics in the exhibit were interesting	4.568	0.625
Presence		
How much did you feel that you were in the exhibit and not just looking at a photo?	8.273	1.318

Table 1 shows the actual mean score and standard deviation of the variables relating to Situational Interest and Presence. Table 2 shows the results of the Pearson's correlation test between situational interest (SI) and presence. The test revealed a significant correlation between the two variables, with a p-value of less than 0.001. The r-value of 0.572 indicates a positive linear relationship between SI and presence.

Table 2
Pearson's Correlation Test Result for Situational Interest and Presence

	r	*p-value*	*95% CI*
Correlation (r)	*0.572*	*<0.001*	*[0.332,0.743]*

Note. CI = Confidence Interval.

Interesting Feature and Aspect of the Exhibit

Table 3
Themes that Emerged as Interesting Features/Points/Areas of the Exhibit

Feature/Point/Area	Frequency
Immersive experience	12
Interactive elements	9
Artistic quality	8

Feature/Point/Area	Frequency
UPOU Virtual Tour	6
Educational content	5
Technical issues	5
Navigation challenges	4
Geographical accessibility	3
Comparison to VR/Gaming	3
Cultural references (e.g., BTS)	2
Navigational improvements	2
Balance of academic and fun	2
Individual exploration	2
References to other experiences (e.g., VR NFT, video games)	2
Desire for future revisions	2
Clear instructions/tutorials	2
Variety of formats/features	2

The analysis of participant feedback yielded several key themes, shedding light on the aspects that garnered attention and appreciation from the participants.

Immersive Experience

The predominant theme emerging from participant comments was the appreciation for the immersive experience offered by the virtual exhibit. Participants expressed a sense of presence and engagement within the virtual environment, using terms such as "excellent," "fascinating," and "entertaining" to describe their overall encounter.

Interactive Elements

The interactive nature of the exhibit emerged as a crucial point of interest. Participants valued features such as playable audio, links to works, and various interactive formats. This suggests that interactivity significantly contributed to the positive perception of the virtual exhibit, aligning with the growing emphasis on user engagement in digital environments.

Artistic Quality

The aesthetic appeal of the virtual exhibit was a noteworthy aspect, with participants lauding its "simple," "classic," and "well-decorated" attributes. The positive reception of the artistic quality underscores the importance of visual design in creating a favorable user experience.

UPOU Virtual Tour

Specific mention of the UPOU Virtual Tour indicated that participants found this feature particularly noteworthy. The ability to virtually explore distant locations,

as exemplified by the UPOU Virtual Tour, resonated positively, offering an accessible and immersive experience for those unable to visit the physical locations.

Educational Content

Comments reflected a positive response to the educational content embedded in the virtual exhibit. Participants perceived value in the informative nature of the entries, emphasizing the balance between serious academic content and interactive, engaging elements.

Technical Issues and Navigation Challenges

While the overall feedback was positive, a subset of participants noted technical issues and navigation challenges. Addressing these concerns is pivotal for optimizing user experience, as smooth navigation and functionality are imperative for the success of virtual exhibits.

Geographical Accessibility

The appreciation for the virtual exhibit providing access to locations like Visayas underscores its potential to bridge geographical gaps and offer a unique experience to participants regardless of their physical location.

Comparison to VR/Gaming

References to other experiences, such as VR non-fungible tokens (NFT) and video games, suggest that participants drew comparisons, potentially influencing their expectations and experiences with the virtual exhibit. These external references provide context for understanding participants' perspectives.

Cultural References

The mention of cultural references, such as BTS, added an unexpected and exciting element to the exhibit. The incorporation of culturally relevant content contributes to the diversity and richness of the virtual space.

Desire for Future Revisions

Expressions of a desire for future revisions indicate a participant's interest in continuous improvement and refinement of the virtual exhibit. These comments emphasize the evolving nature of digital experiences and the necessity of continuous development.

Discussion

Relationship between Sense of Presence and Situational Interest

Our study reveals key insights into how situational interest (SI) relates to the sense of presence within a virtual exhibit. The high mean score (4.591) for the

statement "The exhibit was entertaining" suggests that participants generally found the virtual exhibit engaging and enjoyable. The positive correlation ($r = 0.572$) further supports this, indicating that those who enjoyed the exhibit more also found navigating it to be less of a hindrance.

The positive linear relationship between SI and presence ($r = 0.572$) is indicative of a strong connection between the perceived interest in the exhibit's content and the feeling of being present within the virtual environment. This aligns with existing literature suggesting that heightened situational interest can lead to an increased sense of presence in virtual environments (Slater & Wilbur, 1997). The statistically significant correlation ($p < 0.001$) further emphasizes the robustness of this relationship.

The high mean score (8.273) for the statement assessing the feeling of being in the exhibit rather than merely observing a photo supports the notion that participants experienced a strong sense of presence. This observation aligns with previous research that underscores the importance of presence in creating positive user experiences in virtual environments (Biocca et al., 2003).

The positive relationship between SI and presence has practical implications for the design of virtual exhibits. Focusing on creating content that elicits situational interest may enhance the overall sense of presence, thereby improving user engagement and satisfaction.

Interesting Feature and Aspect of the Exhibit

The analysis of participant feedback revealed several key themes that shed light on the aspects of the virtual exhibit that captured participants' attention and appreciation. The immersive experience emerged as a central theme, with participants reporting a strong sense of presence and engagement. This supports the positive correlation identified in the first research question, highlighting the crucial role of immersion in fostering both interest and presence.

The interactive elements, highlighted by the participants, indicate a growing emphasis on user engagement in digital environments. Incorporating interactive features, such as playable audio and links to works, can significantly contribute to the positive perception of virtual exhibits.

Artistic quality received positive feedback, emphasizing the importance of visual design in creating a favorable user experience. This finding underscores the need for virtual exhibits to prioritize aesthetics and design to enhance user satisfaction.

The UPOU Virtual Tour, mentioned as a noteworthy feature, indicates the potential of virtual exhibits to provide accessible and immersive experiences, particularly for those unable to visit physical locations. This finding supports the idea that virtual exhibits can bridge geographical gaps and offer unique experiences to a diverse audience.

While the overall feedback was positive, the identification of technical issues and

navigation challenges highlight the importance of addressing such concerns to optimize user experience. Smooth navigation and functionality are crucial for the success of virtual exhibits.

References to other experiences, such as VR NFT and video games, suggest that participants drew comparisons, influencing their expectations and experiences with the virtual exhibit. Understanding these external references can provide valuable insights for designers and curators.

The inclusion of cultural references, like BTS, adds an exciting and unexpected element to the exhibit, contributing to the diversity and richness of the virtual space. This finding emphasizes the potential of virtual exhibits to incorporate culturally relevant content.

Expressions of a desire for future revisions indicate a participant's interest in continuous improvement. This feedback emphasizes the evolving nature of digital experiences and the necessity of continuous development to enhance virtual exhibits over time.

Conclusion

Our research offers valuable insights into the connection between situational interest and the sense of presence in virtual exhibits, highlighting its significant features. The positive correlation between these variables suggests that fostering situational interest can contribute to an enhanced sense of presence, thereby improving user engagement. The analysis of participant feedback further identifies key features and aspects that contribute to a positive user experience, including immersive experiences, interactive elements, artistic quality, virtual tours, educational content, and cultural references. However, attention must be given to addressing technical issues and navigation challenges to optimize user satisfaction. The findings of this study contribute to the expanding body of literature on virtual exhibits and provide practical implications for their design and development. Future research could investigate the long-term impact of these strategies on improving user engagement in virtual exhibits.

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Template for Quantitatively-Oriented Articles

Title of Article

Author 1[1]and Author 2[2]

[1]Position, Institutional Affiliation, Country, Email address

Abstract

Abstract in 150-250 words.

Keywords: No more than five (5) keywords.

Introduction (Center Heading 1)

This section contains a clear historical background of the study, showing why the research had to be undertaken. In this section, the author(s) shall have the opportunity to expound on what the research says about the research problem, and show clear support for the need to undertake the research, through appropriate research gap analysis.

Objectives (Center Heading 2)

This section provides a clear statement of the goals and objectives of the research.

Conceptual/Theoretical Framework (Center Heading 3)

The conceptual or theoretical framework would be expected for research studies that dealt with empirical procedures and methodologies. A framework of this nature would provide for clear interrelationships and direction of interactions of variables which the researcher expects to show by his/her data and data interpretations. It should be noted that variable interactions may be easier to understand if they were to be presented in illustrated model formats.

Methodology (Center Heading 4)

This section includes brief discussions of data collection procedures and analyses. Data must be presented in appropriate tables.

Results and Discussions (Center Heading 5)

Analytical discussions must present possible relationships of the results of the study and the findings from other studies specifically reviewed for this purpose. Post analysis data may be presented in both statistical tables and appropriate models and figures.

Include subheadings as are necessary.

Conclusions and Recommendations (Center Heading 6)

Conclusions must be according to the objectives of the study.

Recommendations must reflect the objectives and conclusions of the study.

References

General format must follow the suggestions for authors, but generally must follow the APA Style for publications. (As of writing, APA's publication manual is in its 7th edition.)

Template for Qualitatively-Oriented Articles

Title of Article

Author 1[1] and Author 2[2]

[1]Position, Institutional Affiliation, Country, Email address

Abstract

Abstract in 150-250 words.

Keywords: no more than five (5) keywords

Introduction (Center Heading 1)

This section contains the historical background of the study, including specific reports and studies that provided direct support to the research problem. Some relevant part of the literature shall be included in the discussion of the research problem to establish more strongly the need to undertake the study.

Objectives of the Study (Center Heading 2)

This section contains both the research over-all goal and the specific objectives to be attained.

Relevant Studies or Review of Related Studies (Center Heading 3)

Review of studies that are highly related to the current study. After the relevant studies have been presented, a synthesis of these may be presented and the relationship of such synthesis must be related to the study under consideration.

Subheading may be determined as necessary. In these subheadings, specific observations may be noted and statistical tables presented as well as figures and models.

Discussions (Center Heading 4)

In this section shall be inserted full discussion of results and finding, discussed

more deeply in relation to the related studies already reviewed. Subheads may be determined and included in the discussions.

Conclusions (Center Heading 5)

The conclusions of the study must reflect the objectives of the research.

Recommendations (Center Heading 6)

All recommendations must appropriately correspond to the conclusions, and therefore the objectives of the study.

References (Center Heading 7)

Follow the APA Style Guide (As of writing, APA's publication manual is in its 7th edition.)

Style Guide for Full Paper Submission

The paper should be 15-25 pages long (including tables, figures, and references) and prepared preferably in Microsoft Word format. The author(s) should provide a title, the name(s) of the author(s), position(s), institutional affiliation(s), institutional address(es), email address(es) and key words (no more than five). You may make use of the template for preparing your paper: Journal Article Template (Qualitatively-Oriented); Journal Article Template (Quantitatively-Oriented). Detailed guidelines are as follows:

1. **Font type**
   The whole text should be in Arial.

2. **Margins**
   The paper should be A4 size (21 x 29.7 cm). All margins (top, bottom, left, and right) should be 1 inch.

3. **Line Spacing**
   The whole text should be single-spaced.

4. **Title**
   The title of the paper should be 14-point, bold, in capital and lower case letters, and centered.

5. **Author Information**
   Use 12-point and centered for the author name(s). The Western naming convention, with given names preceding surnames, should be used.

   The author name(s) should appear below the title, with one blank line after the title.

   Use 10-point for author(s)' position(s), institutional affiliation(s), country, and email address(es).

   The author(s)' position(s), institutional affiliation(s), institutional address(es), and email address(es) should appear below the author name(s), with one blank line after the name(s).

6. **Headings**
   - Heading font (with the exception of the paper title and the abstract) should be 14-point Arial and in bold.
   - Headings should be centered and in capital and lower case letters [i.e. nouns, verbs, and all other words (except articles, prepositions, and conjunctions) should be set with an initial capital].
   - There should be two blank lines before each heading and one blank line after it.

7. Subthemes

- Subtheme(s) should be 14-point Arial, in bold capital and lower case letters, and flushed left.
- There should be one blank line before and after each subtheme.

8. Abstract

- The abstract heading should be 14-point Arial, bold, centered.
- The abstract should be in **150-250 words.**
- The main text of the abstract should be 12-point Arial, italicized.
- Alignment of the main text of the abstract should be justified, no indent.

9. Key Words

- Include **at most five** keywords.
- Use 12-point Arial. The keywords should appear below the abstract, with one blank line after the abstract.

10. Main Text

- In general, paragraphs should be separated by a single space.
- All paragraphs must be in block format.
- Text font should be 12-point Arial, single-spacing. Italic type may be used to emphasize words in running text. Bold type and underlining should be avoided.
- The first line of each paragraph should not be indented.

11. Tables and Figures

- Tables and figures should be numbered and have captions which appear above them.
- Graphics and pictures should not exceed the given page margins.
- Captions should be 14-point centered.
- The tables and figures of the paper should follow the APA citation style.
- There should be no space between the caption and the table/figure.

12. Footnotes

- Footnotes may be used only sparingly. A superscript numeral to refer to a footnote should be used in the text either directly after the word to be discussed or – in relation to a phrase or a sentence – following the punctuation mark (comma, semicolon, or period)
- Footnotes should appear at the bottom of the page within the normal text area, with a line about 5 cm long immediately above them.
- Footnotes should be 10-point and aligned left.

13. References

- The author-date method in-text citation should be used. Following the APA format, the author's last name and the year of publication for the source should appear in the text.

- All references that are cited in the text must be given in the reference list. The references must follow the latest edition of the APA Style

Guide (as of writing, APA's publication manual is in its 7th edition) and arranged alphabetically at the end of the paper.

Sample:

Surname, A. A. (year). Article title. *Title of Journal, volume number*(issue number), inclusive page numbers. URL/doi link

Surname, A. A. (year). *Title of book.* Publisher location: Publisher Name.

Surname, A. A., Surname, B. B., & Surname, C. C. (2000). Title of article. *Title of periodical, volume number*(issue number). URL/web address.

Surname, A.A. (Year, Month). *Title of paper.* Paper presented at name of conference, city, country.

14. Length

The paper should be **3,000-7,000 words** including tables, figures, and references.

Author Guide

The International Journal on Open and Distance e-Learning (IJODeL) welcomes original research articles, book reviews, theories, and best practices pertaining to ODeL worldwide. Articles should be 3,000-7,000 words including tables, figures, and references.

A publishable quantitatively-oriented paper should contain the following:

1. Abstract
2. Objectives
3. Conceptual/Theoretical Framework
4. Methodology
5. Results and Discussions
6. Conclusions and Recommendations
7. References

Go to: Quantitatively-Oriented Journal Article Template

A publishable qualitatively-oriented paper should contain the following:

1. Abstract (with keywords)
2. Introduction
3. Objectives of the Study
4. Relevant Studies or Review of Related Studies
5. Discussions
6. Conclusions
7. Recommendations
8. References

Go to: Qualitatively-Oriented Journal Article Template

To submit an article, the IJODeL website and follow the steps in the online submission system.