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IN THIS ISSUE:

- Google Analytics for User-Centered Design: A Case Study in Open and Distance e-Learning

- Technology-Based Support of Final Year Bachelor of Education Students in a South African Open Distance e-Learning Institution

- Online Laboratory Instruction as Alternative and Supplementary Mode: Students' Assessment of the BS Agricultural Biotechnology Program

- Boundless Classrooms and Touchless Bodies: Teaching Physical Education Online

- A Conjoint Study and Segmentation on the Preferred Online Learning Attributes of Senior High School Learners

- Towards an Age-friendly University: An Intergenerational Study among FICS-UPOU Graduates

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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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Table of Contents

Articles

Google Analytics for User-Centered Design: A Case Study In Open and Distance e-Learning

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Abstract

This paper examines the use of Google Analytics in online and distance education, specifically in the context of learning analytics, to improve teaching and learning designs. The data analyzed in this study is generated from an online student support system and is examined using Google Analytics. This study aims to identify significant parameters for learner-centered application design by analyzing one year's worth of data based on learner parameters. The study proposes design attributes that will make future applications more user-centered. The parameters analyzed include language, physical location, browser, operating system (OS), and device. This information is useful to design personalized learner-centered applications. This study highlights the potential of using Google Analytics to improve the quality of online and distance education by personalizing the learning and application design and making it more effective and learner-centric.

Keywords: *Google Analytics, learner-centered design, open and distance learning*

Introduction

In recent years, Open and Distance Learning (ODL) has become increasingly popular as an alternative mode of education for individuals who cannot attend traditional brick-and-mortar schools. This online and distance education mode uses technology to provide students with access to course materials, assignments, and assessments, regardless of their physical or geographical location. However, ensuring a high-quality online learning experience is a challenge for educators, as they must balance the need for flexibility and accessibility along with maintaining student engagement and motivation.

To address this challenge, Learning Analytics (LA) has emerged as a powerful instrument for tracking and analyzing student behavior, performance, and engagement in online learning environments. Similarly, Google Analytics (GA) is a widely used web analytics tool that can provide valuable insights into how students are using online resources, such as learning management systems (LMS) and course materials. GA can help educators in making data-driven decisions to improve the online learning experience, such as identifying which materials are most popular and effective and which areas need improvement, as well as in monitoring student progress.

Furthermore, learner-centered design (LCD) is an instructional design approach that focuses on the needs, motivations, and experiences of learners to create effective learning experiences. LCD emphasizes active learning, personalization, and technology use to support individualized learning experiences. Learner-centered is an approach or method of teaching from the teacher's perspective and process of learning from the student's perspective which encourages them to think critically and reflect on what they are learning and how they are learning (Students at Center, 2016). In practice, LCD involves key elements like assessment of learner needs which involves understanding the needs, motivations, and prior experiences of learners. These parameters are critical in the LCD process. Learner-centered design demands repetitive design and development of tasks and supporting students in their learning process and activities (Jackson et. al., 1995). The objectives of the learning experiences should be defined by keeping learner requirements in mind. LCD emphasizes active learning, where learners engage in hands-on, experiential activities that allow them to apply what they have learned. LCD approaches often involve personalizing the learning experience for each learner. Different methods can be used to achieve different learning goals. To enhance the LCD approach in online learning, Google learning analytics and spatial learning data can be used to collect and analyze location-based data about student behavior, activity, and performance within physical spaces, such as classrooms or libraries.

Learner-centered framework as illustrated in Figure 1 shows the overall context that covers the four primary components including learner personalization, competency, ownership, and location.

Figure 1

Student-centered Design Framework
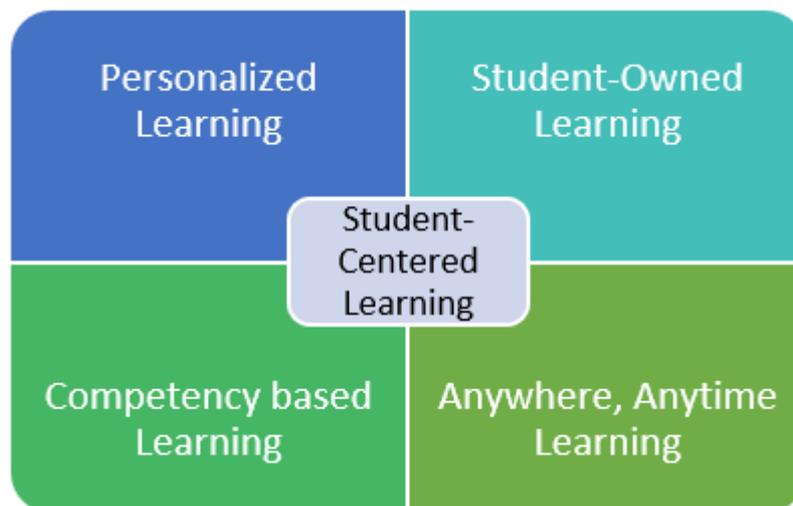
Note. Copyright (2016) by Students at Center

Personalization is one of the important factors of a student-centered design framework. It involves the modification of the learning content and strategy as per the needs of the learner and the use of context and localization. This is generally called personalized learning teaching strategy.

Kamran Mir, Ali Tahir, & Hajrah Amir

This also includes the personal interests of an individual student or a group of students. The example of personalization includes giving contextualized examples of generalized concepts according to the local sociopolitical environment. Personal interest also impacts while giving personal class assessments.

The second important factor is competency-based learning, which means making the learning and teaching process competency-based. The learning content, tasks, assessments, and activities should relate to the prevailing competencies of the learner. For instance, when a learner is part of a group that lacks physical strength, they might not be assigned tasks or activities demanding physical exertion or potentially impeding their learning progress. Similarly, the group assessments must be according to the individual or class's overall competency.

Ownership is another important factor in which the purpose of learning and teaching depends on developing student ownership. The learning content usually in a classical learning environment comes from the teacher's side only. However, having ownership encourages collaboration and teamwork. It is natural to have a sense of ownership when the content is also created by the learners. Wikipedia has a similar concept where a learner's answer is not only evaluated by the teachers, but all the learners can read and give feedback to the answers given by a single student which will increase the motivation of students and their sense of ownership.

Lastly, conventional face-to-face education is dependent on space and time. However, in recent times, information and communication technologies can be effectively used as an alternative to traditional face-to-face teaching methods by making them independent of time and space. Online and distance learning is one of the prominent examples of this mode.

Likewise, in these theoretical frameworks, data analytics is one of the applied techniques which is being used in many industries to make better informed decisions by visualizing the data. In education, LA is a very popular term that is used to collect, measure, and analyze the learner's data to make suitable developments in learning and teaching designs.

This study will focus on answering research questions regarding how GA can be helpful in making learner-centered application design and which factors are critical. Therefore, this research paper aims to explore the use of GA and spatial learning analytics in the context of learner-centered design for open and distance e-learning. The paper will provide a case study of an ODL institute that illustrates how these tools can be used to gather data on student behavior, performance, and engagement, and how this data can improve decision-making to enhance the online learning experience. Additionally, this research paper will contribute to the existing body of literature on the use of LA in education and provide insights into how LCD can be applied in the online learning context.

Objectives

The main objectives of this research study are:

1. To analyze user analytics data of an online student support system using Google Analytics to identify key factors important for learner-centered application design, including user system language, geo-location, browser and operating system, and user device category; and

2. To propose design attributes for future applications based on the analysis of user analytics data, to make them more personalized and user-centered, taking into consideration the identified factors such as user device, location, language, and operating system.

Literature Review

User personalization is one of the critical factors in several domains. For example, web links recommendation (Atahan & Sarkar, 2011), personalized blogs (Liu et al, 2014), personalized movies (Ying et al. 2006), personalized news (Shapira et al, 2009), personalization in maps (Tahir et al, 2010; Tahir et al, 2012) and personalized emails (Ansari & Mela, 2003) are some of the common application areas of user personalization. However, there are relatively fewer studies on learner-centered approaches using GA.

Personalization or user-centric approach is not a very new concept, historically, the collective work of different historic personalities of the 17th and 18th centuries like John Dewey, Jean Piaget, Lev Vygotsky, Al-Ghazali, and Shah Waliullah focused on student learning behavior and teaching methods which was not given the same term as student-centered at that time. However, all these concepts presented by these historic personalities had a similar type of domain which further led to teaching and learning approaches that involve student-centric techniques.

Developing a learner-centered design is not easy as it looks. This personalized design requires a lot of effort and planning. The major challenge is the arrangement of the content and converting them as per the requirements of the learner. The new idea must be incorporated with new activities. It may take a while to convert from traditional method to learner-centered approach. Nevertheless, this develops self-confidence and motivation in students to create their own approach to learning (Morphew, 2012).

There is a need to apply this approach in both offline and online education. Most teachers had a view that factors like problem-solving, enthusiasm, and peer learning had key roles in improving the learning process (Ertmer et al., 2012).

A study examines how computer and internet technology have made learning analytics a new discipline in online and distance education. To improve the quality of higher education, LA includes analyzing vast amounts of educational data to uncover trends and structures connected to students. The online

environment enables thorough computer-generated logs of learner interactions, including content access, development, sources used, and sharing activities. Web analytics, academic analytics, educational data mining, and institutional intelligence are all included in the interdisciplinary discipline of LA. LA studies can make use of a variety of data generated by environments and tools, including LMS, social network apps, computer logs, games, simulations, video sharing platforms, and search engines. Data visualization, in-depth research, and statistical methods are also required for the examination of huge data (Firat & Yuzer, 2016).

Another study provides practical guidance for learning designers to create effective and engaging learning experiences. The study emphasizes the importance of considering the needs and perspectives of learners throughout the design process. It introduces a framework that outlines five stages of learner-centered design (LCD) and presents various LCD methods, such as user interviews and usability testing. The authors highlight the iterative nature of LCD, encouraging designers to continuously evaluate and refine their designs based on user feedback. They also highlight the importance of collaboration and interdisciplinary teamwork in implementing LCD in learning design. This research offers practical methods to incorporate LCD principles and enhance the learning experiences of the learners (Schmidt et al., 2020).

Another study by Vesin et al. (2018) focuses on the application of LCD and analytics in an adaptive learning system within smart environments. The study emphasizes the importance of understanding learners' needs and preferences to develop effective personalized learning systems. Through a case study, the authors showcase the iterative design process and implementation of an adaptive learning system that leverages data analytics to provide personalized learning experiences. The findings highlight the benefits of LCD and analytics in enhancing the learning experience, including personalized recommendations and adaptability to individual learner needs. The research contributes valuable insights into optimizing learning systems within smart environments through continuous evaluation and improvement based on user feedback and data analysis.

A study by Kilis and Gülbahar (2016) explores the application of learning analytics in distance education through a systematic literature review. This study highlights the importance of leveraging data from online learning platforms to improve educational practices and student outcomes. It identifies three key areas of focus for LA in distance education: student performance, engagement, and instructional design. The study emphasizes the potential benefits of LA, such as early identification of at-risk students and personalized learning experiences. However, it also highlights challenges related to ethics, data privacy, and data interpretation. The authors stress the need to address these challenges and provide support for educators to effectively utilize LA. The output of this research also offers valuable insights into the current landscape of LA in distance education and its implications for research and practice.

A study investigates user habits on academic education platforms using GA data. The study aims to gain insights into user behavior and preferences to

improve the design and effectiveness of online education platforms. The study highlights the significance of analyzing user habits for optimizing educational platforms and enhancing user experience. By utilizing GA, the researchers gathered valuable data on user engagement, navigation patterns, and content consumption. The findings provide meaningful information about the preferences, interests, and learning patterns of users, which can be used to tailor educational content and enhance platform usability. The study contributes to the field of online education by offering practical insights that can inform the development of more user-centric and personalized learning experiences (Özen et al., 2014).

One example of the use of GA in education is a study conducted by Abeysekera and Dawson (2015), who used GA to analyze the usage patterns of an online learning system. They found that students who used the system more frequently and for longer periods of time tended to achieve higher grades, suggesting that personalized applications designed to encourage greater use of online learning systems could have a positive impact on student performance and grades.

Another study explores the landscape of distance education research during the specified time frame. The authors conducted a comprehensive review to identify major research areas, methodologies used, and patterns of authorship within the field. The purpose of this study was to provide an overview of the key trends and developments in distance education research. By analyzing research themes and methodologies, the paper offers insights into prevailing approaches and collaboration patterns. The paper provides valuable insights into distance education research during the specified period, shedding light on some key areas of study and highlighting the methods and authors contributing to the field (Zawacki-Richter et al., 2009).

Materials and Methods

The research methodology was quantitative in nature and the research design adopted was descriptive in general. To ensure the privacy and confidentiality of user data, all data collected during the study is treated with the utmost care. Participants' identities were kept strictly confidential, and all personal information was anonymized and stored separately from the research data except the public information. Any identifying information was removed or replaced with pseudonyms where required, and only the research team had access to the raw data.

The data analyzed was collected from GA configured with a helpdesk system for student support deployed at an ODL institute to provide immediate online support to student queries coming from different channels.

Figure 2

Help Desk Student Support System Workflow

Previously, there was no consolidated online help desk available for student support. For some queries, the record was maintained while not for others which caused administrative and processing delays in decision-making. Figure 3 below presents the data collection methodology which was used in this study to collect and analyze GA in identifying factors important for learner-centered application design.

Figure 3

Data Collection Methodology
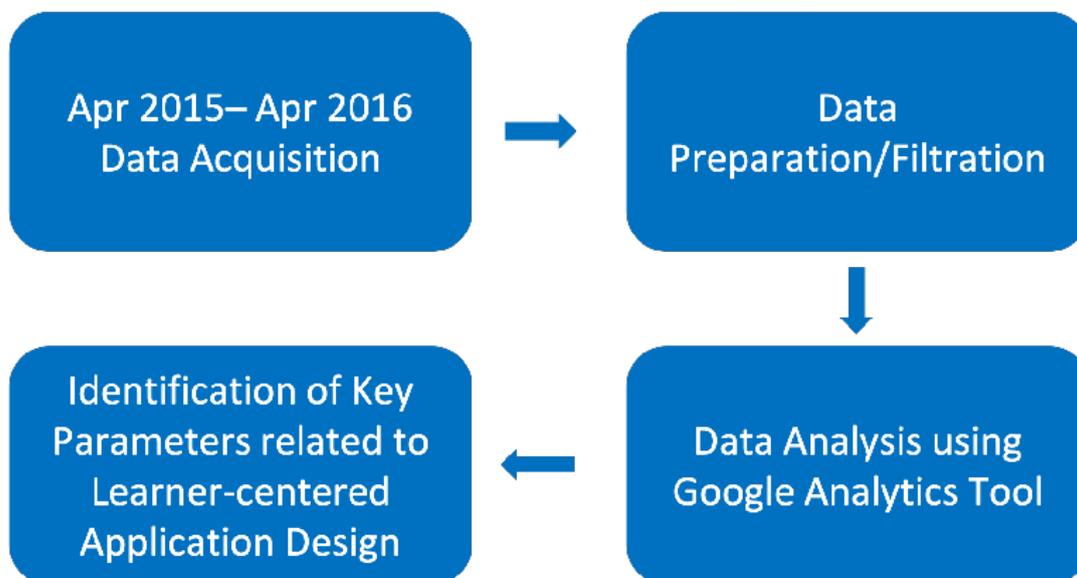
Results and Discussion

To collect the GA data, one year of data starting from April 1, 2015, to April 1, 2016 was downloaded from GA which was configured with an online help

desk system. Figure 4 below shows that during this period of one year 155,981 unique users accessed this Help Desk, and more than 715,052 times different pages were viewed. Each learner spent approximately three minutes during each session. On average three to four pages are visited by each learner in each session. The 47% bounce rate reflects that significant visitors exit the Help Desk after visiting the landing page.

Figure 4

Audience Overview April 2015-April 2016

Sessions	Users	Pageviews
206,748	155,981	715,052

Pages / Session	Avg. Session Duration	Bounce Rate
3.46	00:03:02	47.13%

% New Sessions
75.42%
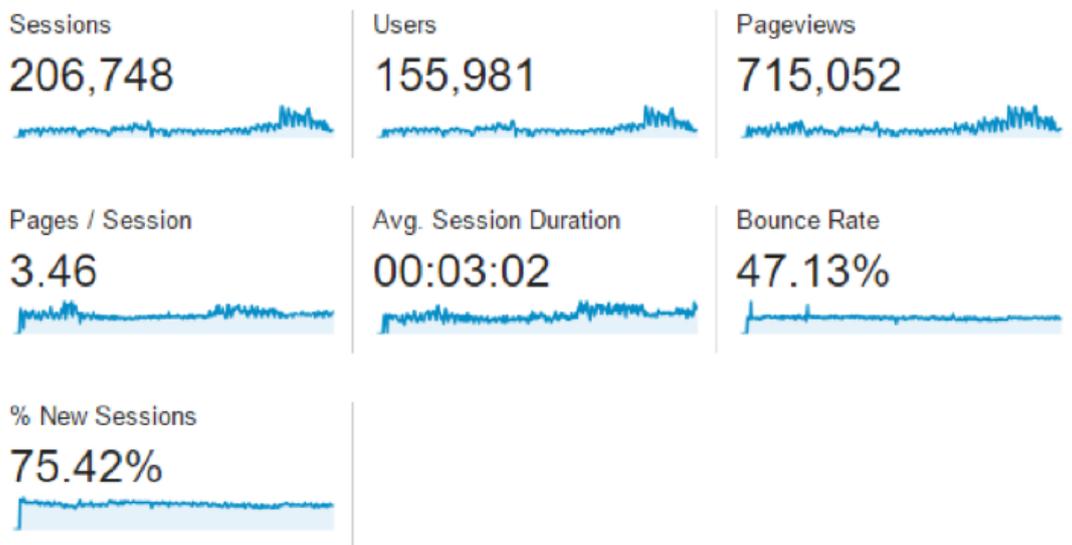
Several design factors which include language, geo-location, browser, and user device were analyzed in this study.

Language Factor

Data analysis of system language shows that a majority of learners (80%) use US-English as a default language setting in their systems. Such kind of information is very important for designing a localized language application. In this case, the application design should be compatible with the US-English (en-us) language as the majority of learner's device is compatible with the English language.

Figure 5

User System Language

Language	Sessions ▼ ↓	Sessions
	206,748 % of Total: 100.00% (206,748)	206,748 % of Total: 100.00% (206,748)
1. ■ en-us	165,026	79.82%
2. ■ en-gb	27,184	13.15%
3. ■ en	10,009	4.84%
4. ■ (not set)	3,175	1.54%
5. ■ en-pk	253	0.12%

Geo-location

The second factor which is analyzed is the geographical attribute. Using location data and co-relating it with other parameters, it was observed that most of the learners around 80% are from Pakistan. However, users from countries where the university is not providing services are questionable and need further analysis from an application security point of view (Figure 6).

Figure 6

Geo-location

Country	Sessions ↓	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration
	206,748 % of Total: 100.00% (206,748)	75.57% Avg for View: 75.42% (0.20%)	156,246 % of Total: 100.20% (155,938)	47.13% Avg for View: 47.13% (0.00%)	3.46 Avg for View: 3.46 (0.00%)	00:03:02 Avg for View: 00:03:02 (0.00%)
1. Pakistan	165,847 (80.22%)	75.01%	124,394 (79.61%)	46.23%	3.67	00:03:10
2. Kenya	9,139 (4.42%)	73.83%	6,747 (4.32%)	46.74%	2.76	00:02:40
3. United States	7,808 (3.78%)	81.42%	6,357 (4.07%)	53.89%	2.33	00:02:14
4. India	6,899 (3.34%)	81.07%	5,593 (3.58%)	47.47%	2.57	00:02:30
5. United Arab Emirates	3,507 (1.70%)	73.54%	2,579 (1.65%)	47.05%	2.87	00:02:47

Browser and Operating System

The browser is a client-side application software that renders a web page code in a presentable HTML form. Cross-browser compatibility is one of the prominent design issues in web application development.

Figure 7

Browser

Browser	Sessions ▼ ↓	Sessions
	206,748 % of Total: 100.00% (206,748)	206,748 % of Total: 100.00% (206,748)
1. ■ Chrome	126,449	61.16%
2. ■ Firefox	24,379	11.79%
3. ■ Opera Mini	13,469	6.51%
4. ■ UC Browser	13,218	6.39%
5. ■ Android Browser	9,742	4.71%

Results show that most learners (more than 60%) use Chrome as an internet browser. Other browsers like Firefox, Opera Mini, UC, and Android are also seen to be significant. This information is very useful for application designers to consider while designing interfaces for any student-related application. Similarly, information regarding operating systems is also necessary for the developers and designers to develop or design such an application that is supported by all such operating systems which are used by potential or existing clientele. Figure 8 shows the operating systems used by most learners. From an application design viewpoint, it should be such that it is equally compatible with all operating systems used by users as shown priority-wise in the figure below.

Figure 8

Operating System

Operating System	Sessions ▼ ↓	Sessions
	206,748 % of Total: 100.00% (206,748)	206,748 % of Total: 100.00% (206,748)
1. ■ Windows	130,609	63.17%
2. ■ Android	51,248	24.79%
3. ■ (not set)	12,481	6.04%
4. ■ iOS	4,357	2.11%
5. ■ Macintosh	3,373	1.63%

User Device

The device type or category is one of the key factors to consider while designing any application. Applications that are compatible with all kinds of devices are called responsive applications or responsive designs. In this case, Figure 9 below illustrates that learners use different types of devices such as desktop,

mobile, and tablet. Application design must be responsive so that it may support all kinds of device types as listed below.

Figure 9

Device Types

Device Category	↑	Sessions ▼	Sessions
		206,748 % of Total: 100.00% (206,748)	206,748 % of Total: 100.00% (206,748)
1. ■ desktop		139,157	67.31%
2. ■ mobile		63,528	30.73%
3. ■ tablet		4,063	1.97%

There are prospects to further enhance the analysis of the design factors by incorporating additional tools or instruments to measure parameters beyond GA. This would provide a more comprehensive understanding of how these design parameters influence the development of learner-centered applications. For example, combining data from learner surveys or feedback with the analytics data collected from GA would provide a more in-depth analysis of user behavior and preferences.

In terms of the design parameters, it is important to consider the users' language, location, device category, and operating system to create personalized and user-centered applications. In this study, it was found that most users (around 8%) used US-English as their default language setting and were based in Pakistan. These insights are valuable for designing a localized language application that is compatible with the US-English language and Pakistani context. It can be further drilled down to province level to incorporate local cultural and language context in the design.

Furthermore, it was observed that many users (around 60%) used Chrome as their browser and used different types of devices such as desktop, mobile, and tablet. This highlights the importance of developing responsive applications that are compatible with different device categories and operating systems used by the target audience.

To enhance the analysis, it is recommended to incorporate additional tools or instruments to measure the parameters and gain a more comprehensive and holistic understanding of learner behavior and preferences. This could include surveys or feedback from learners, teachers, and administrators of the institute, spatial heat mapping tools using geographic data, or user testing to evaluate the effectiveness of the application design.

Conclusions

It is evident from the results that Google Analytics can play a significant role in understanding and developing learner-centered applications and user-centered

interfaces. Factors including location, language, OS, and device were analyzed, and it was revealed that these factors are crucial in creating user-centered applications. By using GA, existing software and web applications for students can be improved by making them more personalized and learner-centered. Furthermore, integrating GA with online LMS, CMS, and related student support systems can help to relate different factors to students' performance and scores. In future work, learners' behavior on learning management systems can be studied by analyzing factors such as their geographical location, literacy rate, technology infrastructure, time, gender, age, and personal interests with their scores using spatial learning analytics. In general, the potential of learning analytics to enhance the effectiveness of personalized learning is vast, and this study provides valuable insights regarding the application of GA as learning analytics for researchers and developers in the field of education.

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Technology-Based Support of Final Year Bachelor of Education Students in a South African Open Distance e-Learning Institution

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Abstract

Throughput rates are a cause for concern across South African universities. Acceptance at university does not guarantee success for students, particularly the historically and economically disadvantaged majority. This challenge is exacerbated in Open Distance e-Learning institutions such as the University of South Africa. Through a case study, this paper discusses critical issues affecting students on the brink of completion, requiring one or two modules to complete their Bachelor of Education qualification at the University of South Africa. The two hundred students who were part of the study were enrolled in the second-level English module, Genres in Literature and Language: Theory, Style and Poetics. The sampling was voluntary and purposeful from students who were enrolled in this module, who either sought assistance with the module content via email or who qualified for the Final Year Concession, which is an additional assessment opportunity for final-year students. The study explores the following questions: 1. What are the most significant barriers to successful study in the Genres in Literature and Language: Theory, Style and Poetics module as identified by applying Keller's (1987) Attention, Relevance, Confidence and Satisfaction Model of Motivation? 2. How can these barriers be addressed through the Lecturer-in-the-Pocket approach toward improving student engagement and success in the course? The success of this cohort provides another approach to improving throughput rates in Open Distance e-Learning institutions.

Keywords: *motivation, lecturer-in-the-pocket, open distance e-learning, throughput rates, mobile technology*

Introduction

This paper outlined a case study of the intervention piloted at the University of South Africa (UNISA), a Comprehensive Open Distance e-Learning (CODeL) institution. The English Studies Department conducted this study to support a group of final-year Bachelor of Education (BEd) students. These students needed to pass one or two modules to complete their BEd qualifications.

Student emails, such as the directly quoted email request for assistance below, indicated that students tend to experience challenges in mastering the outcomes of some modules offered in the English Studies Department, particularly in the first and second-level modules.

Technology-Based Support of Final Year Bachelor of Education Students in a
South African Open Distance e-Learning Institution

15

Student 1	Madam "My name is […] Iam a students of unisa. I have 39 module since2016 I have a problem I failed Eng2602 modern 5 time. I ask any [advice] that will help me. I am not work ,I failed even to pay my study fees for last [semester],please madam help me.I feel as failed now because I loose many opportunity through this Eng. I will be glade if my request is successful Your faithful […]"

Such emails do not only indicate that students are experiencing challenges but from the tone, one can also detect the student's despondence.

The students seem to find the Foundations in English Literary Studies (ENG1501), a first-level module, and the Genres in Literature and Language: Theory, Style and Poetics (ENG2602), a second-level module, as the most challenging. The passing rate in these modules over six years, from 2014 to 2019, has been below the expected college average of 75%. At some point, the pass rate for both modules dropped to 34% and 28%, respectively.

Several students have constantly repeated the ENG2602 module, which is the basis of this case study. For those students who have also failed the final year additional assessment (FI Concession), this means that they cannot complete their qualifications. This can result in congestion in colleges, such as the College of Education, that have qualifications with prerequisites in certain modules offered by the English Studies Department. However, this situation can be addressed by providing a bridge that connects academics, students and existing support materials, enabling more productive tutoring.

This paper expands on the Finally-I-Can Intervention Project (FICan), as wordplay on the existing FI Concession – an institutional intervention for improving throughput. The FI Concession has some limitations that exclude certain students. According to the UNISA Assessment Procedures Manual (2013, pp. 62-63), not all modules qualify for an FI Concession; this includes modules for the Post Graduate Certificate in Education and modules offered for non-degree purposes. Moreover, the FI Concession cannot be taken more than once. If students fail it, they must re-register the module and study through the semester or year to write another standard examination. Thus, the students with bursary funding, or those funded through the National Student Financial Aid Scheme, are left without funding requiring them to pay the incurred fees. This case is not always possible since some students are from low socio-economic backgrounds. Consequently, these students who have already passed 39 modules could drop out because of a lack of funding, even though they are only left with one module to complete their qualifications.

Lungelwa Phakathi

Thus, this study employed the ARCS Model of Motivation to explore factors contributing to gaps in student motivation in the ENG2602 module. It further examined how these factors can be addressed using the Lecturer-in-the-Pocket (LiP) approach, leading to an improved success rate in the ENG2602 module that could contribute to the university's throughput.

Objectives

This paper sought to determine gaps in student motivation that have led to repeated failure in the ENG2602 module, guided by the ARCS Model of Motivation. Moreover, it sought to demonstrate how the researchers applied the LiP approach to address some of these gaps and enhance tutoring support to help a group of ENG2602 students to complete their BEd qualification. To this end, it proposed to answer the following questions:

1. What are the most significant barriers to successful study in the ENG2602 module as identified by applying Keller's ARCS Model of Motivation?
2. How can these barriers be addressed through the LiP approach to improve student engagement and success in the course?

Review of Related Literature

In 2008, Motlik argued that it would be an injustice for Asia and Africa to emulate the West in pursuing internet-based learning because the Asian countries being the "most wired" (p. 5) were still unable to develop efficient e-learning methods. While this may have been true in 2008, universities across South Africa introduced online learning to complement contact classes over a decade later (Bosch, 2009; Czerniewicz & Brown, 2009; Ravjee, 2007). This is advantageous for students in contact universities as it means their learning continues beyond the lecture hall and the library. ODeL students who study without contact sessions have, however, not been similarly favored.

ODeL entails that students do not have ready access to lecturers (Howland & Moore, 2002; Spooner et al., 1999). According to Prinsloo et. al (2012) "[s]tudents and especially distance education students in ODL settings do not leave their other identities 'outside' of their learning, but rather find them in ever increasing networks of identity constructs" (p. 131). This means that students can also be parents, workers, spouses or life partners. Prinsloo et al.'s (2012) description of students in an Open Distance Learning (ODL) institution alludes to the multiple roles that students must fluidly and simultaneously occupy. This implies that they have limited time to access libraries and computer centers during working hours, since they may also be at work, during the day. Such students are left to fend for themselves, while the existing digital platforms that were created to mitigate the distance remain unused. This proves Motlik (2008) correct to a certain degree for it has resulted in the privileged students, who can afford meaningful internet connectivity, being further privileged while the underprivileged students suffer even more.

Existing scholarship reveals concern over the low throughput rates in higher

education institutions (Aluko, 2015; Letseka & Karel, 2015; Sondlo, 2013). According to Letseka and Karel (2015), "UNISA alone accommodates an estimated 40% of South Africa's entire university student headcount enrolments" (p. 65). The implication is that if throughput rates are low at UNISA, the country will have lower throughput rates. This is contrary to the National Plan for Higher Education (NPHE, 2001) which seeks to improve graduate outputs. The previously mentioned problem in English Studies also contributes to this low throughput rate, especially for BEd students. This has necessitated intervention to try and rectify the situation.

Various scholars have advanced possible solutions to the challenge of low throughput rates in South Africa. Some propose improved student support (Dunpath & Dunpath, 2015; Pitsoe & Baloyi, 2015; Shandu-Phetla, 2017; Sondlo, 2013). According to Dunpath and Dunpath (2015), "virtually all institutions invest heavily in mediating the effects of the articulation gap between secondary and higher education, particularly deficits in academic skills and literacies which accelerate dropout" (p. 108). They focus on student support intended for newly enrolled students. Pitsoe and Baloyi (2015) perceive epistemological access, poor bandwidth and under-preparedness (of both students and the institution) as challenges that impede student success and retention. Although they advance, among other solutions, that the use of the myUnisa platform as a Learner Management System (LMS) and tool for tutoring through discussion forums, partially addresses the challenge, they still raise a concern that students in rural areas are not accommodated (Pitsoe & Baloyi, 2015). The exclusion of students in rural areas has implications for student motivation as access to learning platforms is limited. Other scholars' proposals relate to a range of support that can be offered through multi-purpose centers (Sondlo, 2013) and mobile learning applications, designed to assist first-year students with English proficiency, through vocabulary development (Shandu-Phetla, 2017). The limitation of their proposals and arguments, where this study is concerned, is that they focus on students who are at the beginning stages of their degrees such as first-year and second-year students who have failed some first-level modules. This leaves the matter of students who are on the brink of completing their qualifications inadequately addressed. On-the-brink refers to students with one or two outstanding modules, before qualification completion. This study, therefore, sought to address this gap.

The study advances that by providing a bridge that will connect academics, students, and existing support materials, in a manner that will enable more productive tutoring, academics could turn this situation around. This is based on the belief that tutoring in ODeL should closely model the face-to-face context as far as possible, hence, applying the Lecturer-in-the-Pocket (LiP) approach in the intervention. Hamman (2019) coined the phrase "face-to-face at a distance" (p. 5) when referring to the pedagogical model that relies on live streaming. This alludes to open-distance distance tutoring modelling the face-to-face context by bringing the lecturer close to the student virtually. The LiP approach, similarly, seeks to emulate the face-to-face context by placing the lecturer in the student's pocket through brief, downloadable and shareable resources, as well as through harnessing existing technology of the institution's LMS, mobile phones and the internet to enhance the students' learning experiences. According to

Lungelwa Phakathi

Mayisela (2013) "mobile technology has a potential to support blended learning beyond classrooms and computer centres" (p. 17). This implies that students in a CODeL environment could benefit from mobile learning as it would minimize the need for students to travel to the nearest campuses. This justifies the LiP approach.

Letseka and Karel (2015) also address student support. However, they extended their argument to include the need for UNISA "to review its admission policies so that only those prospective students who qualify for admission and have the potential to succeed are admitted" (p. 4). While this has merit, it neither addresses the question of what to do with students who are already in the pipeline nor does it address the concern of the remaining module for students who have passed all thirty-nine modules, with distinction in some cases. This paper, therefore, seeks to provide another alternative to addressing the challenge of low throughput rates, particularly by addressing what to do regarding the last outstanding module.

Theoretical Framework

The study adopted Keller's (1987) ARCS Model of Motivation, which is clustered under four components, Attention, Relevance, Confidence, and Satisfaction (ARCS). According to Keller (1987, p. 3), attention is the foundation of learning, which needs to be sustained. He further discourages learning as an end. Rather, he stated that it should meet certain needs or goals of the students for it to be relevant. The major need and goal of students in this study was the completion of their qualifications, which implied that the intervention would be relevant in this capacity.

For Keller (1987), the process is as important as the end, and therefore, the relevance component addresses this process through the "perceived utility" (p. 3) of what is being taught. Students need to understand why they are learning something and how it will benefit them beyond the classroom. The fact that these ENG2602 students in the study had repeated the module several times brought to question whether they understood its relevance. Keller (1987) argues that "[r]elevance can come from the way something is taught, it does not have to come from the content itself" (p. 3). The researchers, therefore, needed to determine whether there was a weakness in their instructional processes or in the students' approach to learning the module content.

Keller (1987) also posits that a student's confidence levels can influence "persistence and accomplishment" (p. 5), which implies that with low confidence levels, student success may be impaired. Most students in the study had failed the ENG2602 module multiple times, therefore, the confidence levels, which according to Keller (1987) are fundamental to students achieving their goals, were presumably low.

Satisfaction is the last of the components in the ARCS model. It focuses on "practices that help make people feel good about their achievements" (Keller, 1987, p. 6). As already mentioned, repeated lack of success in ENG2602 and the inability to complete the BEd degree was demotivating for the students in

the study.

Other scholars have explored Keller's ARCS Model of Motivation on learners' and students' motivation, in various fields of teaching, with encouraging possibilities. For instance, Milman and Wessmiller (2016) believe that although the model is over two decades old, it is still "applicable to today's learners, particularly those who are learning online" (p. 67). This study shares a similar sentiment, hence, applying the ARCS Model of Motivation in ODeL, more than three decades since its inception. Milman and Wessmiller (2016) suggest practical ways in which this model can be used in online learning. They concluded that incorporating elements of the ARCS Model of Motivation in online education could increase learners' motivation even when "content is taught asynchronously" and learners are "geographically separated" (Milman & Wessmiller, 2016, p. 70). This is an inspiring conclusion as the asynchronous nature of content and geographical separation in ODeL can exacerbate the challenges of distance learning.

Along the lines of this study, Malik (2014) investigates the effectiveness of the ARCS Model of Motivation in overcoming the non-completion rate in distance education students. She employs various methods underpinned by the ARCS Model of Motivation to sustain students' motivation in distance education. She concludes that "motivational strategies improve the disposition of the learners to finish the course successfully" (Malik, 2014, p. 198). This suggests that the ARCS Model of Motivation, in its focus on motivation has the potential to improve success rates, as students' outlook toward the course improves.

In the field of science and technology, Chang et al. (2018) incorporated the ARCS Model of Motivation into a problem-based learning model in a flipped classroom environment that led to satisfactory results. Their findings that "the experimental group had a significant improvement in their learning results after the implementation of the teaching method [underpinned by the ARCS Model of Motivation] in this study" (Chang et al., 2018, p. 12) affirm the validity of the ARCS model as an instructional approach to improve success.

Keller's ARCS Model of Motivation was, therefore, the approach of choice because it enabled the researchers to engage with the various components of motivation in the design of the intervention. The researchers conducted the intervention based on the hypothesis that there was a flaw in the student's motivation, causing them to fail the module several times. However, using Keller's ARCS Model, they could also reflect on the strengths and weaknesses of their instruction in the ENG2602 module. With motivation being addressed through the ARCS Model, they expected to see some improvement in student success and throughput rates, similar to what has been experienced by other scholars using this model.

Methodology

The intervention took four months and was facilitated by five academics from the English Studies Department, including the author. The study utilized voluntary and purposeful sampling. Researchers use purposeful sampling intending to ensure certain, specific characteristics in the participants (Kilinç & Firat, 2017;

O'Donnell, 2011; Tafur-Arciniegas & Lara Contreras, 2018). In this case, the researchers specifically needed students who were in their final year of the BEd degree and remained with the ENG2602 module (among others) to complete their degrees, hence sampling being purposeful. The voluntary sampling technique is applicable when participants volunteer to take part in research (Alvi, 2016; Thubakgale & Chaka, 2016). The intervention began with students who requested help to develop relevant competencies to meet the module outcomes, via email. They volunteered to be part of the intervention, thus the sampling being a combination of both voluntary and purposeful elements. After the release of examination results, this number increased to 200 on-the-brink BEd students. Of these, only 150 ENG2602 students qualified for the FI Concession.

This study adopted the mixed-method approach. Brien and McAllister (2016) caution that the term "'mixed methods' is often incorrectly used to refer to research involving a number of research disciplines" when in fact "it has a singular and more specific meaning" (Brien & McAllister, 2016, p. 172). This approach is utilized when, as in this study, research has qualitative and quantitative elements (Brien & McAllister, 2016; Creswell, 2014; Plano Clark & Badiee, 2010). Since this study was an intervention geared towards improving success in ENG2602, it was imperative to engage with performance statistics, thus using the quantitative aspect of statistical analysis. As the researchers also sought to understand the key factors affecting the students' motivation, they needed to use elements of the qualitative approach, such as drawing conclusions from students' reflections.

In line with the mixed-method approach, the research instruments used were performance statistics before and after the intervention. The statistics before the intervention served as part of the baseline survey to determine what the students' latest results in this module were at that point. A baseline survey is conducted at the starting point of research to form a basis for comparison to determine change or progress. The researchers extracted information on the students who requested support with the module content via email to determine the number of times each had repeated the module to inform the learning activities. Furthermore, they needed this information on previous attempts in the module and initial performance statistics to have a reference point to evaluate the efficacy of the intervention.

Since the students' motivation was low, the researchers began with formative, fun exercises that reduced the anxiety of failure to attract their attention as per the ARCS Model. The first activities were online in NoRedInk because the poor grammatical expression in some students' emails led the researchers to conclude that grammar was a contributing factor to their low success rate. To make the activities relevant, the researchers based them on the common grammar errors they had picked from the students' emails and other common errors encountered when marking students' assignments and examinations. In NoRedInk, if a student does not get the correct answer, a brief tutorial explains the rule that should be applied to arrive at the correct answer. The student then tries the question again, hopefully with better confidence. NoRedInk was, therefore, the lecturer inside the student's pocket.

The researchers also used the discussion forum on myUnisa for students to reflect on their performance and their use of available support, i.e., e-tutors, discussion forums, and additional resources such as video podcasts (vidcasts). Through reflections, they aimed to ascertain the students' use of existing teaching platforms to determine their relevance to the students' needs. They further hoped the reflections would help the students to diagnose each student's individual weaknesses for development. Tutoring would thus be relevant to their needs and hopefully, sustain their engagement as they would be learning aspects that they deemed important.

After the survey, students worked individually through the study guide, taking note of challenging sections to raise later. Thereafter, the researchers divided the study units among the five team members so that each could focus on one specific area. According to Keller (2009, p. 45), it is imperative to stimulate and sustain students' interest. Each research team member, therefore, spent a week or two on activities, per study unit, using the WhatsApp application as a connecting point for all the other technologies, namely myLife email accounts, myUnisa discussion forums and NoRedInk. The WhatsApp group was only for students in this intervention and this group was deleted after the intervention, for ethical compliance. The chats from the group were stored in a password-protected file. The researchers also uploaded some short vidcasts on myUnisa, as extra tutoring support. To further enhance relevance, the students completed activities based on the study units for examination, namely: Persuasive Prose and Prose Fiction.

Students then received the portfolio examination questions to complete individually over seven days, during which the author was available, both on the WhatsApp application and discussion forum on myUnisa, for support. The assessment had a content section based on the study units and a reflection section that would assess the student's ability to find their own external sources and apply them to a response related to the student's studies. Students submitted these portfolios via their myLife email accounts.

The limitation of using a portfolio of evidence (PoE) for assessment is that it is conducted in a less stressful environment (at home) with a longer time frame, unlike the two-hour venue-based examination from which the baseline statistics came. Comparing results from such varied examination conditions may not be a conclusive way to establish the efficacy of the intervention, however, the results could shed light on a possible alternative assessment approach.

The mixed-method approach in the study used quantitative and categorical methods to categorize statistical data based on the number of times students in the sample repeated the module. The other category was the performance percentages of the student results before and after the intervention. Descriptive summaries were used to explain these categories of statistical analysis and their implications. The study further employed qualitative analysis, specifically framework analysis. According to Goldsmith (2021), the "overall objective of framework analysis is to identify, describe, and interpret key patterns within and across cases of and themes within the phenomenon of interest" (p. 2061). In this study, the framework analysis was guided by the thematic approach based

on recurring concerns from students.

The methods of collecting data were on platforms where one would be privy to the students' identities. Therefore, in line with the ethical consideration, to retain anonymity, the study participants are referred to as "Student 1", "Student 2", etc., in cases where their personal responses are referred to.

Results

The following results are presented thematically based on information from the collected data.

Module Complexity

It has already been established that students sent emails indicating they were experiencing challenges in mastering the module content, leading to multiple unsuccessful repeats. The student's email below was very striking in this regard to module complexity.

Student 2	"Dear Sir or Madam
	I have a problem in this module as the module left for me to complete. I wrote it for seven times, and I get F1 concession two times, but I failed. I lose hope now and I'm frustrated what I am going to do.
	At home I am a bread winner. I am a domestic worker and I earn R1 400.00 a month and I have 5 children. My husband had a stroke in 2011, so he is not working. I get child support grant of R1100.00 of the three children. I cannot afford to make a better life for my family. Please assist me."

The following graphs indicate the status of this cohort before the intervention began. The baseline statistics to determine the number of times the students in the intervention had repeated the module, presented in Figure 1 below, revealed that some students had repeated the module up to eight times.

Figure 1

ENG2602 Repeated Failure Statistics – Whole Group
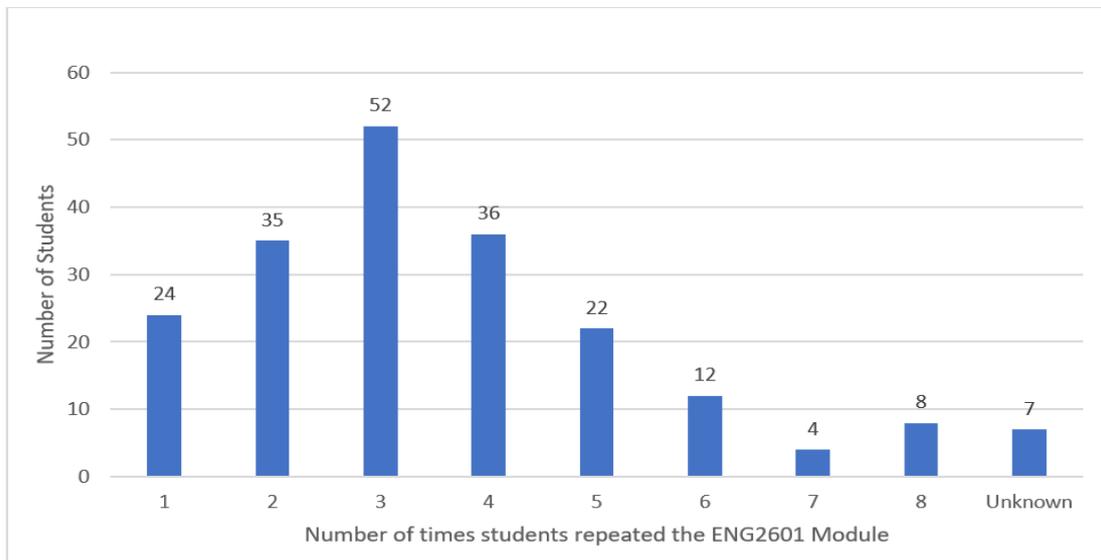
Out of the 200 students who were part of this study, the researchers could not access the profiles of seven students due to outstanding fees. For the rest, the statistics demonstrate that 134 out of 200 (67%) students had repeated the module more than two times. Of these students, 18% have repeated the module more than five times.

Figure 2 below shows an item analysis of the students' results in the examination before the intervention.

Figure 2

ENG2602 Results before Intervention
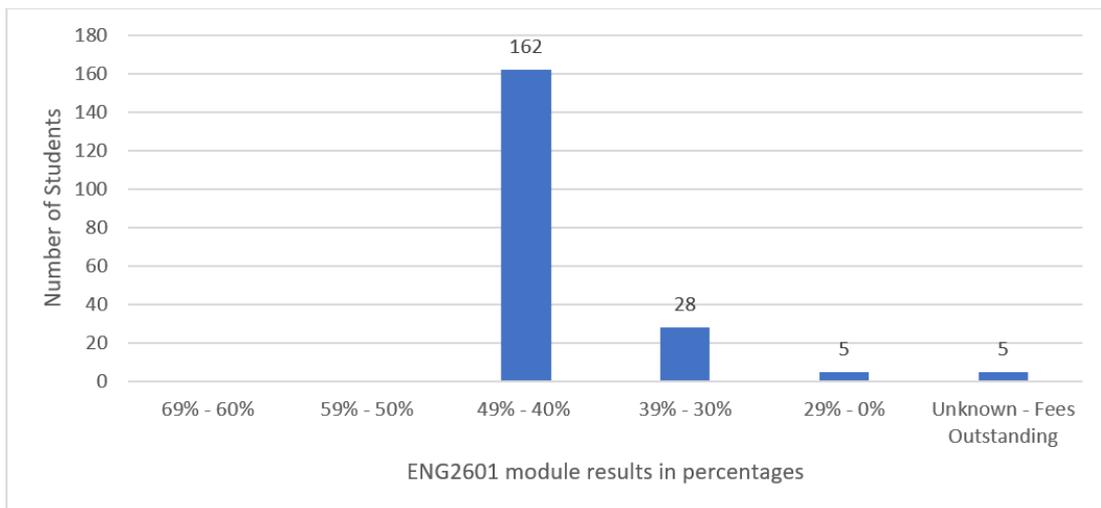
Due to outstanding student fees, the researchers could not obtain information on five students. The results before the intervention demonstrate that 162 out

of 200 students, which is 81% of the cohort, obtained a score between 40% and 49%. This means that they only needed less than 10% to pass.

From these initial statistics, it is evident that students were struggling with the module. The students' reflections on the *myUnisa* discussion forum and the summative PoE related to the broad question of "What led to students failing the module and what kind of support they needed?" Their responses showed three main areas of weakness, i.e., lack of quality in assignment feedback, need for extra tutoring support, and venue-based examination duration. Below is a summary of these weak areas in order of priority according to the students' reflections.

Assignment Feedback

Of the total student sample, 51% indicated that their challenges with the module were due to feedback:

- not being timely, sometimes arriving after exams;
- being abstract, rather than specific and detailed; and
- focusing on the negative aspects, thus being discouraging.

Among these, some revealed that they ignore assignment feedback. Some reflections relating to feedback are presented below.

Student 3	"Sometimes students ignore feedback because of the marks they already received and feel that they have already failed and do not have the need to change anything, because it won't make a difference. When some students desperately want to better their marks and do their best to follow the feedback given, it becomes difficult. Some feedbacks are not clear and only states that it was wrong, it does not always give an indication of what to do and how to fix it."
Student 4	"I believed I failed the module because of my assignments. I did not get feedback on them, I only received feedback after I wrote the exams. So due to confusion and lack of understanding I failed the exam." *(2018-02-17 18:21:17)*

Student 5	"The problem has to do with lack of understanding the feedback itself. Sometimes, I would get a feedback that tells me that my essay lack argumentation while I thought I had done that. […] I think it would be better if you could give an example of what I should have written."
Student 6	"Sometimes when we look at the previous examination papers, we notice that the exams are not the same as the assignments ending up focusing on the papers instead of the feedback."

Need for Extra Tutoring Support

This was cited by 44% of the study sample as a stumbling block. These students felt that they needed face-to-face or video conferencing tutorials that they could access from UNISA campuses. There was also a request for video tutorials that simplified the learning material. For some, this need for extra learning support was due to limited access to internet connectivity, which meant that they could only spend a limited time on the myUnisa platform engaging with online tutors or lecturers. The PoE reflections from some students encapsulate this need as seen below.

Student 7	"If I were possible for me to change the current approach of teaching at Unisa, I would make sure that students get a chance to see a lecture at least twice a week for all their concerns regarding their modules because some students find it hard to communicate with the lectures on the online platform, some do not even have access to the internet. Some students understand better if the person explaining is in front of them as we all have different learning styles."
Student 8	"I would ensure that students are given enough material that makes it easy for them to cope on their own hence the University offers long distance learning. I would ensure that learners are given proper and effective feedback on assignments and other visual tutorial aids such as video footage where lectures explain some of the complicated content of the modules offered by the university."

Venue-based Examination Duration

For 36% of the students in the cohort, the two-hour duration of the examination was a challenge due to the intensity of the analysis required. The discussion forum reflections from two students are presented below.

Student 9	"This module is complicated, it requires lot of writing. it is not easy to write 2 essays of not less than 2 pages in 2 hours' time. The courses of repeating this module for me is that it took me long time to read and understand an extract that was given in the exam, let alone to write 2 pages for section A. I did not finish writing section A, looking at the time I had to move on to section B which was a poetry. Again, to read a poem takes lot of time because you must get theme which it not easy, you need to read a poem more than one time and, in the exam, you cannot read loud, yet reading loud is helping in getting a theme quickly. The writing of 2 pages it is also a concern." *(2017-11-08 12:30:15)*
Student 10	"Hi i am […] Thanx for the opportunity. 2 hours were too short for me. I have a problem to analize properly." *(2018-02-17 16:35:42)*

The previous statistics presented in Figure 2 on the results before intervention showed that 81% of the students are held back by 10% or less from completing their degrees. The statistics after the intervention demonstrate an improvement in results that led to most of the students in the cohort passing the module, as the graph in Figure 3 on results after intervention below indicates.

Technology-Based Support of Final Year Bachelor of Education Students in a South African Open Distance e-Learning Institution

27

Figure 3

ENG2602 Results after Intervention
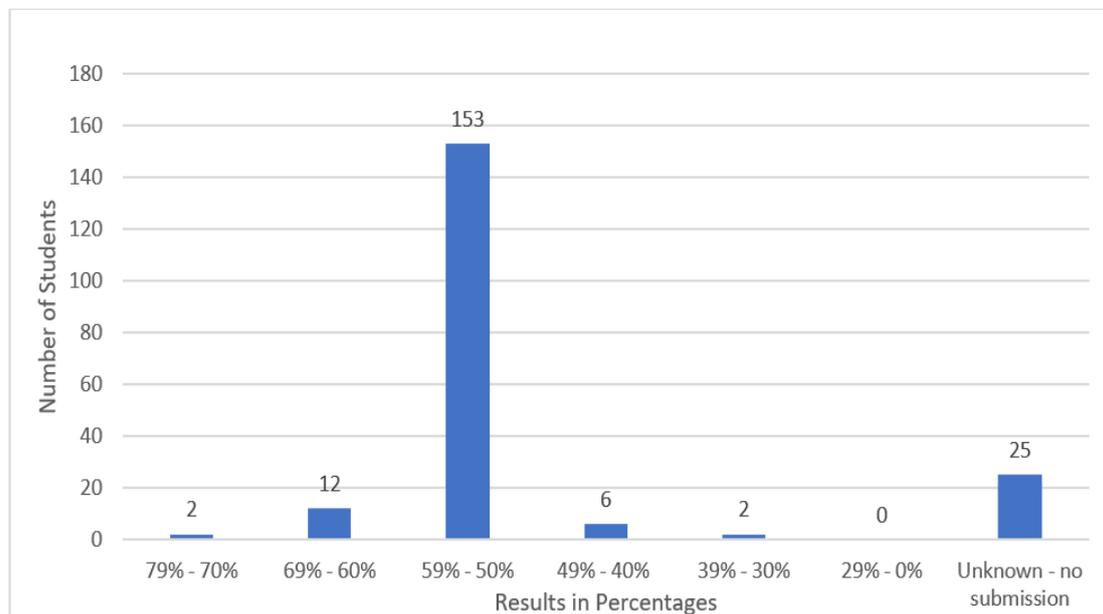
The tutoring support enabled the researchers to bridge and, for a few students, even surpass this 10% gap. In fact, 95% of the students, who opted to write the portfolio examination, passed. The 25 students who still needed to submit, either could not be reached on their phone numbers or opted to write the supplementary examination at the end of the semester.

Discussion

From the study, the researchers realized that their offering has gaps in all four dimensions of the ARCS Model of Motivation (1987; 2009). The gaps are in Attention due to limited meaningful internet connectivity, in Confidence due to the complexity of the module, and in Relevance and Satisfaction due to feedback challenges, and a lowered "expectancy for success" (Keller, 1987, p. 3) among repeating students, due to the examination duration. These have contributed to repeated failures in the module. Challenges occur at three levels: institution, department, and student level. During the intervention, the researchers tried to mitigate some of these, which revealed possibilities of how such challenges can be addressed in the future. The ARCS model is largely used to plan instruction in advance. This study has demonstrated that this model can also be a tool for finding gaps in implementing the existing instructional design. By identifying gaps in students' motivation, ODeL institutions can determine ways to address these gaps and strengthen their teaching methods, irrespective of whether they were based on the ARCS model from the outset.

The Gap in Attention – Meaningful Internet Access

In a CODeL institution, all students need access to electronic devices from which they can access resources and study materials. Meaningful internet access

is therefore crucial; without it, students' attention is already lost. As Keller et al. (2016) also argue in ARCS model, emphasis is "not only on generating attention but sustaining it" (p. 69). Lack of meaningful internet access meant that attention was not being sustained. With the intensive tutoring happening on the seemingly more affordable WhatsApp application first, before other platforms, the researchers could maintain meaningful engagement, thus sustaining attention.

The Gap in Confidence – Module Complexity

The study has also revealed that students find the module challenging, which could lower their "self-efficacy beliefs" (Bandura, 1989; Zimmerman & Cleary, 2006). This is primarily due to its complex nature, which requires the application of critical analysis. In their quest to develop the skill of critically analyzing texts, students were frustrated by the inaccessibility of academics, which is ironic because of all the available support; e-tutors were the least consulted, with only 29% of the students utilizing this service. This implies that students relied on lecturers rather than working with existing e-tutors.

The students' requests for tutoring support revealed a lack of synergy in the university's offering because what they needed was already offered. By introducing tutoring on the WhatsApp application as part of the LiP approach, the researchers were able to quickly contact students and synergize tutoring by directing students to other relevant platforms. Tutoring on this application, thus, enabled the researchers to harness other existing technologies. This platform also encouraged students' participation and helped them regain their confidence. Milman and Wessmiller (2016) argue that "[o]nce you have captured learners' attention and they perceive it is relevant, then the instructor's task is to convince them that they are capable of accomplishing the task at hand" (p. 70). The discussions on the WhatsApp application assisted students in believing in their abilities, as reflected in the following student's comment below.

Student 11	"I'd say engaging with my lecture and fellow students helped me a lot. A lot of ideas and different mindset to answers kept me on the edge of wanting to learn more. Through participation and asking questions where I couldn't understand, also getting clarification via my lecture prepared me well for the portfolio. The discussions we had played a big role in boosting my confidence for the portfolio. My mind perspective expanded throughout for ENG 2602. Without those discussions, I wouldn't have made it."

This student passed the module, which validates Malik's (2014) assertion that "Motivational strategies can improve the disposition of the learners to finish the course successfully and the number of learners successfully finishing the courses can increase" (p. 197-198). The statistics presented in Figure 3 on the

ENG2602 Results after Intervention, also allude to the increase in the success rate when the gaps in motivation are addressed.

The Gaps in Relevance and Satisfaction - Feedback

Assignment feedback which is a crucial didactic tool in an ODeL/CODeL institution, ironically poses a challenge to most of the students in this study. The students' complaint that individual feedback was not timely is contrary to "provid[ing] informative, helpful feedback when it is immediately useful" which Keller (1987, p. 5) advances as a satisfaction strategy. Malik (2014) also suggests that to improve satisfaction among students, educators should "make turn-around time for assignments short" (p.197). The complaint, thus, revealed a gap in relevance because delayed feedback means that by the time it is received, it may no longer be perceived as relevant by students. This also impacts satisfaction as students' gratification is delayed. The WhatsApp application discussions expedited feedback; students could immediately tell where their strengths and weaknesses lay as feedback was instant.

Concerns about feedback at the departmental level were that it was vague. This is contrary to Milman and Wessmiller's (2016) suggestion that instructors should "highlight specific ways in which [learners] can grow" (p. 70). The student's attitude towards it further hampers the didactic purpose of individual feedback, as some ignore feedback. Such attitudes reflected by Student 6 reveal a limited understanding of the formative purpose of assignments: to "help learning" (Harlen, 2012, p. 87). Students' requests for sample essays imply that students want to regurgitate what lecturers write rather than develop critical analysis skills. All these factors made feedback ineffective, as it no longer serves the didactic purpose it should. The students' challenges regarding feedback reveal drastic flaws that could severely impact motivation.

The Gap in Confidence and Expectancy for Success – Examination Duration

For students who identified the examination duration as the main course of failure, writing the examination again under the same conditions could lead to a lowered "expectancy for success" (Keller, 1987, p.3), as they have already failed due to this time restriction. The researchers mitigated this time factor by making the summative assessment a portfolio examination.

Conclusion and Recommendations

This study set out to determine gaps in student motivation that led to repeated failure in the ENG2602 module to support on-the-brink BEd students to complete their qualifications. As indicated in the findings, the study has revealed gaps in the four categories of Keller's ARCS Model of Motivation (1987; 2009). The PoE results presented in Figure 3 demonstrate that success rate improves if existing resources are made available. The LiP approach seems to promote synergy in tutoring support, mitigating gaps in the learning process, which improves success and invariably throughput rates. Therefore, the researcher recommends the following:

1. In an ODeL context, constant communication between academics and students is important. In this study the WhatsApp application was utilized; however, any suitable affordable platform can be used. This will help academics to maintain the student's attention. To achieve this, ODeL institutions could consider negotiating a lower price for the bulk purchase of tablets for all newly enrolled students to improve access to their LMS and all the resources therein. The amount of this device can be added to the student fees. Thus, lecturers will be placed inside the students' pockets from the onset and their attention can be better sustained.

2. Where module complexity lowers confidence, students require constant guidance from academics, i.e., lecturers, tutors, and teaching assistants. Furthermore, additional resources need to be provided to students via various platforms. However, there needs to be synergy between all the academic support provided, to limit confusion, which lowers confidence. Announcements about the availability of e-tutors and additional resources can be sent through free digital and print media to all students enrolled in ODeL institutions. Departments in ODeL institutions can conduct virtual tours on finding and participating in one's e-tutor/teaching assistant class and accessing and saving additional resources.

3. The number of markers should enable a ratio of 1:150 scripts per assignment/ examination to improve individual assignment feedback turnaround.

4. Commenting should be simplified and students' strengths should be acknowledged for effective remedial purposes and confidence building, in line with Milman and Wessmiller's (2016) argument that "[w]hen instructors provide formative feedback, they should emphasize students' strengths" (p. 70).

5. Academics in ODeL institutions need to train students to become self-assessors through virtual classes or vidcasts that explain how students should interpret the assessment rubric, thus making the markers' comments relevant.

6. ODeL universities with timed examinations may consider lengthening the paper duration to reduce anxiety and increase the "expectancy for success" (Keller, 1987, p. 3) while minimizing failure that is due to insufficient examination time. Alternatively, module teams can consider revising the examination structure to align with the limited examination time.

7. For on-the-brink students, the ODeL institutions may amend their assessment policy to provide the FICan-type assessment of all on-the-brink students. Once amended, an e-tutor/teaching assistant or module team member should provide tutoring using existing resources, as was done for the FICan project in this study.

This will help improve success rates at UNISA and in all ODeL institutions that need to support final-year students, remaining with one or two modules, to complete their qualifications. Furthermore, this study has demonstrated that

the ARCS Model of Motivation can be used beyond the planning stage, as a benchmark to diagnose gaps in motivation that may be affecting success rates. Finally, the study has shown how the LiP approach can facilitate the ARCS Model of Motivation, because placing the lecturer in the student's pocket can enhance and sustain students' motivation in ODeL.

Limitations of the Study

The study is limited as it only focused on one aspect – motivation – as the cause of low success rates in ENG2602. Further research can be conducted to determine other causes for the low success rates in this module, such as the limited participation in e-tutorial classes. Moreover, since this is a case study, this implies that the results may vary if this study were replicated in a different context with a different cohort of students with different needs. Moreover, since this is a case study, the findings are in a different context and have a cohort of students with different needs. With these, the results may vary. The results are also bound to vary using different modes of summative assessments (venue-based versus non-venue-based). In this case, however, this discrepancy in assessment styles indicates an alternative assessment form for consideration. While this is a case study in a specific module in a South African ODeL university, it can be replicated, to a degree, in other ODeL institutions facing a similar challenge.

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33

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Technology-Based Support of Final Year Bachelor of Education Students in a South African Open Distance e-Learning Institution

35

Online Laboratory Instruction as Alternative and Supplementary Mode: Students' Assessment of the BS Agricultural Biotechnology Program

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Abstract

When the COVID-19 pandemic hit the education sector, the University of the Philippines Los Baños (UPLB) faculty started to tailor-fit their lectures and laboratory activities in the form of course packs to continue delivering various academic programs. The BS Agricultural Biotechnology (BS ABT) program is one of the courses that relies heavily on laboratory exercises. BS ABT students were randomly surveyed to: (1) assess faculty's teaching style during online distance learning in terms of lecture and laboratory instructions, educational materials, core subjects with laboratory implementation, and students preferred remote learning-based courses; and (2) explore students' experiences in alternative and supplementary online laboratory. Experiments in all exercises were conducted synchronously and asynchronously through Google Classroom, and commonly accomplished with simplified experiments, simulations online, and supplemented by online videos via their personal laptops and smartphones. Regular synchronous meetings were religiously done every week, with classes meeting once or twice a week. Based on the results, 94.5% of the BS ABT student-respondents were generally satisfied with the teaching style of the faculty, and the remote implementation of the laboratory activities. The present study's findings serve as inputs in enhancing the implementation of laboratory classes remotely in hard science particularly in the BS ABT program.

Keywords: *agricultural biotechnology, laboratory instruction, COVID-19 pandemic, remote teaching & learning, education for agile work environments*

Introduction

The onset of the pandemic during the first quarter of 2020 has prompted the Philippine government to impose lockdown restrictions, putting the entire country under various quarantine classifications as modalities to curb the spread of the virus. Education institutions are one of the hardest hit sectors prompting drastic approaches to teaching and learning processes.

The BS Agricultural Biotechnology (BS ABT), the newest undergraduate program offered under the College of Agriculture and Food Science (CAFS) of the University of the Philippines Los Baños (UPLB), had to revisit applicable

teaching and learning modalities to respond to the needs of its stakeholders amid the challenge of the pandemic. Established in 2010, the program aims to utilize biotechnology to create an updated and innovative approach to the agriculture of the country. Every year, the BS ABT program accepts approximately 100 students. An estimated 400 students are enrolled in the course every school year. The program has already produced several graduates who are now excelling not only in agriculture, but also in different fields such as academia , medicine, law, business, etc. Before they reach junior standing, BS ABT students can freely select their desired major among Animal Biotechnology, Crop Biotechnology, Crop Protection Biotechnology, and Food Biotechnology. These major fields and their respective specializations require a heavy load of laboratory activities. During the laboratory exercises, hands-on experience and face-to-face interaction are the more critical factors in retaining students' contentment in the activity, focus on the lecture, and retention of theoretical knowledge. During the virtual implementation of the laboratory courses in tertiary college, improvised laboratory experiments were devised to be conducted in their respective places. Hence, the study sought to answer the following: (1) How effective is the faculty's teaching style during online distance learning in terms of lecture and laboratory instructions, educational materials, core subjects with laboratory implementation, and students' preferred remote learning-based courses? (2) What are the students' experiences in alternative and supplementary online laboratories?

Objectives

The study's objective was to look into the implementation of online laboratory instruction during the COVID-19 pandemic. The study specifically aimed at : (1) assessing faculty's teaching style during online distance learning in terms of lecture and laboratory instructions, educational materials, core subjects with laboratory implementation, and students' preferred remote learning-based courses; and (2) exploring students' experiences in alternative and supplementary online laboratory mode.

Review of Related Literature

Coronavirus 2019

The surge of Coronavirus Disease during the 2019 pandemic affected the daily lives of people worldwide. COVID-19 is a disease with an enveloped, non-segmented positive-sense RNA virus from the *Coronaviridae* family, order Nidovirales, which affects humans and other mammals (Richman et al., 2020). This disease is reported to have originated from the Huanan Seafood Wholesale Market, in Wuhan, Hubei, China (Huang et al., 2020; Richman et al., 2020; Wu et al., 2020). The continuous flight and loose restrictions before the pandemic started the spread of the virus from one country to another. This led to easier transmission since the virus was reclassified as air borne (Tang et al., 2021; Zhang et al., 2020). For over two years, there have been several variants of COVID-19 that have been known.

Patients with COVID-19 commonly experience flu-like symptoms such as high

fever, cough, sore throat, malaise, diarrhea, and fatigue (Singhal, 2020; Viner et al., 2020; Wang et al., 2020). On the other hand, COVID-19 had distinct symptoms, e.g., loss or change in smell, loss of taste, weakening of the body, and shortness of breath, which regular flu does not manifest (Viner et al., 2020). This illness affects people to different degrees. Some people can have mild symptoms, while others, especially those with comorbidities, can have fatal conditions and often develop into acute respiratory distress syndrome (ARDS), pneumonia, and multi-organ dysfunction (Singhal, 2020). Since 2019, millions of people around the globe have been killed by this disease. The disease can usually be detected through RT-PCR and diagnostics kits (Pokhrel et al., 2020). Forced quarantine or isolation of the confirmed or suspected COVID-19 patients to their respective accommodations, e.g., personal room, own house, hotel rooms, isolation facilities, has been implemented in every country. A contact tracing system was also used to monitor the possible contacts of the confirmed or suspected patients. Moreover, nowadays, vaccines, which are classified as inactivated, live-attenuated, and viral vectors (WHO, 2021) are being administered in different parts of the world. In the Philippines, the common brands of administered vaccines are Pfizer-BioNTech, Moderna (mRNA-1273), Oxford/AstraZeneca, Johnson and Johnson-Janssen, and CoronaVac (Sinovac) (DOH, 2021).

Shift to Online Learning

In the surge of the COVID-19 pandemic, the Philippines' higher education institutions (and even basic education) had to address the failure to continue delivering instruction. Proximity was indeed a tremendous delivery challenge for teachers and learners, and therefore, there is no other way but to utilize the technology to bridge the former and the latter in an attempt to uphold quality education even during the pandemic.

On March 17, 2020, the Philippine government, following the Inter-Agency Task Force (IATF) Resolution No. 13, Series of 2020, imposed a lockdown to prevent the spread of the virus in the country (DOH, 2020). However, the lockdowns also resulted in the disruption of the daily routine of Filipinos. This includes the offering of education especially to the Filipino youth at all educational levels. Thus, a shift from a regular face-to-face set up to an online learning method was imposed.

Distance learning or remote learning, usually through online learning, is a product of re-designing or re-engineering education systems resulting in a so-called "new" learning method (Kumar Basak et al., 2018; Nicholson, 2007). Online learning covers using Information and Communication Technologies (ICT) like internet websites, emails, chat, texts, and video conferences, to enhance knowledge retention and deliver quality education (Dhull & Arora, 2019; Tibaná-Herrera et al., 2018). This also includes digital learning (d-learning), mobile learning (m-learning), and computer-based learning, or electronic learning (e-learning) (Kumar Basak et al., 2018).

Before the pandemic, online learning was offered as another modality of education. This is popularly availed by working students and professionals

(Rawlings et al., 2019), who cannot have face-to-face classes since it concurs with their working hours. The FIC can organize synchronous - the FIC and students simultaneously meet for the real-time class through video conference, and asynchronous meetings - the FIC assigned activities that can be done by the students remotely. Furthermore, another essential element in online learning is a functional platform, a learning management system.

Learning Management System. It is a software or online platform utilized by teachers as a support and management tool for learning purposes, achieving course objectives, and delivering course materials to the students (Tinmaz & Lee, 2020; Turnbull et al., 2021). The course materials, such as lectures, lecture notes, class exercises, multimedia, notes, outlines, course syllabi, pictures, bibliographies, diagrams, videos, tests, instructional handouts, illustrations, drawings, art, educational videos, websites, and software, are being uploaded to the LMS to serve as their guide through the whole course. Because of this, according to Bradley (2021), the faculty-in-charge (FIC) can organize the course of the discussions, schedule the online activities, set learning expectations, offer the students with learning options, and build critical thinking of the students in terms of problem analysis. The use of LMS plays a critical role in the remote learning environment of the students, for it serves as an avenue for interaction between the students and teachers (Adzharuddin, 2013). This also strengthens the engagement and communication between the students and FIC. Thus, mismanagement of LMS may result in disinterest or dissatisfaction of the students in the distance learning setup.

Laboratory Instruction through e-Learning

During the COVID-19 pandemic, the lectures and recitation classes, especially at the onset of the COVID-19 pandemic, are compromised. Most of the students needed help in connecting theoretical and practical theories and concepts since laboratory experiments were not being offered. Moreover, the methodological and troubleshooting skills that are necessary to be developed during laboratory experimentation have been a big problem among the students. Remote learning, commonly designed for courses with lectures and recitation classes only, is rarely applied to laboratory instructions. In the study conducted by Achuthan et al. (2021), alternative methodological approaches, such as the use of Transactional Distance Theory (TDT) and remotely triggerable (RT-UTM) laboratory platforms for engineering students, have been proven effective for remote laboratories in engineering education. In the field of biology at the tertiary level, although online instruction was offered, students preferred to have face-to-face meetings for laboratory experiments and group meetings (Sarvary et al., 2022). In support of implementing laboratory instructions for undergraduate biology subjects, Parrington and Giardino (2021) recommended nine (9) points to the institutions, faculty, and undergraduate students to keep up the quality of biological experiments.

Materials and Methods

A survey was formulated by the researchers for the assessment of the laboratory instruction among the BS ABT students at the University of the Philippines Los

Baños (UPLB). The survey through a Google Form was distributed to randomly selected respondents from different year levels, age brackets, and majors of the said degree program. Simple random sampling through a random number generator was used to select respondents. Only students who enrolled during the COVID-19 pandemic and had an experience with online distance learning were asked to participate in the survey. An estimated 10 to 14% (55 students out of 400 students) of the total number of BS ABT students enrolled during the pandemic was included in this study. Before answering the survey, all respondents were assured that their personal information and responses would be protected under the Philippines' Data Privacy Act of 2012 (Republic Act No. 10173) to protect their identity.

Furthermore, the participants' consent was asked, and they were assured that they could withdraw their participation anytime. All participants were also informed about the content and objective of the survey, which took 15 to 25 minutes to accomplish. All in all, it was made sure that no physical or mental harm was done intentionally or unintentionally to the respondents.

Research Instrument

To cross-examine the factors affecting the laboratory instruction among the students, the questionnaire consisted of close and open-ended, multiple choice, modified Likert Scale questions (ranging from "Very Satisfied" to "Strongly not Satisfied"). Other confirmatory questions were also created answerable by Yes, No, and Not applicable. The questions focused on topics such as access to virtual learning, mode of teaching, lecture-related, remote laboratory instruction, and recommendations. The access to virtual learning focused on technology-related questions such as internet connectivity, gadgets of the students, and common problems encountered. The mode of teaching focused on the platforms, frequency, and way the courses are taught. Lecture-related information discussed the courses and how the students feel about the implementation of the said courses. This also included the students' assessment of the quality of the activities and courses. Remote laboratory instruction emphasized the varieties of student assessments being used in the courses with laboratory activities. The recommendation part gave the respondents the chance to voice their experiences and personal feedback on how the courses could be improved.

Data Analysis

The gathered data were analyzed using descriptive statistics. The respondents' demographics, such as admission year, age, program, major, semesters taken, and total earned units were also analyzed in percentage. The graphs and figures, portraying the descriptive data, were generated through Google Forms. A thematic analysis was conducted for the qualitative data to highlight common themes. To analyze the data, manual coding was done. The verbal statements of the respondents were also presented to support the analysis.

Results and Discussion

Data about the Respondents

To understand the status and experiences of the students (n= 55 responses), questions related to their background and the length of stay in college were asked. The respondents were almost 10-14% of the total enrolled BS ABT students with laboratory instruction during the transition period to remote learning (2nd semester 2020 to mid-year July 2022). Figure 1 shows the demographic distribution of the respondents in this study. Some students who participated in the survey were from the Batch 2018 (32.7%) and 2019 (27.3%), with ages ranging from 18 to 28 years old. Most of the students are 21 (29.1%) and 22 (32.7%) years old (Figure 1B).

Among the total respondents, 40.7% of students are from the Crop Biotechnology major, followed by Food Biotechnology (18.5%), Animal Biotechnology (11.1%), and Crop Protection Biotechnology (7.5%), respectively. Some students have yet to decide on their chosen major, mostly those in their 1st year or 2nd year in the program. Further, some students have already attended 8 semesters pegged at 29.1%, 2 semesters (21.8%), and 6 semesters (21.8%). There was an outlier to the respondent as well who enrolled almost more than 12 semesters in the college.

The pandemic has also prompted some policies to be implemented to respond to the needs of the students. The regular academic workload has been reduced from 15 units to 12 units. Owing to the entire credited units under the program, respondents of the study had generally earned more than 36 units (58.2%), while the lowest units earned ranged from 19 to 24 units (1.8%). Overall, the data gathered displayed diversified experiences among the students.

Figure 1

Demographic distribution of the respondents for the assessment of the laboratory instruction among BS ABT students
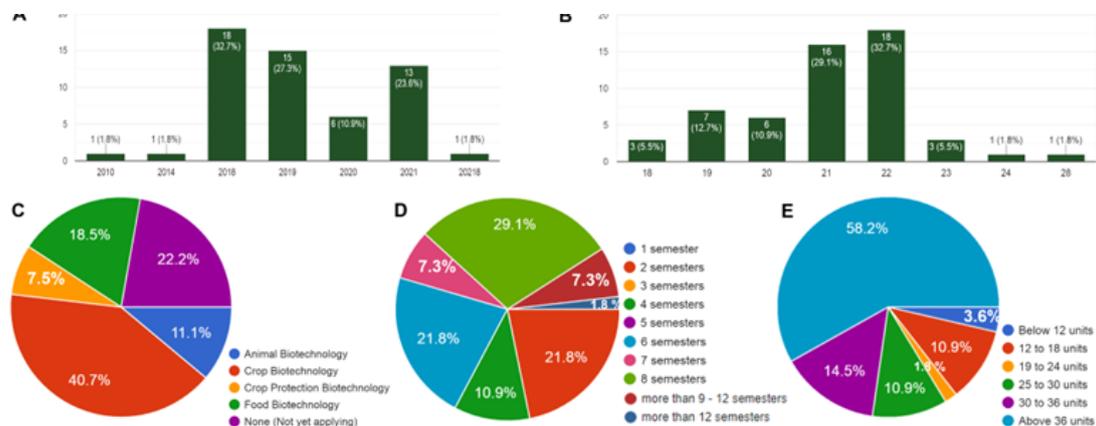
Note. (A) Year of Admission; (B) Age; (C) Major of the Students; (D) Total Number of Semesters as Students; and (E) Total Number of Units Earned by Students

Learning Management System during Pandemic Period

During the transition phase of education, i.e., during the COVID-19 pandemic, the LMS played a vital role in sustaining the teaching and learning process, ensuring that disruptions in education are addressed. Figure 2A shows the most used LMS platforms for announcement and class activities, usually for asynchronous set-up, are indicated. The most used platforms are Google Classroom (100%), Canvas (72.7%), Facebook (52.7%), and Edmodo (20%). Zoom (100%) and Google Meet (83.6%) are the most preferred applications for the synchronous delivery of lessons. In Figure 2C, the online classes are usually held twice a week (85.5%), once a week (49.1%), or every other week (9.1%).

Figure 2

Platforms for instructional delivery during remote learning
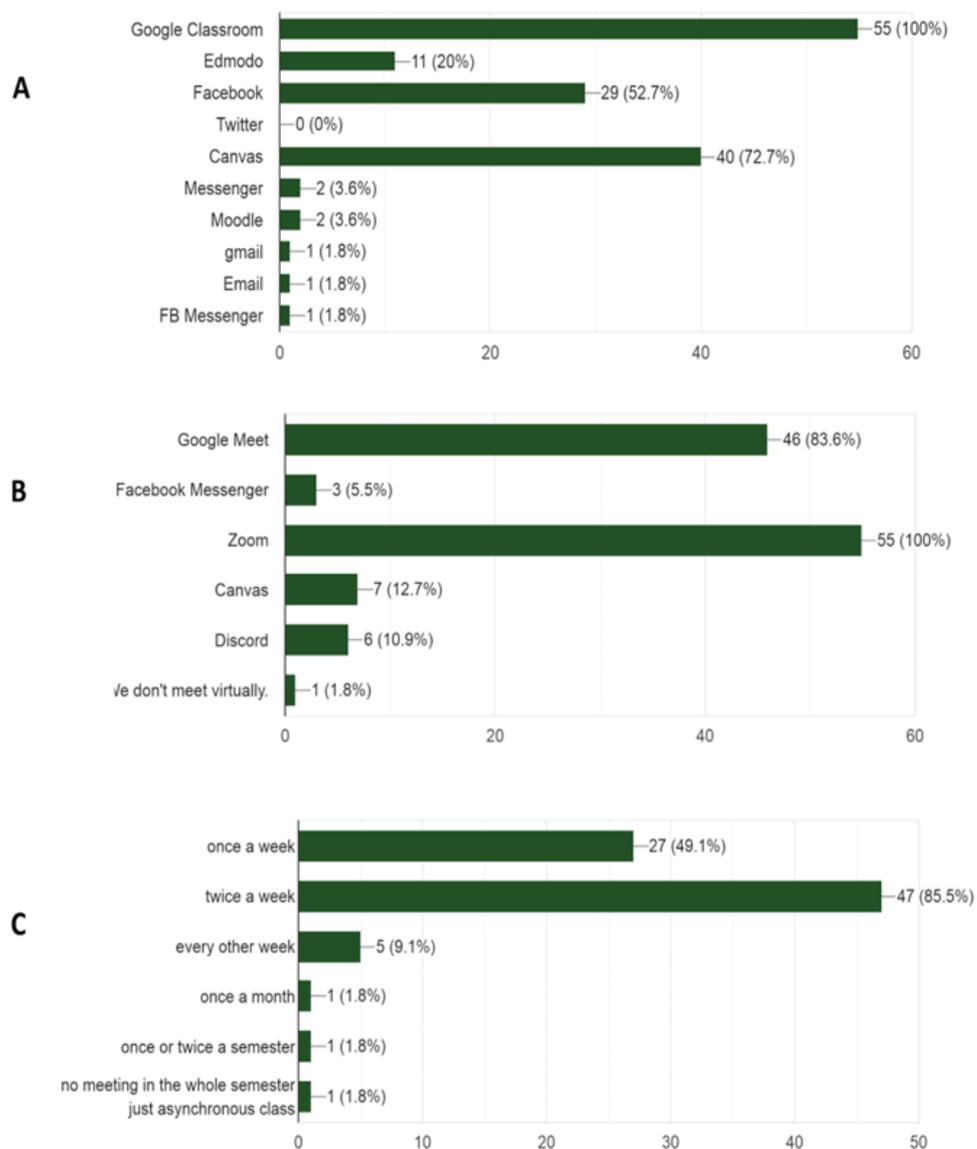
Note. (A) Platforms for Announcements and Class Activities; (B) Platforms for Synchronous Meetings; and (C) Frequency of the Class Meetings

Reniel S. Pamplona & Inero V. Ancho

Google Classroom allows interaction between the teachers and students by posting announcements in forum type; uploading materials like videos, PowerPoint slides, PDF readings, or website links; submitting worksheets or documents; uploading assessment tools like quizzes, exams, surveys, or grading sheets, and monitoring students' progress. In a study conducted by Okmawati (2020), Google Classroom has been considered an effective platform for fulfilling the learning objectives of the course by following the theory of effectiveness of the communication by Hardjana (2003) - the effectiveness based on the message recipients, contents, communication media, format, source, and timing. Education institutions around the world utilize this LMS for their mode of communication with the students in college- level, vocational schools (K A'yun et al., 2021; Kado et al., 2020; Novita et al., 2022; Saimi & Mohamad, 2022; Syahfitri & Herlina, 2022; Zuniga-Tonio, 2021). As reported by the study respondent, Canvas requires in-depth training and further mastery.

Table 1

Laboratory Courses enrolled by the students during the remote learning

No.	Course Number	Course Title	Classification of the course	Number of students enrolled	Percentage
1	ABT103	Experimental Techniques in Agricultural Biotechnology I	Core	2	3.64
2	ABT104	Experimental Techniques in Agricultural Biotechnology II	Core	1	1.82
3	ABT106	Molecular Markers	Core	1	1.82
4	AGR150	Method in Plant Breeding I	Specialized	7	12.73
5	AGR153	Method in Plant Breeding II	Specialized	5	9.09
6	AGR21	Introduction to Animal science	Foundation	15	27.27
7	AGR22	Introduction to Livestock and Poultry Production	Foundation	15	27.27
8	AGR31	Fundamentals of crop science I	Foundation	15	27.27
9	AGR32	Fundamentals of crop science II	Foundation	15	27.27
10	AGR41	Principles of crop protection I	Foundation	18	32.73
11	AGR42	Pest Management	Foundation	13	23.64
12	AGR50/CRSC105	Principles of Plant Breeding	Specialized	4	7.27
13	AGR51	Principles of Soil Science	Foundation	11	20.00
14	ANSC101	Anatomy and Physiology of Farm Animals	Specialized	1	1.82
15	ANSC103	Principles of Animal Breeding	Specialized	1	1.82
16	ANSC104	Livestock Sanitation and Disease Control	Specialized	1	1.82
17	ANSC105	Poultry Sanitation and Disease Control	Specialized	1	1.82
18	BIO30	Genetics	Foundation	8	14.55
19	BOT20	Elementary plant physiology	Elective	2	3.64
20	CHEM 18, CHEM 18.1	Fundamentals of chemistry	Foundation	6	10.91
21	CHEM 40, CHEM 40.1	Basic organic chemistry	Foundation	3	5.45
22	CMSC12	Introduction to Computer Science	Foundation	7	12.73
23	FST101	Food Chemistry 1	Specialized	1	1.82
24	FST122	Food Fermentation	Specialized	1	1.82
25	FST167	Principles of Food Safety	Specialized	1	1.82
26	HORT132	Plant Growth	Specialized	4	7.27
27	HORT133	Plant Tissue Culture	Specialized	7	12.73
28	MCB11	Biology and Applications of Microorganisms	Foundation	7	12.73
29	MCB180	Introductory Food Microbiology	Specialized	2	3.64
30	STAT162	Experimental Designs I	Core	2	3.64

Table 1 presents the laboratory courses the students enrolled in from March 2020 to July 2022. Courses taken are classified as foundation (46.67%), core

Online Laboratory Instruction as Alternative and Supplementary Mode:
Students' Assessment of the BS Agricultural Biotechnology Course

43

(13.33%), specialized (36.67%), and elective (3.33%). Most of the courses with the highest enrollees belong to the core courses category. This includes AGR 41 - Principles of Crop Protection I (32.74%), AGR 21 - Introduction to Animal Science (27.27%), AGR 22 - Introduction to Livestock and Poultry Production (27.27%), AGR 31 - Fundamentals of Crop Science I (27.27%), AGR 32 - Fundamentals of Crop Science II (27.27%), AGR 42 - Pest Management (23.64%), and AGR 51 - Principles of Soil Science (20%).

Assessment of the Teaching Style of the Faculty-in-Charge

The delivery of the lectures is very important to establish the interaction and connection between the teachers and students. Figure 3 shows that most faculty members still conduct regular synchronous meetings (96.4%), and upload PowerPoint presentations or handouts (89.1%) in Google Classroom. Other teaching practices reported are uploading reading materials (76.4%) and pre-recorded videos (74.5%) and conducting simulation or interactive activities through internet websites (34.5%).

Figure 3

Faculty-in-Charge's style in teaching lecture and laboratory instructions
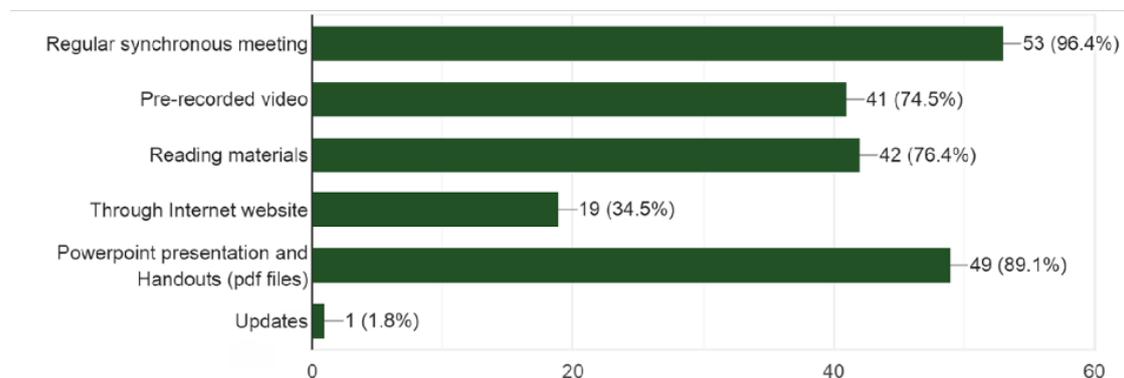
Figure 4 presents the students' satisfaction with the teaching style. Figure 4A shows that the teaching style and activities earned the approval of the students. It can be gleaned from the figure that 94.5% (14.5% strongly agree, 60% agree, and 20% slightly agree) of the respondents generally agreed to the delivery of lecture and laboratory instructions. The students are also satisfied with the topics from the course syllabus, where 98.2% (40% strongly agree, 47.3% agree, and 10.9% slightly agree) of the participants express their appreciation of the content of the course (Figure 4B). Figure 4C shows that 96.4% (58.2% strongly agree, 25.5% agree, and 12.7% slightly agree) of the students unanimously agree that the experience allows them to achieve the learning outcomes, while 1.8% slightly disagree.

Figure 4D assessed the understanding and mastery of the faculty-in-charge in the subject. The students rated 90.9% (45.5% strongly agree, 23.6% agree, and 21.8% slightly agree) for this category, while 3.6% of the respondents were slightly disagreeing. In Figure 4E, the participants evaluated the coherence and

integration of the topics in all courses. This means that the topics outlined in the specific course are well-organized, well-designed, and well-thought-out, and they can be combined or associated with other topics as well. This can be implied by applying the concepts as well, showing 96.3% (20% strongly agree, 61.8% agree, and 14.5% slightly agree) of them agree, while 1.8% expressed slight dissatisfaction. Lastly, in Figure 4F, 98.2% (30.9% strongly agree, 49.1% agree, and 30.9% slightly agree) agreed that the lectures and activities in the courses during the remote learning are all updated.

Figure 4

Satisfaction of the students with the faculty-in-charge's style of teaching
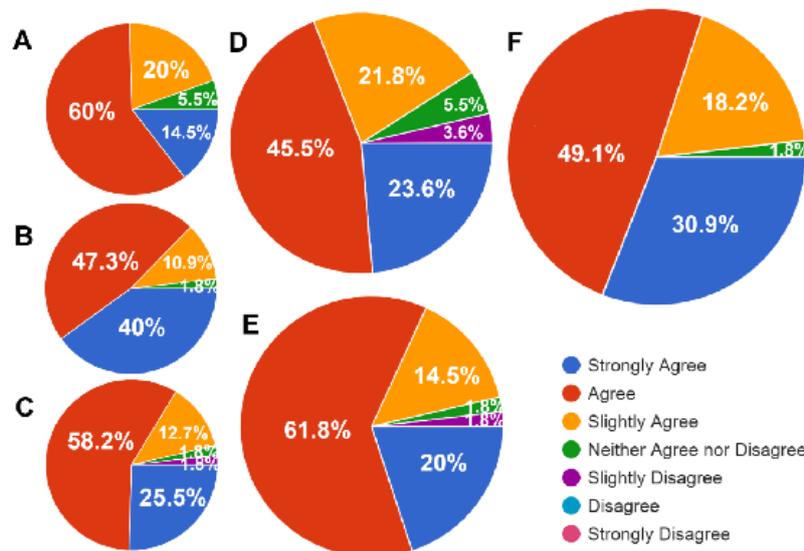
Note. (A) Delivery of Lecture and Laboratory Instructions; (B) Topics from the Course Syllabus; (C) Achieving the Learning Outcomes; (D); Displaying Breadth and Depth in Teaching; (E) Coherence and Integration of the All Courses; and (F) Up-to-date Lectures and Activities.

Quality of Educational Materials in the Laboratory Instruction

Materials used in the instructional process such as textbooks, video and audio tapes, computer software, and visual aids, play an important role in the instruction of the teacher and the learning progress of the students (Kitao & Kitao, 1997). In Figure 5, participants were able to rate the quality of education materials used in online laboratory instruction. Figure 5A portrays the revised laboratory manual, which is adjusted for remote learning during the pandemic period. A total of 81.8% (21.8% strongly agree, 38.2% agree, and 21.8% slightly agree) of the participants expressed their satisfaction with this material; however, 14.5% (10.9% slightly disagree, 3.6% disagree). For the lecture syllabi (Figure 5B), 89% (32.7% strongly agree, 43.6% agree, and 12.7% slightly agree) of the students are collectively satisfied with the material, while 5.5% slightly disagree . Audiovisual presentations such as PowerPoint slides and educational videos (Figure 5C) garnered 94.6% approval (49.1% strongly agree, 36.4% agree, and 9.1% slightly agree), while 5.5% of them disagreed. For the hand-outs, including reading materials (Figure 5D), students had an approval rating of 90.9% (29.1% strongly agree, 52.7% agree, and 9.1% slightly agree).

During the Covid-19 pandemic, the UPLB adjusted the course content and activities without compromising the quality of lectures in the form of course packs (Figure 5E). Students gave a 90.9 approval rating of 90.9% (27.3% strongly agree, 52.7% agree, and 10.9% slightly agree) while 3.6% disagreed (1.8% slightly disagree, 1.8% disagree).

Figure 5

Rating of the students in the faculty-in-charge's educational materials
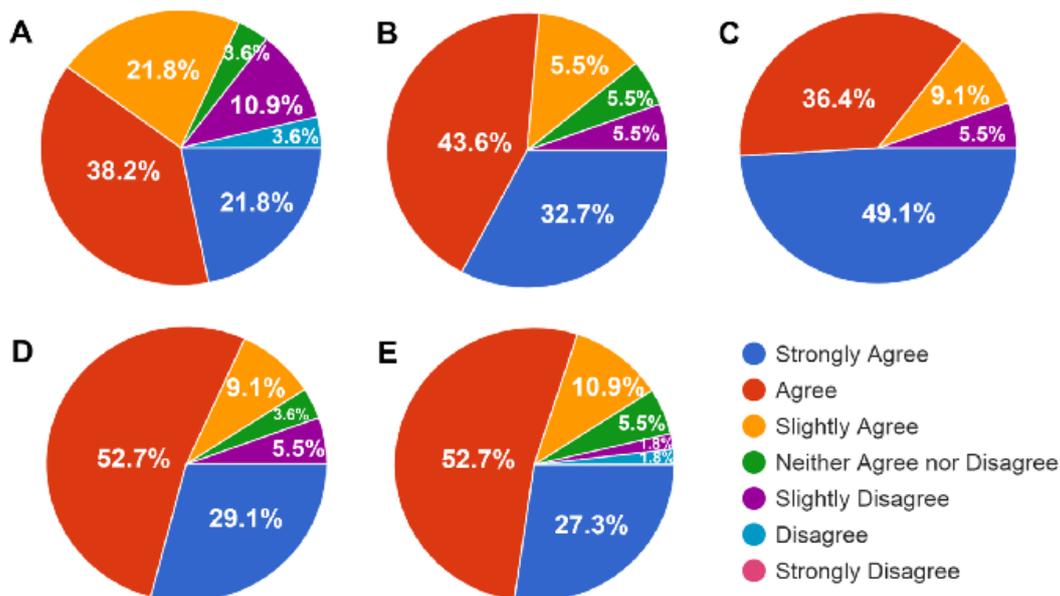
Note. (A) Laboratory Manuals; (B) Lecture Syllabi; (C) Audio-visual (PowerPoint, videos, etc.); (D) Hand-outs; and (E) Course Packs.

Aside from the materials mentioned in Figure 5, there are software , applications, and internet videos from YouTube, LabX, and others that are used as educational materials for delivering lectures and laboratory classes. Meanwhile, in Figure 6, the students rated the implementation of the core subjects such as ABT 103 - Experimental Techniques in Agricultural Biotechnology I (Figure 6A), ABT 104 - Experimental Techniques in Agricultural Biotechnology II (Figure 6B), and ABT 106 - Molecular Markers (Figure 6C). Each of these courses received an approval rating of 47.3%, 51%, and 40%, respectively. The rating in the neither agree nor disagree category can be related to the students without major subjects yet.

Figure 6

Rating of the students in the implementation of core subjects with laboratory classes
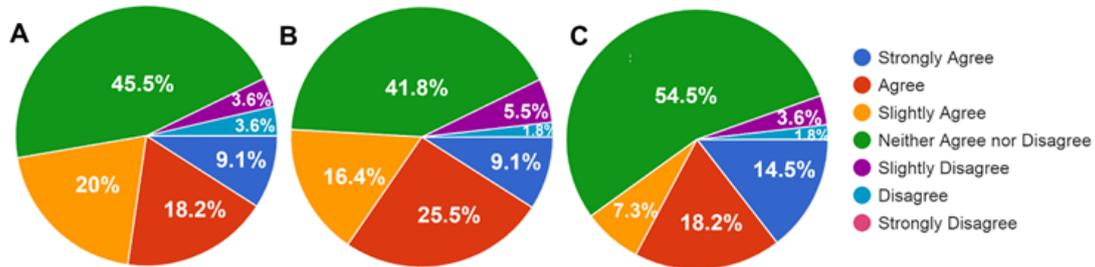
Note. (A) ABT103; (B) ABT104; and (C) ABT106

Among the subjects with laboratory instruction offered, core, courses such as ABT103 (21.82%), ABT 104 (27.27%), and ABT106 (14.55%) received the top affirmation. Students favored the activities like bioinformatics, designing primers, DIY mung bean DNA extraction, protein extraction, and molecular markers analysis in ABT104; home set-up plant tissue culture and kimchi making in ABT103; and molecular marker-related analysis and research proposal writing in ABT106. The next highly favored courses are from the foundation course of the BS ABT program, such as AGR21 (9.09%), AGR22 (12.73%), AGR31 (5.45%), AGR 32 (10.91%), AGR41 (12.73%), and AGR51 (3.64%). Meanwhile, some students did not respond to this category (14.55%).

Table 2

Courses that the students preferred most during the remote learning

No.	Course Number	Students who like the course	Percentage	Desired Topic
1	ABT103	12	21.82	Home set-up Plant Tissue Culture; Kimchi making
2	ABT104	15	27.27	Bioinformatics; Designing of primers; Mung Bean DIY DNA extraction; Protein extraction; Molecular Markers
3	ABT105	1	1.82	Necropsy
4	ABT106	8	14.55	Primer designing, Making of Dendrogram, Molecular Markers Analysis, Research Proposal writing
5	AGR160	3	5.45	PGR collection, Regeneration, Characterization of different chili accessions
6	AGRI150	2	3.64	Cross pollination
7	AGRI21	5	9.09	Tocino and Pastillas making; Farm blueprints; Rating of animal appearance
8	AGRI22	7	12.73	Lassoing; Milking
9	AGRI31	3	5.45	Growing of plants; Seed germination
10	AGRI32	6	10.91	Mini garden; BIG set-up
11	AGRI41	7	12.73	Herbarium; Identification of Weeds
12	AGRI42	1	1.82	Insect pests and weed identification
13	AGRI51	2	3.64	Soil Assessment; Computations of Fertilizer application
14	BIO30	1	1.82	DNA structure
15	BOT20	1	1.82	Chlorophyll extraction
16	CHEM18.1	1	1.82	Nuclear Reactions
17	CMSC12	2	3.64	Writing codes, Programming
18	FST101	1	1.82	Effect of heat and acid on vegetables
19	HORT132/ BIO132	2	3.64	Corn planting; Growth of an intact plant
20	HORT133	2	3.64	Corn embryogenesis; Callus initiation
21	MCB11	2	3.64	Drawing of Microscopic Organisms; Computations of CFU
22	MCB180	1	1.82	
23	No Answer/ Uncategorized	8	14.55	

For the overall rating of the implementation of remote laboratory instruction, 45.45% of the students expressed their satisfaction, while 34.55% showed dissatisfaction. 9.09% and 10.9% were undecided and unable to give their opinion, respectively.

Students' Voices on Their Online Laboratory Experience

The present study also gathered students' qualitative remarks about their overall experience with online laboratory set up. It could be noted that students are affirming the positive, innovative style in teaching the course amid the challenges faced along with attempts to improve instructional materials.

DIY Experiments as 'Substitutes'

It is worth noting how students were able to navigate the experiments given the do-it-yourself directions in conducting such activities. Students believe this set up could be considered a substitute for the actual experiments done in the laboratory. With this, students are encouraged to maximize available resources at home, especially when mobility and travel have been restricted due to the pandemic. Experiments utilizing available materials at home contribute to the success of this activity. Some students also preferred these DIY tasks rather than watching online videos.

> "So far yes. Most laboratory exercises still enabled us to apply our skills. The exercises also consider the different set-ups of each student in their

respective houses." (Participant 54)

These experiments, however, present challenges, as some limitations are encountered. Issues related to the overall experience and achieving the course's intended learning outcomes are prime concerns.

> "I was only slightly satisfied because not all laboratory exercises have ample explanation or can be only answered based on videos and the module. Some ABT, AGRI, and FST courses require home experiments to answer the exercises." (Participant 14)

Learning Materials: As Supplement and as Guide

The era of remote learning gave rise to asynchronous and synchronous sessions. As it fosters independent learning, effective learning can only be ensured depending on the quality of materials provided to the students. Supplementary materials come in the form of recorded videos instead of experiments and assigned activities. As most participants recognized the need to shift to this modality, they were also satisfied with the quality and quantity of the handouts and other materials.

> "Yes. The lab profs gave us enough time to finish our lab exercises. They also gave demonstrations and sufficient website resources on how we can do, and experience actual lab works." (Participant 15)

> "Some courses such as the ABT106, the laboratory class was some-what challenging however, a lot were taught well, and the assessments done were sufficient. Most of the ABT courses have a lot of teaching materials that were through video presentations such as the proper execution of some techniques in the laboratory which I think is okay. Overall, I am satisfied." (Participant 42)

While this works well for others, some students expressed inconvenience.

> "I'm slightly satisfied because some of the laboratory classes would only require us to attend webinar and then we'll just have to answer guide questions or make a narrative report." (Participant 33)

Hands-Off on Laboratory Equipment: Lack of Hands-On Experience

Other students expressed their dissatisfaction with the online learning of laboratory classes. They also stressed some points that need to be improved or acquired by the students when taking up the respective course. As courses are conducted online, with prerecorded tasks and lectures, students had to express their clamor to work in the field. Comparatively speaking, some respondents have noted that the experience at home differs from the actual laboratory experience.

> "I feel like the two years of studying laboratory in an online setup is a

waste because the skills we must acquire as lab students were not properly practiced since we rely on videos and not actual application." (Participant 3)

"No. Most, if not all, laboratory exercises were not conducted by the student. Students are typically given a recording or link to a YouTube video of the experiment or exercise which they are to assess. Sometimes, only written handouts are given, too, which describe the procedures." (Participant 37)

Difficulties Encountered: Lessons Learned

With the nature of the academic program being science-based and relying heavily on lectures and experiments, students faced numerous difficulties, given that assigned activities are implemented at home. Students were guided by materials provided to them. Further, the respondents expressed that some materials to conduct experiments are unavailable at home, if not difficult to secure. This is addressed by providing videos online or through virtual laboratory programs.

"I know my profs did all they can to teach their respective courses and help the students to attain the learning objectives. But there are lapses and gaps that were not sealed nor bridged which is not something to blame to the profs, the institution, or the students. It's just the situation didn't allow to fully deliver the course the way it should. So, I am not fully satisfied but I am thankful. Really thankful that everyone did try." (Participant 8)

"Some were too intensive since they are groupworks and getting ahold of groupmates is difficult." (Participant 12)

"Sometimes the load of worksheets are overwhelming for me and I am often unsure of what I do and the scope of my answers. Although there are alternative activities, actual lab work remains a regret." (Participant 40)

Towards an Improved Online Laboratory Instruction

Based on the findings of the study, the following inputs are proposed to improve online laboratory instruction:

1. *Use of low-cost materials for the experiment or early announcement of the materials.* As the students would need to look for materials to be used in experiments at home, it is suggested that these items are easily found or bought. Student's ability to source materials for the experiment equitably positions the student to participate and conduct assigned tasks. Further, it is also helpful that the needed materials are announced beforehand so students can work on the procurement beforehand.

2. *Provision of detailed instructions on the experiments and regular*

consultation with the faculty. Given the nature of structured experiments and activities, students require detailed instructions on the conduct of experiments at home, if not the supervision of the faculty-in-charge.

3. *Conduct of activities and lectures based on structured sequence and time frame.* As planning becomes vital to students to successfully attend to their school tasks and other academic needs, strictly following a particular timeline and sequence, mostly stipulated in the syllabus, would help identify students' priority areas. In classes where laboratory experiments play a significant role in assessing students' learning, how the class progresses from one topic to the other matters. Working on a particular timeframe could help students stay organized and able to plan.

4. *Promotion of student support through equitable class requirements.* An optimal approach to maximizing learning in a remote modality involves careful planning and preparation. As essential competencies are identified, class requirements to be submitted by the students should also be revisited as regards the need and impact. With great consideration of equitability and learning demonstration, these requirements should reflect how authentic learning is manifested.

Conclusion

The present study provides crucial discourse in the conduct of online laboratory instruction. Various platforms need to be scrutinized to determine whether these respond to the needs of the nature of the class. Online videos and laboratory programs need to be revisited to ensure equity and authenticity of the totality of the students' learning experience.

As teaching styles matter, implementing laboratory activities at home requires careful planning, especially when it comes to providing materials available at home. The conduct of synchronous classes serves as a vital component in the delivery of lectures. Quizzes, exams, and written reports are also considered to be essential. Requiring group activities and projects need to be enhanced, justified, and strengthened, as students find these least desirable.

Whether or not online laboratory instruction is here to stay, the present study is significant in designing courses implemented in preparation for a disruptive-free teaching and learning process. Innovating approaches to certain classes should be encouraged as these highlight efforts to address contemporary issues and concerns. Allowing students to plan and implement their academic activities leads to positive gains. Attending to student needs through consultation and supervision appears to be a much-needed response, especially during the pandemic.

In addition, using online learning materials is indeed a challenge for the students as it may be of high provision and maintenance cost for the students themselves. Hence, platforms must not only be accessible but affordable in consideration of the socio-economic conditions of the students.

The present study also presents limitations. The findings, results, and interpretation may not be generalized to all students with online laboratory experience   since the nature of academic programs, classes, and approaches need to be taken into consideration. Since respondents of the study are from the BS ABT program, given the online modality of data gathering, findings cannot be generalized to all science courses and laboratory classes.

Recommendations

In relation to instructional practices and student learning assessment, it is recommended that faculty-in-charge fosters a healthy and nurturing online learning landscape for both teachers and students. Managing expectations and emphasizing responsibilities would mean establishing how both teachers and students could maximize the benefits of learning through online modality. Further, the present study opens new discourse on teacher education research. Teachers are recommended to survey student needs and expectations and align these with classroom rules, requirements, and regulations. Innovative and data-based decisions and practices could fuel effective teaching preparation and implementation. Constant checks and balances on student satisfaction and needs assessment surveys could also contribute to the efficient delivery of each lesson. The teacher should be sensitive to these elements as evidence of students' learning and academic progress. Higher education institutions are encouraged to craft policies that highlight addressing student welfare by identifying the   essential learning competencies in laboratory sessions. Provisions must explicitly state the consideration   of the availability of needed resources for home-based experiments, structured and regular consultation, and equitable student requirements. In the future, prospective avenues to study include how students address the challenges of online laboratory instruction, curriculum implementation processes vis-à-vis students' home-based experiments, and institutional support provided to students and teachers to deliver online delivery instruction effectively. Another promising area of inquiry includes teacher professional development vis-à-vis training and capacity building for teachers who handle courses under this delivery modality. A qualitative research approach would also contribute to addressing research gaps in this area. Furthermore, future researchers may explore existing literature to crosscheck the results of the study further. They may also explore more cases, studies, and examples of how Google Analytics enhanced or created learner-centered, personalized apps to better understand online distance learning tools.

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Online Laboratory Instruction as Alternative and Supplementary Mode: Students' Assessment of the BS Agricultural Biotechnology Course

53

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Online Laboratory Instruction as Alternative and Supplementary Mode: Students' Assessment of the BS Agricultural Biotechnology Course

55

Boundless Classrooms and Touchless Bodies: Teaching Physical Education Online

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Abstract

This qualitative study explored the PE teachers' experiences in teaching online during the outbreak of the COVID-19 pandemic in the Philippines. Using the phenomenological approach, it investigated the pedagogical practices, the educational theories that guided the participants, and their reflections on teaching PE online. In order to describe the PE teachers' pedagogical practices and perspectives regarding online teaching, the following research questions guided the study: (1) What are the daily instructional practices of the participating online PE teachers? (2) What educational theories guided these participants in teaching online? and (3) What are the reflections of the participants in teaching PE online? Data collection methods for this qualitative study included: 1) interviews with online PE teachers; 2) virtual classroom observations and field notes; and 3) text messaging and e-mail communications between the researcher and the participants. Content and thematic analyses were used to interpret the results of the study. Results showed that teachers provided demonstration classes and allowed students to be creative in submitting their outputs. They practiced differentiated instruction, challenged the creativity of students, and developed innovative ways of teaching PE online. They implicitly ascribed to Gardner's Multiple Intelligence Theory and Bandura's Social Learning Theory. The results of this study supported the premise that college PE can be taught online and is workable during the pandemic.

Keywords: *pedagogical practices, educational theories, virtual classroom, student support, challenges*

Introduction

A large portion of the physical education curriculum centers on socialization, shared games, and physical activities necessitating close contact. However, the coming of COVID-19 created a new educational challenge for physical educators to teach a predominantly movement-based curriculum in a distance learning format, which runs counter to the traditionally defined identity of physical education.

Several studies were conducted on online learning. Researchers have explored the effectiveness and student satisfaction in online courses (Sidman et al., 2011), success and struggles of teachers (Mercier et al., 2021), and

students' perceptions and preferences (Muthuprasad et al., 2020). However, the study of online courses should not only be in terms of effectiveness and student satisfaction but should also include the examination of the instructional practices used to attain optimal learning outcomes. Other researchers have attempted to provide an overview of online PE-related fitness courses and have suggestions for the creation, implementation, and assessment of online health and fitness courses within a secondary or post-secondary physical education curriculum, but they have not addressed physical education teaching practices for optimal online instruction Goad (2018) and Ransdell et al. (2008).

There is an overall lack of research regarding how best to design teaching PE online, the educational theories that guide the teachers, and their perspectives or reflections on teaching PE online. This study will help address the current shortage of research in this area and provide value in teaching PE online. It will contribute to the body of knowledge on teaching tertiary PE online and set the stage for further research in teaching online physical education by identifying teachers' teaching practices, guiding philosophy, and reflections on teaching online.

Objectives

Given the lack of research regarding teaching PE online, this study explored the pedagogical practices of PE teachers. It also determined the educational theories that guided them in teaching online. Another purpose of the study was to probe into the reflections of the PE teachers with regard to their instructional practices on online teaching.

This study contributes to the literature on teaching tertiary physical education. It assists current and future online PE teachers in understanding what teachers think about online teaching. Ultimately, understanding how teachers engage in online teaching during this time of the pandemic can serve as a reference for the future promotion of e-learning.

A close look at the daily instructional practices and the perspectives of PE teachers about virtual PE may be helpful in providing insight into how an online PE class works, and how an online PE teacher can facilitate student learning virtually. With the current emphasis on social distancing without sacrificing students' acquisition of knowledge, skills, and attitudes specifically in PE, the teacher is considered a key facilitator for online courses (Foye & Grenier, 2021). Online teachers must have technological skills in addition to traditional teaching skills to help students move through the content virtually.

Review of Related Literature

Martin Heidegger's Phenomenology provided guidance for this qualitative research seeking to explicate the lived experiences of teachers teaching PE online. As cited by Kelly et al. (2016), "Heidegger's key phenomenological tenets such as lived experiences, everyday ordinariness, Dasein, being in the world, being with, encounters with entities, temporality, and the care structure can serve to expose the meaning of everyday ordinary human existence as

part of conducting interpretive phenomenological research". In this study, these tenets paralleled with the participants' experiences in teaching online, their daily activities, their encounter with the pandemic leading them to teach online, the temporariness of online teaching, and the student support given to students as part of their care structure.

Several studies examined the impact of online learning and presented interesting findings. Varea and Gonzalez-Calvo (2020) investigated how PE practices became touchless and bodies were absent because of COVID-19. Their study focused on a group of pre-service PE teachers who were forced to switch to online teaching during their PE practicum experience. Results indicated that the pre-service teachers experienced a mix of emotions during this time due to missed physical contact with students and believed PE was losing its identity because of the pandemic. Conclusions suggested a shift in the way classes were assembled and the possibility that pre-service teachers were missing out on an important aspect of their practicum experiences because of the lack of direct contact with students.

In the Philippine setting, Francisco and Barcelona (2020) investigated the role of Eliademy as a web-based classroom in designing an alternative learning tool in times or emergencies. They utilized a qualitative interview among selected graduate school students of La Consolacion University in the Philippines during the academic year 2018-2019. The results revealed that students strongly agreed that Eliademy can be used as an alternative tool for teaching and learning. Their study also revealed that Eliademy is accessible and can promote time management and promptness, however, it can be a challenge for users as it requires strong internet connection and is time pressured. They concluded that in times of calamities, Eliademy may be considered as an alternative approach to teaching so as not to compromise classes.

Other studies focused on the status of online physical education (OLPE), as what Daum and Buschner (2012) did in the United States through a survey among high school online physical education teachers. Results of their study indicated that the majority of the online PE teachers focused on a fitness curriculum with an emphasis on the cognitive domain. Teachers expressed support, hesitation, and even opposition toward online physical education.

The status of online teaching was further refined by other researchers such as D'Agostino et al. (2021) who conducted a survey among PE teachers in the US starting from preschool to 12th grade. The study aimed to determine the physical education teachers' perceived significance of different design features for an online teaching tool to promote physical activity and equity during school closures. Results showed that although online resources are already available for educators, they are not sufficient to meet current physical education teacher needs. Unlike Daum and Buschner (2012), who investigated the status of OLPE in the United States, D' Agostino and associates (2021) explored the perceived significance of online teaching tools.

Muthuprasad et al. (2021) focused on understanding Agriculture students' perception and preference towards online learning through an online survey.

Students' preferences for various attributes of online classes were assumed helpful to design effective online learning environment. The results indicated that majority of the respondents were ready to opt for online classes to manage the curriculum during the pandemic. The study indicated that flexibility and convenience of online classes made it an attractive option, whereas broadband connectivity issues in rural areas made it a challenge for students to make use of online learning.

Like Muthuprasad et al. (2021), Elshami et al., (2021) conducted a study aimed to identify factors affecting student and faculty satisfaction with online learning during the new normal. Results indicated a higher overall satisfaction among students compared to the faculty. The highest areas of satisfaction for students were communication and flexibility, whereas a great majority of the faculty were satisfied with students' enthusiasm for online learning. Technical problems led to reduced student satisfaction, while the faculty were hampered by the higher workload and the required time to prepare the teaching and assessment materials. Study load and workload, enhancing engagement, and technical issues (SWEET) were the themes that emerged from the thematic analysis as affecting student and faculty satisfaction.

A similar study of Barrot et al. (2021) delved into the challenges and coping strategies of students using online learning in the Philippines. Employing a mixed-method approach, their findings revealed that online challenges of students varied in terms of type and extent. Their greatest challenge was linked to their learning environment at home, while their least challenge was technological literacy and competency. The strategies employed by students were resource management and utilization, help-seeking, technical aptitude enhancement, time management, and learning environment control. The study offered implications for classroom practice and policymaking among others.

To investigate the relationship between student academic performance and online learning, Darkwa and Antwi (2021) compared classroom learning effectiveness during pandemic and pre-pandemic at the University of Cape Coast. The performance of students in both teaching and learning modes was also compared. Course content, pedagogical approaches, interactivity and assessment, feedback and evaluation were used as indicators for effectiveness. The results showed that classroom learning was more effective than online learning. In addition, the students exhibited good academic performance in classroom learning than online learning, although the difference was not statistically significant.

Nepangue et al. (2022) sought to describe the lived experiences of physical education teachers in quaranteaching utilizing Hussler's phenomenological qualitative research design. Seven (7) PE teachers from two universities participated in the study. Results revealed that though the PE teachers experienced difficulties, they learned to innovate in handling the course. They recommended that tertiary PE teachers undergo pedagogical and technological training in the utilization of different learning platforms.

Analysis of data showed that teachers provided individualized instruction,

offered students choices, facilitated student success, and implicitly subscribed to constructivist educational theories and practices. Results of the study supported the premise that teaching PE online was a viable option for high school PE for some teachers in the U.S. and Canada.

The literature has highlighted different studies` on online teaching concerning impact, status, perceived significance, students' preferences, challenges and coping strategies of students, student and faculty satisfaction and relationship between online learning and academic performance which provided the basic framework to understand online education. However, only a few research have attempted to address how online learning works.

The study of online courses should not only be in terms of effectiveness, satisfaction, and impact, but should also include an examination of pedagogical practices used to attain optimal learning outcomes. The researcher tried to fill this gap in this study, drawing insights from the literature in conceptualizing the problems focusing on the PE teachers' pedagogical practices, their guiding philosophies, and their reflections on teaching PE online.

Data Collection Methods

The data collection methods used in this study included ethical standards and confidentiality, description of the respondents, and data gathering procedures.

Ethical Standards and Confidentiality

The data gathering procedure started with an initial invitation letter asking for their willingness to participate in the study. The rationale was explained as capsulized in this statement, "I am a strong advocate of the use of ICT in education and instruction, and I am curious how this technology is applied in the field of physical education especially in MSU-IIT where I came from." Those who were willing were asked to attend the orientation which discussed the data that the researcher will ask from them. The assurance that personal confidential information shall be observed, and pseudonyms shall be used to hide their identity were also mentioned. Together with the invitation letter was an informed consent form for them to sign to indicate their willingness to participate.

During the orientation, the study procedure was explained to them which included the interview sessions, where they were asked to discuss their daily instructional practices, the educational theories that guided them in online teaching, their reflections on online teaching, and their strategies in supporting student learning. They were also asked to allow the researcher to observe their virtual classrooms two times for the duration of the study to allow her to view their teaching practices and subject delivery.

Participants

A total of eight (8) experienced online tertiary PE teachers from MSU-Iligan Institute of Technology served as participants for this study. Pseudonyms have

been used to protect their identity. In selecting the participants, a purposive criterion sampling method was employed. As Creswell (2007) postulates, phenomenological studies are concerned with what all participants have in common as they experience a phenomenon. The PE teachers met the following criteria: a) hold a current, valid teaching certificate; b) be certified to teach physical education; c) have a minimum of two years of experience in online learning; and e) receive two or more years successful teacher evaluations while teaching online.

Jeff. In addition to meeting all the requirements as mentioned above, Jeff holds a Master of Science in Physical Education degree. He specializes in Dance and Sports. At 26 years old, he already has seven (7) years of teaching experience.

Jun-jun. Junjun is 29 years old and holds a master's degree in Physical Education and is highly involved in research activities. He specializes in Dance, Sports, and Health Education. He has been teaching Physical Education for four (4) years.

Larry. Larry holds a Master of Science in Physical Education degree and is heavily involved in extra-curricular activities such as fitness coaching, dance coaching, and sports coaching with fitness and dance as his specializations. He is 35 years old and has eight (8) years of teaching experience.

Cindy. At 44 years old, Cindy holds a degree of Doctor of Education major in Physical Education and has taught both at the undergraduate and master's program in her school. She has taught for twenty (20) years and is presently the chairman of the PE department.

Katrina. At 22 years old, Katrina is the youngest among the participants. She finished an undergraduate course in Bachelor of Secondary Education major in Music, Arts, Physical Education, and Health (MAPEH). She is still finishing a master's degree in PE and has taught for two (2) years making her have the least number of years teaching. She specializes in Dance and Sports.

Kenneth. At 25 years old, Kenneth already holds a Master of Science in Physical Education degree. He specializes in Dance and Sports and has been teaching for four years.

Lyn. Lyn graduated from a sports program in high school and became a varsity player for volleyball in college. At 24 years old, Lyn holds a Master of Science in Physical Education degree. She specializes in Sports, Health Education, and Dance and has been teaching PE for four (4) years.

Becky. At 64 years old, Becky is the oldest among the participants and had the longest experience in teaching PE which is thirty-seven (37) years. She holds a doctoral degree in Education. Unlike the other participants, Becky had already finished a different bachelor's degree, a non-PE course, and already held a non-teaching position when she decided to pursue a teaching

career in PE. She became an Assistant Dean of the College of Education and held several positions as Department Chairman, Graduate School Coordinator, and Assistant Director for Extension. She is highly involved in linkages and occupies key positions in professional organizations.

Data Gathering Procedure

Data collection methods for this qualitative study included: 1) interviews with online PE teachers; 2) virtual classroom observations and field notes; and 3) text messages and e-mail communications between the researcher and the participants. The interviews, which approximately lasted forty minutes were semi-structured to provide a framework and to get specific answers to the research questions. Questions were open-ended to provide room for flexibility (Qu & Dumay, 2011). Within a semi-structured format, the questions did not have to be asked exactly in order. Probing questions and statements followed participants' responses when necessary for clarification and expansion. The interviews took place either in person at the participant's workplace or through SMS or Facebook messenger. Interviews were recorded upon the consent of the participant to check the accuracy of the transcription. A group chat was created among the respondents, researcher, and research aides for easy communication.

Any questions that may not have been asked during the interview sessions due to time constraints were addressed through the more informal setting of email or group chat or even with text messages or SMS. Each interview was transcribed immediately upon completion for fresh recall of the participants' answers, and transcription was done manually. This transcription was then sent to the participant for verification and to solicit their agreement on what was written. Participants were given the freedom to edit the transcriptions. In addition to interviews, the participants' online classroom was visited. This phase of data gathering noted the course syllabus, teacher-developed resource materials such as PowerPoints and videos, assignments, submitted student outputs, and suggested links/references to students.

Discussion

Content and thematic analyses were used to interpret the results of the study. Common themes were identified as they emerged. These included: (1) daily pedagogical practices and class activities and strategies; (2) guiding philosophies in teaching PE online; and (3) reflections.

Pedagogical Practices

Three areas of concern emerged from the interviews supported by visits in the virtual classrooms regarding the pedagogical practices of PE teachers in their online classes. These included a description of their typical day, student support, and class activities.

Typical day. A close look at the daily instructional practices of online PE teachers may be helpful in providing insight about how an online PE class works, and

how an online PE teacher can facilitate student learning virtually. Analysis of the participants' typical day yielded six (6) common practices. This included: (a) waking up early; (b) making a presentable appearance to the students; (c) creating conducive conditions for the virtual classes; (d) doing physical fitness activities; (e) checking email, answering messages, checking Facebook, and replying to students' queries; and (f) checking student outputs.

For a more specific description, let us consider Larry's typical day. Larry wakes up early to prepare for his online classes such as installing a camera and looking for a spot that would provide good lighting. In between classes, he would check emails, answer messages, check Facebook, and reply to students' queries. This took so much of his time, so he devised a way of taking note of frequently asked questions and discussing them in his next virtual meeting.

A typical day for Cindy on the other hand, always started with excitement in meeting her students. As an early riser, she saw to it that everything was in order before class started. This included making herself presentable to the students, preparing her PowerPoint or videos for discussion, and setting conducive conditions such as good lighting and clear audio using a headset. Students are advised to submit their outputs to the MSU-IIT Online Learning Environment (MOLE). For privacy purposes, students download their videos on YouTube then submit the link and post to MOLE.

For Jeff, who was very particular in creating conducive conditions for his classes, he would prepare and check his materials the night before. He would prepare in advance the questions to be asked and saw to it that pre-assessment activities were in place. Part of a conducive learning condition would be a presentable appearance against a plain background and enough space for demonstration purposes.

Checking emails, answering social media messages, checking Facebook, and replying to students' queries also constituted part of the other participants' typical day. As with Kenneth, he would entertain questions until 10:00 at night and make announcements through a group chat created for the class. A big chunk of the participants' typical day was spent checking students' outputs. Checking was done either in between classes or after classes. In consideration of students who might find technical problems in submitting their outputs, Jeff for example would wait to check student outputs two days after the deadline. Some teachers observed weekly post-advisory to those who failed to submit their outputs. Other participants would use the group chat to remind students who failed to submit their requirements.

This is consistent with the findings of Hiloma et al. (2021), who reported that teachers exercised flexibility to be responsive to students' learning needs. Student's difficulties in online classes due to lack of gadgets and poor internet connectivity call for "modification of classroom management strategies to respond to the fluctuating classroom environment". Because the COVID-19 pandemic changed the learning environments of PE classes, teachers needed to modify their pedagogical approaches to respond to the learning limitations that students experience.

Class Activities / Strategies. It was found out that PE teachers utilized a variety of online activities depending on the areas taught. In teaching dance, most of the participants employed demonstration teaching through recorded video prepared by teachers themselves as teachers want to show their mastery to the students and provide personalized teaching. This shows that college teachers were more likely to make course videos for students to watch (Wu, 2021).

In the case of Cindy, after her demonstration, students dance with her. When students mastered the basic steps, they were then required to choreograph their own dance at home. They partnered either with a friend or family member which allowed students not only to be creative but also to bond with their family. Cindy also adopted a simple practice to ensure students acquire creativity through what she called TikTok Dance Challenge with a Twist. This activity further developed students' creativity as they had to perform a TikTok dance trend while also incorporating a story or task such as putting on one's shoes. As Cindy described it, "This activity was both enjoyable to the students and the teacher." To the teacher, it was an affirmation that students learned from her and was therefore gratifying. To the students, it was a manifestation that learning PE and dancing is fun."

In the case of Jeff and Larry, they gave demonstrations using recorded videos as some students had problems with connectivity. After these, students were required to choreograph and execute the dance collaboratively. Several studies conducted before the pandemic reported negative results on collaborative student engagements. This "revealed members' discomfort about interacting with the students whom they did not already know" (Vonderwell, 2003). It was further reported that students expressed a lack of social engagement and hesitated to contact each other.

However, during the pandemic, these negative connotations with online collaborative work changed. Whereas before the pandemic, students had many opportunities for physical contact with other students/friends and were open to other social engagements, the pandemic restricted them from these activities. They were forced to stay at home and felt isolated. Thus, collaborative work done online which required students to edit their presentations, was a welcome opportunity to socialize with classmates. Though "touchless", this activity provided them an opportunity to collaborate and interact reducing the feeling of isolation. As Larry stated, "I want something where they can use pretty much anything they can use. I want them to be creative and get enthusiastic about it and erase the feeling of isolation as the task involved working virtually with the group."

Moreover, Larry created a technique for teaching the basic dance steps using a square board filled with numbers representing footsteps to guide in executing the basic dance steps. This contrasts with the study of Hiloma et al. (2021) who concluded that there was no mention of unique or novel approaches and strategies both for online instruction and assessment which they attributed to the participants' lack of experience in handling online PE prior to the pandemic.

As shown in this case, teachers can be innovative in teaching online. Other teachers showcased excellent outputs to inspire other students and to recognize quality outputs.

Teaching sports online, however, was a different ball game since games cannot be orchestrated like dancing. For example, Lyn was limited in requiring students to submit videos of warm-up exercises. Kenneth devised a way to integrate team sports into e-sports which students played online. This innovation was applied in an interclass tournament where he divided the class into two teams. This was shown on Facebook where students had individual assignments either as players, team leaders, directors, scorers, watchers, or announcers. Students did the planning and implementation of the tournament virtually.

Teaching PE online also enabled teachers to use online applications. They used Padlet and Forum in classroom discussions, used in quizzes, and the Clock Method in teaching badminton. In addition to these online applications, Lyn used video animation to present the sensitive topic of human reproduction. Some teachers used differentiated instruction as an offshoot of their beliefs in multiple intelligences and individual differences. In planning class activities, they saw to it that students' individualities were considered. Katrina said, "I allow my Muslim students to work on different activities that would not go against their cultural and religious practices".

Despite the pandemic, the participants continued their programs and sports activities initiated by students as required in the subjects concerned. Teachers like Becky and Kenneth devised a way to teach team sports by organizing tournaments or competitions. In teaching Sports Management, Becky started by organizing an international webinar on Physical Education and Sports, inviting a speaker from Singapore as part of their faculty exchange program. After the webinar, the students were required to conduct various activities that would allow them to put into practice their knowledge of managing team sports. The class was divided into groups where each group acted as facilitators, and others were in charge of the technical aspects as this activity was done online. The roles of the groups were rotated allowing them to experience all the roles needed in managing a sports competition such as arnis, Laro ng Lahi (native games), and ballroom. Planning various competitions were done by students online. They conducted these different competitions in five high schools. This was considered a hybrid approach since the competitions were conducted in person observing health protocols but other activities starting with the webinar and planning were done online. These activities were recorded and submitted to the teacher as student outputs.

In general, it can be said that teaching PE online enabled teachers to use varied techniques and strategies in teaching which were predominantly internet-based. The activities and strategies used by the PE teachers challenged the creativity of students and developed innovative ways of teaching PE online. Through all of these, they provided student support and facilitated student success. As a result, students became creative independent.

Student Support or Scaffolding. PE teachers extended varied support to their

students. Listening to the interviews, the researcher identified three areas of teacher support. These included communication, consideration, and concern. An important student support is communication between students and teachers and among students themselves. As Roorda et al. (2011) pointed out, "Positive teacher –student connections are associated with higher levels of student involvement, motivation, and academic accomplishment."

Students found the freedom to pose questions via SMS as there were questions that they might have hesitated to ask openly in the presence of their classmates. As Lyn shared, communications between her and her students improved because of the increased use of communication technologies. Aside from providing varied forms of communication, in the case of Kenneth, he observed weekly post-advisory to those who failed to submit their outputs. He entertained questions until 10:00 at night to show support to his students and made announcements through a group chat created for the class. Communication was not limited to student queries but also included reminders from teachers for non-submission of outputs of missing the deadlines. As Howland and Moore (2002) pointed out, communication between students and teachers was a critical issue in internet-based courses.

Another form of student support was giving consideration to students. This came in the form of accepting late submissions, giving extra time to prepare for written exams, and understanding students who had no gadgets therefore submitting poor quality. As for Jeff, he always gave emotional support to students, especially those who were struggling with academic work. He encouraged students to continue schooling despite the challenges they were facing during this pandemic. He gave positive reinforcement or recognition to those who were performing well. Jeff practiced consideration of his students and judged student outputs not so much with the "form" but more of "substance" or content. Jeff admitted "I became more sensitive to my students' needs concerning lack of gadgets and poor connectivity which may cause delays in submission of outputs". He said he had developed empathy with students and saw learning more from the students' viewpoint.

Finally, PE teachers supported their students by helping them develop their potential. Junjun organized student activities to support student learning. As an adviser of a PE student organization, he created a dance group, conducted virtual meetings, and encouraged students to succeed academically. With the pandemic, these activities were done virtually. Meanwhile, Cindy encouraged her students who are good at dancing to join cultural troupes to further hone their talents.

Guiding Philosophies/Theories

Most of the participants such as Larry, Kenneth, Katrina, and Junjun anchored their teaching on Gardner's Multiple Intelligence Theory which led them to individualize instruction and to not be judgmental. Junjun believed that every student has a different gift, not necessarily mental intelligence. Applying this philosophy, he does not judge his students but felt that it was his responsibility to guide his students to develop their gifts. Katrina, also a believer in multiple

intelligences individualized her teaching by using differentiated instruction. Teaching in a multicultural classroom required her to respect her students' cultural diversities. As Katrina shared, "I not only differentiate instruction, but I differentiate what I ask my students to produce to demonstrate understanding. This is critical to challenging students and keeping them engaged."

All the participants believed in Bandura's Social Learning Theory leading them to use demonstration in teaching dance and sports requiring students to observe and imitate. In addition, they made use of Liv Vygotsky's use of scaffolding especially for students who seemed to fall behind. They made use of collaborative learning approach where grouping was heterogeneous to make sure that fast learners and slow learners can benefit from one another.

Jeff believed in experiential learning saying that, "Experience is the best teacher." Kenneth on the other hand was an existentialist. He was student-centered, allowing them to make their own choices in making their outputs. Lyn was a pragmatist. She believed in the practical side of life, stating that "Knowledge and skills in PE should be used for practical applications." This study showed that teachers adopted various theories and philosophies that guided them in the design and implementation of an effective online learning environment. Furthermore, it indicated that PE teachers adopted different theories and beliefs, not relying on one theory alone.

Teachers' Reflections

Teachers' reflections included how they looked at teaching PE online. This included their perceptions on what they thought they needed to know to successfully teach PE online, the challenges encountered in teaching PE online, and their positive experiences while teaching PE online.

Perceptions on teaching PE online. When asked how they viewed teaching PE, their common response was that "teaching PE is a calling and a gift to be shared and celebrated." They considered it a calling because most of them did not initially decide to be PE teachers, but in some ways, they were led to teach PE. They considered it a gift because almost all of them had talent in dancing, cheerleading, and playing sports. Considering their talents as gifts, they became passionate about sharing these gifts with their students. For Katrina, teaching PE was a gift, and this gift was her passion for dancing and sports, particularly in arnis. It was a passion that led her to instill discipline and correct the misbehavior of her students.

Cindy considered teaching as a calling because not everybody is called to teach and not everybody can teach. Similarly, Junjun shared that he considered teaching PE as a calling and that he was called by God to share his talents with his students. Other teachers like Becky and Larry looked at teaching not only as a calling but as a gift in itself as well. Larry was thankful to have chosen teaching PE as it led him to travels, competitions, and even entry to reputable schools which were gifts in themselves too. Becky likewise looked at teaching PE as God's calling because she already finished a non-PE-related degree before she thought of teaching PE. Likewise, she considered it a gift because

through PE she got recognized and appreciated even outside the country.

A calling implies a deep-seated belief that teaching is the only profession that makes sense for one to pursue such as a nudge toward the teaching profession from a former teacher or parent as in the case of Jeff and Lyn who were influenced by their teacher and father respectively. This was because these influencers saw their passion in sports, dancing, and PE-related activities that a simple suggestion made them decide to pursue a career in teaching PE.

Challenges. Transitioning from face-to-face to online learning spawned some barriers for teachers considering that it happened without preparation. In the case of most of the participants, they easily transitioned to online teaching because of their previous training. However, they indicated challenges encountered but these mostly came from the students' end. Some of them did not have gadgets and resorted to borrowing from friends or family members. A similar finding was reported by Baticulon et al. (2020), stating that 1 out of 5 students did not have a computer, and relied on prepaid mobile data for connectivity. Power interruptions, weak infrastructure, and internet costs restricted the students' access to online content. Similarly, Elshami et al. (2021) reported that technical problems led to reduced student satisfaction. This condition prevented teachers from presenting live demonstrations and had to resort to recorded videos.

From the teachers' end, they admitted the difficulty of teaching sports compared to dancing where movements are choreographed. Actions and moves in games were unpredictable. Another challenge in teaching PE online was assessing the individual outputs of students as these came in videos increasing the workload of teachers. For Lyn, this became more complicated when students did not follow deadlines and submitted on the eleventh hour. With the school's pronouncement to be considerate to students during this pandemic, this task became even more difficult.

They find this more overwhelming as the evaluation of the performances did not happen on the spot like in the face-to-face. The respondents in the Hiloma (2021) study shared their sentiments about the seemingly compromised quality in the performance and outputs of some students. Some students fail to accomplish tasks and must be constantly reminded and compelled to submit their outputs. In addition, those who did submit their tasks appeared as if they did not take the task seriously. The respondents found this more challenging unlike in the face-to-face learning setup where students were more proactive in class.

Some teachers resorted to group activity to solve this problem. However, because of the strict implementation of social distancing, students needed to edit their outputs to put together each one's contribution. Though "touchless," this activity provided them an opportunity to collaborate and interact reducing the feeling of isolation.

Though most of the respondents were comfortable with the use of technology in teaching PE, they still felt the need for more training to improve their strategies and techniques in teaching PE online. This is consistent with the study of Jeong and So (2020) whose participants admitted their lack of handling PE online but

proactively sought professional improvement like producing their online class videos and materials.

The COVID-19 pandemic has brought with it challenges for teaching PE online. Nonetheless, teachers will be best served by taking advantage of these extraordinary circumstances, focusing upon the advantages of technology, and using it as an opportunity to enhance teaching online. Furthermore, much of what is effectively taught in the online situation may be further utilized in future blended teaching in the post-COVID-19 era—all of which may allow for timesaving in face-to-face situations and make teaching PE more productive.

Positive Experiences. The majority of the participants enjoined that they were happy to see that their students learned from their online classes as evidenced by the outputs. In the case of Katrina, she reflected that whether students learned or not was primarily her responsibility as a teacher. That is why she was happy to see her students showing evidence of learning.

For Junjun he was happy to know more about his students and their interests. This was shared by Kenneth and Larry who admitted that checking outputs was also enjoyable knowing that students learned from them as evidenced by their progress and sometimes student outputs would have funny moments. All teachers appreciated the fact that students learned on their own, became independent learners, and developed creativity. Larry shared that he liked the challenges online teaching brought as he learned from the experience. It led him to acquire more skills, including learning how to manage time better. Most of the teachers confided that they enjoyed most the opportunity of working at the comfort of their homes.

Lyn liked the easy communication feature of online teaching. Students can easily be reached through the tip of their fingers using mobile phones, internet, and social media.

Limitations

This investigation included limitations related to the sample that should be acknowledged in interpreting the results. First, all the participants taught college PE in a state-owned institution providing the same curriculum and school facilities. By limiting participants who worked in a state university with the same setting and common student populations, the results may not be generalized. Second, this study examined the teachers' experiences, guiding philosophies, and reflections on teaching college PE online. To get a definite sense of their experiences, it would be useful to elicit feedback from their students. Finally, the participants were not interviewed frequently. This study was, however, crafted in response to the unpredictable arrival of the COVID-19 pandemic. To create a timely product, the researcher was forced to work in an expedited manner, limiting the amount of available data.

Conclusions

The aims of this study were to examine the PE teachers' practices, the teaching philosophies that guided them, and their reflections on teaching PE online.

Results indicated that while teaching PE online, participants were challenged to use varied activities and strategies, delved into their teaching philosophies to support their teaching, and reflected on the whole teaching experience itself. Teachers transitioned smoothly to online teaching and provided student support that helped students cope with the transition. It was also essential for teachers to identify alternative strategies to support student learning. It may be concluded that in the process of ensuring the quality of online education, teachers play a key role. Not only because the teacher faces the students directly, but also because more responsibility has been put on the teacher's shoulder. It is the opinion of the researcher that students learn from good teachers regardless of the learning mode. Teachers have the greatest impact on learning, not the mode or delivery of learning.

Results further revealed that the teachers' philosophies and the theories they subscribed to, guided them in choosing strategies and activities they employed in online teaching. This study also unearthed the teachers' reflections on teaching PE online. Results indicated that teachers felt that the challenges were more at the students' end such as lack of gadgets and poor internet connectivity. They experienced difficulties though in assessing student outputs which usually came as videos.

This study has contributed to the literature on online education. It has also provided valuable information from teachers that can serve online students, other PE teachers, and administrators in providing more effective online education. This research can serve as a valuable guide for PE faculty seeking to improve current PE technologies and practices to produce next generation resources for the profession.

This research is instrumental in providing a landscape of challenges, successes, gaps, and barriers encountered by teachers and students as they migrated to online teaching during the pandemic. Regardless of the status of the COVID-19 pandemic or potential pandemics in the future, this study has shown that online teaching is a promising endeavor in a growing digital world.

The experiences of PE teachers as they switched to remote instruction during the onset of COVID-19 yielded important insights into the landscape of physical education. It is the opinion of the researcher, however, that teachers can overcome the barriers presented to them and still produce good learning outcomes. With the right strategies, guided by a sound teaching philosophy, quality online physical education can be ensured. It is comforting to know that PE teachers are willing to embrace an online learning environment. The results of this study supported the premise that college PE can be taught online and is workable in this time of pandemic. The implication of this willingness to use online instruction is a glimmer of hope in the terrible situation that COVID-19 brought about.

Recommendations

From the results of this study, administrators are challenged to support PE teachers through continued professional development. Technological support is needed as teachers adapt to changing technologies as they lead students on a new path towards learning in physical education.

The findings of this study would persuade educational institutions to develop the quality of online teaching by enhancing the assessment of student outputs and providing continuous training to teachers. Thus, PE teachers need to be equipped with the required digital literacy skills and be prepared to teach in environments where students have a great interest and where they can capitalize on their proficiency to excel academically.

It is hoped that the study provides PE teachers with an opportunity to reflect on and assess their current practices. It calls for the physical education community to explore and innovate various ways to enhance student engagement, develop authentic assessment tools, and promote inclusive and relevant PE curriculum. Future partnerships may be explored through national and international linkages with the goal of building a community of learning to improve teaching PE online.

This study has investigated the adoption of online teaching in PE during the COVID-19 outbreak. However, it is confined to a limited number of participants from a sample university. Therefore, similar studies regarding the adoption of online learning in other schools other than a state university may be explored to strengthen the findings and broaden people's understanding of the issue.

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A Conjoint Study and Segmentation on the Preferred Online Learning Attributes of Senior High School Learners

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Abstract

The educational systems have been disrupted due to the COVID-19 pandemic that has resulted in the sudden shift in the instructional implementation from face-to-face to fully online distance learning. This quantitative study examined the learners' socio-demographic characteristics and access to technological resources, preferred online learning attributes, and their segmentation. The study employed a descriptive and exploratory research design. Using Cochran's formula and disproportionate stratified random sampling technique, 300 senior high school learners were identified as respondents of the study. Five online learning attributes consisting of delivery type, lecture, learning tasks, learning materials, and assessment methods were analyzed through the orthogonal plan component of SPSS 22.0. Respondents voluntarily answered 16 profiles with 2 holdouts generated by the orthogonal design using an online 5-point Likert scale. The conjoint analysis revealed that learners' most preferred online learning attributes were assessment methods using multiple-choice and multiple types of exams; synchronous online lectures with slides as the delivery type; individual tasks; and learning materials utilizing visual aids. Further analysis revealed that learners, considering their preferences and profiles, could be classified into two segments based on grade level. Grade 12 learners comprised segment one, and Grade 11 dominated segment two. The results provide insights for academic institutions that learners in different grade levels differ in their learning preferences in an online setup and to reconsider the appropriate pedagogical activities to be utilized in an online learning setup to ensure educational advantage. Therefore, it would be ideal to redesign the curricula and innovate pedagogical approaches based on learners' preferences and segmentation (grade level) to leverage learning in online education.

Keywords: *distance learning, e-learning Philippines, online teaching and learning, remote teaching and learning*

Introduction

The global health crisis has impeded the educational systems of academic institutions worldwide. On short notice, academic institutions were compelled to experiment and adopt novel methods and strategies of instructional delivery as countermeasures to mitigate the predicaments brought by the pandemic. To

ensure that the educational system continues despite the crisis, new instructional policies and procedures tailored to the new educational setup were crafted and implemented. Primarily, academic institutions have shifted from conventional face-to-face to fully online learning as the mode of instructional delivery. This abrupt paradigm shift in the educational landscape makes learning even more challenging, especially in developing countries (Muthuprasad et al., 2021).

Suliman et al. (2021) viewed online learning as an instructional modality in which the teacher serves as the facilitator and actively engages learners using various technology-based instructional materials that can be accessed despite the geographical separation of the teacher and the learner. In this type of learning modality, the internet mediates the learner-teacher and learner-to-learner interactions through either synchronous or asynchronous sessions. Synchronous sessions require both teachers and learners to have a reliable internet connection so that they can interact in real-time using a learning management system or other online-related learning platforms. In contrast, asynchronous sessions do not necessarily require both the teachers and learners to access the online platform simultaneously. Using a technology-based platform, the teacher provides learning tasks that learners can access and work on anytime (Chen et al., 2021; Suliman et al., 2021).

There is a consensus in the literature on the advantages of online learning that include easy access to information, ease in creating and updating teaching and learning materials, accountability in the teaching-learning process, cost-effectiveness, and enhancement of learners' motivation, among others (Cano, 2022; Wart et al., 2020). It has been reported that online learning can strengthen learners' concept attainment (Batucan et al., 2022); hence, it is occasionally utilized in science education in the form of computer simulations to motivate learners to learn complex concepts (Cano et al., 2022). Likewise, various scientific reports also revealed that learners in the online learning setup showed higher motivation levels and academic performance (Aelterman et al., 2019; Pham et al., 2019; Ruzek & Schenke, 2019). A systematic meta-analytic review by Woldeab et al. (2020) suggests that online learning shows equivalency or even superiority to traditional face-to-face.

On the contrary, despite the advantages proffered by online learning in education, it still draws negative feedback from the academic community (Barrot, 2021; Suliman et al., 2021). Its efficiency and cost-effectiveness have been put into question by some stakeholders. More so, the sudden shift in the adoption of online learning caused even more drawbacks among the stakeholders due to the emergence of different technological, instructional, financial, and even psychological challenges (Baticulon et al., 2021). Likewise, the full implementation of online learning on short notice exposes the severe conditions of the digital divide in remote areas of developing countries (Batucan et al., 2022). There are also many reports on the prevalence of slow or unstable internet connection, insufficient teaching and learning resources, and ineffective online interaction in low and even in middle-income countries (Baticulon et al., 2021; Muthuprasad et al., 2021). Batucan et al. (2022) emphasized that internet connectivity issues, lack of sufficient engagement and interaction between

learners and teachers, and ineffective utilization of technology were the usual barriers in the online learning environment. Accordingly, Woldeab et al. (2020) reported that the adaptability of the teachers and the learner in online education remains a significant gap in an online learning setup. Without proper mitigation, these issues may negatively impact learning in online education.

To address the challenges mentioned above and to leverage learning in the online environment, a consensus in the literature suggests that the learners' preferences must be considered (Muthuprasad et al., 2021; Ong et al., 2021). Preference is a critical factor in the learners' academic performance because it allows them to be engaged and better process the concepts discussed in the most preferred way (Chen et al., 2021). Likewise, identifying the learners' preferences can help teachers develop and design effective and efficient innovative pedagogical approaches that meet the expectations and needs of the learners (Kuzmanovic et al., 2019; Muthuprasad et al., 2021). Furthermore, a study among medical science learners revealed that most of them experienced burden and burnout in the online learning setup (Baticulon et al., 2021). The reasons cited by the learners were difficulty in achieving the educational outcomes of clinical courses due to a lack of social and technological support to manage online learning and the utilization of pedagogical approaches that do not meet their needs. In the study of Muthuprasad et al. (2021) among college agriculture learners in India, learners preferred structured online learning with recorded sessions and assessments after class; however, slow internet connection was the most common problem identified. Internet connection was regarded as one of the critical factors in the learners' preferences and coping mechanisms in online education (Baticulon et al., 2021). Accordingly, Cano et al. (2022) posited that learners' preferences are greatly influenced by their positive perception of easy access to technology. More so, literature reported that utilizing instructional materials based on learners' preferences is an effective measure in bridging educational gaps in online learning (Debattista, 2018; Kuzmanovic et al., 2019).

According to Kuzmanovic et al., (2019), conjoint analysis is commonly utilized in examining preferences. Conjoint analysis is a multivariate statistical technique that is widely used as a market research tool for measuring and analyzing the value that consumers place on features of a product, service, or idea (Hair et al., 2010). It is based on the assumption that the decisions on the features of a certain product, service, or idea are based on several factors that must be considered 'jointly'; hence, the term conjoint. On that note, using conjoint analysis, investigators could easily examine the interrelationship of the different factors as they contribute to the general preferences. Nowadays, the technique has been further applied to understand preferences in various services such as transportation (Kowalska-Pyzalska et al., 2022), retail (Payini et al., 2022), telecommunication (Shin et al., 2011), and health care (Al-Omari et al., 2022; Shammas et al., 2022). More so, the conjoint analysis approach has been applied in making decisions in selecting new personnel by the human resource professionals (Ramantswana et al., 2021), as well as in evaluating teaching performance (Bacon et al., 2016).

Despite the wide utilization of conjoint analysis in the different fields, literature revealed that only a handful of studies had utilized conjoint analysis in the context of education. For instance, Longva et al. (2020) examined the impact of entrepreneurship education using business planning courses on the career intentions and preferences of college learners in Norway; Macindo et al. (2019) explored the experiential learning preferences of student nurses in terms of acute and critical care; Azarcon et al. (2014) attempted to determine the decision-making process of the college learners related to retention and attrition; and Kuzmanovic et al. (2019) designed an e-learning environment that is tailored to the preferences of college learners in Serbia. It can be noted that the studies identified have employed the conjoint analysis approach to examine and explore learners' preferences at higher education levels, specifically during the pre-pandemic periods. Although Ong et al. (2022) conducted a scientific study on the preference analysis of the online learning attributes among senior high school learners during the COVID-19 pandemic, the segmentation of the learners was the limitation of the study.

Like conjoint analysis, segmentation is occasionally utilized as a marketing tool. Martin (2011) defined segmentation as a process of classifying consumers based on their related needs and purchasing behavior pattern. He added that segmenting consumers allows businesses to be more targeted in marketing their products or services. If segmentation is done effectively, it could help organizations to achieve the highest return on investment. He emphasized that if any organization markets its products or services, it should focus on segmenting its consumers. On that note, if segmentation is applied in the educational context, the utilization of instructional strategies and computer systems would be more specific and targeted to the needs and preferences of a particular group of learners. Thus, the instructional outcomes could be effectively channeled to the learners in the online learning environment. It has already been emphasized in the literature review that learners' academic performance, motivation, satisfaction, and even their retention in a particular academic institution in the online learning setup are significantly affected by their perceived preferences. Hence, educational institutions must acknowledge the preferences of their learners and take necessary actions to take advantage of them (e.g., redesigning course curricula based on learners' preferences) to leverage learning in online education.

The results of this study can be applied as take-off points for educational institutions that offer K-12 programs to adjust and redesign their curricula and innovate pedagogical approaches based on learners' preferences to maximize learning in the online environment. Furthermore, the conjoint analysis of the preferred online learning attributes and the segmentation of the learners can serve as models and baselines for future studies to further evaluate the effectiveness of the results in different contexts globally.

Since online learning is multi-attributed, this posed a limitation in the study. More so, Kuzmanovic et al. (2019) posited that the number of levels per attribute in a conjoint analysis is usually limited to 2 to 4 levels. To address these limitations, the researcher only included learner-relevant online learning

attributes that any educational institution can manage. Furthermore, the online learning attribute levels considered in this study were ensured to be adequate, credible, and capable of being traded off against each other (Kuzmanovic et al., 2019). Hence, five attributes of interest were defined based on the previous research (Kuzmanovic et al., 2019; Muthuprasad et al., 2021; Ong et al., 2021), online learning models and frameworks (Anderson, 2013; Garrison et al., 2004; Laurillard, 2013), and the researcher's experience in teaching in the online learning setup. Specifically, the online learning attributes considered were the delivery type, lecture, learning tasks, learning materials, and assessment methods. More so, this study is only within the context of the K-12 program (senior high school) and does not measure learners' perceptions of the online learning setup.

The dearth of literature that examines and explores preferences and segmentation of learners in the K-12 program in a fully online learning setup amidst the COVID-19 periods prompted the researcher to conduct this study.

Objectives

This study aimed to examine the preferences of learners in an online learning setup and explored their segmentation – primarily focusing on senior high school learners. Specifically, this study sought to answer the following research questions:

1. What are the learners' profiles in terms of socio-demographic characteristics and access to technological resources?
2. What are the preferred online learning attributes of the learners?
3. How should the learners be segmented?

Review of Related Studies

Online Learning Models and Frameworks

Different learning models and frameworks suggest different conceptualizations of how learners learn in the context of online learning. The conversational framework by Diana Laurillard described the learning process as an 'iterative' dialogue that is discursive, adaptive, interactive, and reflective (Laurillard, 2013). The framework highlights the process of how both the teacher and the learners are able to access each other's understanding of the content; adapt to their respective tasks, with the teacher setting up the environment for the learners and how they are adapting to the established learning setup; do the learning tasks through the plan-do-check-feedback cycle of interaction; and be reflective as they interact with one another for the refinement and confirmation of the acquired topic goals. This process primarily occurs on two levels: discursive and experiential level. At the discursive level, the learning process occurs through a dialogue between the teacher and the learner. It is where the teacher and the learners exchange and negotiate ideas with one another. While at the experiential level, both the teacher and the learners are adaptive to their tasks and reflective as they interact, especially on the things that transpire during the discursive level. This gives the insight that to maximize the learning process,

the teaching and learning environment must have task goals or outcomes, promotes learner initiative and an effective feedbacking system, and gives an avenue for adaptive and reflective learning (Laurillard, 2013; Picciano, 2017).

Meanwhile, the Community of Inquiry (CoI) model describes the learning experience as the establishment of community through the three elements: social presence, teaching presence, and cognitive presence (Nolan-Grant, 2019). Social presence refers to the ability of the learners to project themselves as 'real' individuals that possess social and emotional qualities in the technology-mediated environment. Teaching presence refers to the designing, facilitating, and guiding of the cognitive and social aspects of the learners by the teachers with the goal of achieving personally meaningful and educationally valuable learning outcomes. On the other hand, cognitive presence is the extent to which the learners are able to construct ideas and validate them through reflection dialogue which is regarded as the widely accepted goal of academic institutions (Shepherd et al., 2022; Wertz, 2022).

According to Picciano (2017), the CoI model is anchored on the 'transactional' point of view, where an educational experience of the learners is viewed as having the dual purpose of enabling their personal construction of meaning and being reinforced by collaboration within a community of learners for the refinement and confirmation of the acquired concepts. Since the CoI model was developed based on research on the distinguishing characteristics of computer-mediated communication, i.e., computer conferencing applications, the preferences of learners and their needs, institutional support, and curricular approaches must be taken into consideration (Rivera-Vargas et al., 2021). For instance, Garrison et al. (2004) posited that there is a difference in the learners' preferences for the type of learning delivery (synchronous and asynchronous), and the cost of supporting the acquisition of technology-based paraphernalia is undeniably expensive (Garrison et al., 2004; Rivera-Vargas et al., 2021). Wertz (2022) suggests that since the levels of interactivity are challenging to prescribe and assess in the online setup, academic institutions should devise strategic methods to ensure that the types of interactions are addressed using various types of technologies.

Moreover, these issues enabled Anderson (2013) to develop the model of online learning that integrates flexibility, self-directed learning, and participation in the learning environment. In this model, Anderson (2013) addressed two approaches in online learning: collaborative learning in a community of inquiry and independent learning using structured learning resources. In the collaborative learning approach, the utilization of asynchronous and synchronous delivery types as means of communication primarily promotes the learner-learner, learner-content, and learner-teacher interactions. Meanwhile, in the independent learning approach, the prominent type of interaction is the learner-content. Likewise, the teacher-learner interaction is possible through the intervention of the content, while the learner-learner interaction is possible through the interaction of the learners with their family members, relatives, and peers, including those whom they might meet in the online environment. Anderson (2013) posited that academic institutions that would like to use this model should consider the curriculum, nature, preferences, and needs of the

learners, among others.

Online Learning Attributes

The online learning modality has many attributes that must be considered to leverage learners' learning. It has been emphasized in the different online learning models and frameworks the salient components of online learning that must be considered to maximize its purpose in the teaching-learning process, such as the appropriateness of online instructional designs to the needs and preferences of the learners, effective and efficient technology integration in discourse, and institutional support. Likewise, Kuzmanovic et al. (2019) reiterated that the online learning attributes that must be utilized are those that are learner-relevant and can easily be managed by any educational institution, and the attribute levels must be credible, effective, and capable of being traded off against each other.

Online learning may be delivered in different types: synchronous, asynchronous, or mixed (Ong et al., 2021). In the synchronous delivery, there is a real-time teaching-learning engagement between the teacher and the learners where they go online at a specified time despite the differences in their geography using a learning management system or other online related learning platforms. In this type of online learning delivery, the teacher gives a live lecture, and the learners learn directly from the teacher, interact, and give feedback in real-time. On the other hand, the asynchronous type of delivery is when the teacher and the learners do not necessarily access the online platform simultaneously. The teacher provides learning tasks that learners can access and work on anytime. Moreover, interaction and giving of feedback are not in real-time. The teacher can upload pre-recorded video lectures through online learning platforms so that learners can watch them at the most convenient time and space (Lee et al., 2021).

Meanwhile, in the mixed delivery type, the teacher gives a live online lecture to the learners while it is being recorded. The recorded videos can be uploaded to online learning platforms for the learners to access and review (Aghababaeian et al., 2019). Lapitan et al. (2021) posited that one of the advantages of the mixed delivery type is that learners with unstable internet connections can still review the lecture recording after their internet connections become stable.

When it comes to learning experiences, Cano et al. (2022) emphasized that learners tend to be motivated to learn and acquire better concept attainment through experiential online learning activities. The hands-on activities in an online environment strengthen the concept attainment of the learners of the topic goals. However, the preferences of the learners in doing online activities are found to be dependent on whether they would be engaged individually or collaborate with their peers (Chandna et al., 2021; Dobao, 2012). Correspondingly, designing appropriate instructional materials by the teachers in an online learning environment has been acknowledged as an effective measure for bridging educational gaps since it intensifies interactions among the teacher, learner, and the content (Kuzmanovic et al., 2019; Muthuprasad et al., 2021).

Furthermore, the assessment method is one of the critical components of the teaching and learning processes, especially in an online learning setup. Primarily, the different assessment methods employed by the teachers are in the form of multiple-choice exams, essays, and conference papers. A multiple-choice type of exam is an assessment technique that presents a question or statement and provides options with the correct answer (Butler, 2018). Meanwhile, an essay exam requires learners to justify by writing a given scenario or problem to measure learners' learning (Mingo et al., 2018). The conference paper requires learners to write an academic paper with content related to a certain topic. These assessment methods are primarily based on the paper's soundness and the content's constructs.

Learner-Related Online Learning Factors

Traditional face-to-face education often assumes a great deal about the characteristics and learning styles of the learners (Messina et al., 2022). Similarly, in online distance learning, these learner-related factors must be taken into consideration, especially in designing instructional materials, using media for instruction, designing, and evaluating interaction, evaluation, and feedback mechanisms, among others (Anderson, 2013; Laurillard, 2013; Wertz, 2022). However, due to the transactional distance posed by the online learning setup, it is even more challenging for teachers to factoring learner characteristics, learning styles, and approaches (Muthuprasad et al., 2021).

Since online learning dramatically depends on technology-based instructional modes of delivery, thus it is centered on the concern for access (Dhawan, 2020). Despite the initiatives of the different government agencies in broadening the reach of online learning to all the learners across different contexts, the access to technology by the learners simultaneously facilitates and constrains the purpose. Moreover, learner autonomy is one learner-related factor that must be considered in the online distance learning modality. Learner autonomy is regarded as the core of several online learning theories, such as the theory of independent study by Charles Wedemeyer, the theory of transactional distance by Michael Moore, and the theory of guided didactic conversation by Borje Holmberg (Dobao, 2012; Garrison & Arbaugh, 2007; Moore & Diehl, 2018). In the transactional distance theory, Moore and Diehl (2018) posited that separating the teachers and the learners creates a communicative and psychological gap called transactional distance. This gap must be addressed in online distance learning, for it can be a possible avenue for misunderstanding between the teacher and learners in the teaching-learning process. Therefore, in any given context of online learning, it is crucial to design learning activities that would promote self-directed learning (Garrison & Arbaugh, 2007; Moore & Diehl, 2018). These self-directed learning activities allow learners to become independent and learn the topic by themselves as they engage with the appropriate learning materials. More so, they help the learners better attain the concepts shared during the class interactions.

On that note, it is, therefore, imperative to design learning activities that promote interaction in every learning situation. According to Dobao (2012), interaction is a specific and essential component of the educational process

since it enhances learner motivation and academic performance. Moore and Diehl (2018) classified interaction into three major types that are particularly effective in creating online learning instructional materials, which are also seminal components of different online learning models and frameworks: the learner-content, learner-learner, and learner-teacher interaction. In the learner-content interaction, the learning materials play an important role. In this type of interaction, the learning materials are designed according to the principles of guided didactic conversation. Correspondingly, in the learner-teacher interaction, the learners receive feedback from the teachers on how well they are learning. Meanwhile, in the learner-learner interaction, the learners are engaged in social interaction with their peers, which increases motivation and social construction of knowledge.

Segmentation

In the fields of business and management, understanding people's behavior based on different aspects is one of the important considerations to fully understand how the markets work (Martin, 2011). Hence, business organizations occasionally segment people based on their needs and purchasing behavior pattern. According to Sahu and Barman (2021), the primary reason for examining the preferences is to provide a concrete basis for effective segmentation for firms to come up with sound marketing plans, strategies, and decisions (Martin, 2011).

Segmentation is the process of grouping people in the market based on their related needs, preferences, or purchasing behavior pattern (Martin, 2011). Using segmentation, any organization can easily and effectively satisfy their customers and achieve a higher investment return since time and resources are allocated and focused on particular groups of people (Sahu & Barman, 2021). According to Martin (2011), effective segmentation should be based on three primary levels: consumers' personal characteristics, desired benefits, and behavior. The personal characteristics involve the consumers' socio and psycho-demographics. The demographics are occasionally utilized as they can provide a good overview of what kind of consumers are dominant in every segment, and firms can easily target these segments. However, according to Martin (2011), the limitation of this method is that, more often than not, it shows no good correlation between personal characteristics and what the consumers want to purchase. In addition to descriptive demographics, one way to understand and analyze consumers' information is through psychographics which attempts to classify consumers based on the combination of their values and resources (Sahu & Barman, 2021). The second level, desired benefits, is segmenting people based on their wants rather than who they are. Utilizing segmentation based on desired benefits is more challenging since businesses need to understand and analyze each product category thoroughly. However, using this type of segmentation level can make the products, services, or ideas match more closely to a particular group of people's specific wants. The third level is segmentation based on consumer behavior. Since consumers have the tendency to switch from their preferred choice to other deals and promos, this segmentation level aims to entice many consumers as possible to switch to the firm's products, services, or ideas by giving them incentives (Martin, 2011).

If learners are seen as customers, segmenting them into specific groups would be beneficial for it can promote satisfaction; hence, learning outcomes could easily and effectively be achieved in the online learning environment despite the transactional distance (Elshami et al., 2022; Ong et al., 2022).

Conceptual Framework of the Study

This study examined learners' preferred online learning attributes and their segmentation in a fully online learning setup amidst the COVID-19 pandemic. To address this goal, the conceptual framework shown in Figure 1 was defined and employed in the study.

Figure 1

Conceptual Framework of the Study
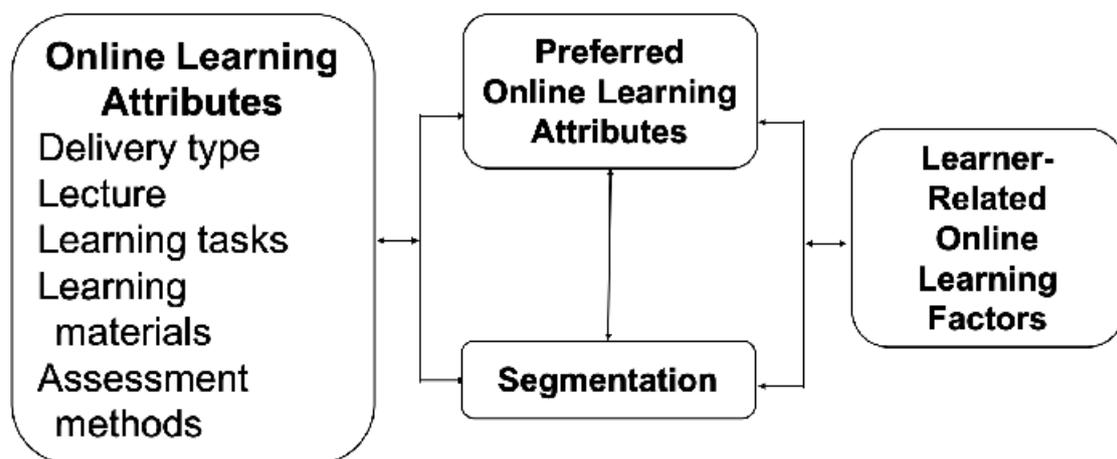
The researcher only considered learner-relevant online learning attributes, which can be easily managed by any educational institution that offers a K-12 program. Likewise, the levels of online learning taken into account in this study were ensured to be adequate, credible, and capable of being traded off against each other (Kuzmanovic et al., 2019). On that note, five attributes of interest were analyzed and defined based on the literature review, online learning models and frameworks, and the researcher's experience in teaching in the online learning setup. Specifically, these attributes were the delivery type, lecture, learning tasks, learning materials, and assessment methods (Figure 1).

The different online learning models and frameworks suggest that online learning is a complex process that demands the interrelated integration of technology, knowledge of content, context, and pedagogy that are based on the needs and preferences of the learners (Anderson, 2013; Laurillard, 2013). The delivery type and lecture are attributes that are predominantly salient components of discourse and pedagogy in the conversational framework (Laurillard, 2013), the community of inquiry model (Garrison et al., 2004), and Anderson's online learning model (Anderson, 2013). Meanwhile, the learning tasks and materials are important aspects of the collaborative and independent learning approaches in Anderson's online learning model, while the assessment methods serve as a

vital component in the teaching-learning process that measure the effectiveness of teaching pedagogies employed by the teachers and the learners' level of knowledge of content acquisition.

The identified online learning attributes were used to determine the learners' preferences and their segmentation. This study is primarily anchored on the idea that the learners' higher concept attainment and academic performance in the online learning setup could be justified by their preferences (Baturay & Yukselturk, 2015; Khanal et al., 2019; Muthuprasad et al., 2021; Pham et al., 2019). More so, the researcher hypothesized that the maximization of online learning could be more effectively and efficiently achieved if the learners are segmented based on their shared, preferred online learning attributes since both the time and resources in the teaching-learning process are allocated to a focused group of learners (Martin, 2011).

However, different learner-related online factors such as access to technology, autonomy, and interaction were reported to have a significant effect on learners' perceived preferences in online education (Dhawan, 2020). For instance, Moore and Diehl (2018) posited that the perception of the learners in an online setup was significantly affected by their limited access to technological resources since it can result in a misunderstanding between the teacher and learners' inputs and outputs due to transactional distance.

Methodology

Research Design

This study employed descriptive and exploratory research designs to obtain the necessary information to generate conclusive insights on learners' preferred online learning attributes and their segmentation. More specifically, it utilized a quantitative approach using multivariate techniques such as conjoint analysis to examine the learners' preferred online learning attributes and cluster analysis to segment them based on their preferred online attributes. Cluster analysis is a technique used to group variables into clusters based on the observed similarities in values for each variable (Sinharay, 2010). In this study, the researcher looked into the socio-demographics and access to the technological resources of the 300 senior high school learners to better understand the reasons for their preferences in the online learning setup. The focus, therefore, is not the individual preferences of the learners but their aggregated preferred online learning attributes. The aggregated preferences of the learners were used to segment them. Since this study utilized multivariate tools (conjoint and cluster analysis), the data gathered were multi-cross-sectionally analyzed — i.e., data from the respondents on their preferred online learning attributes were examined, and patterns were identified and analyzed.

Respondents of the Study

The senior high school learners of the Notre Dame of Marbel University-Senior High School Department (NDMU-IBED SHS) were the respondents of the study. NDMU-IBED SHS is a Catholic academic institution that is managed by

the Marist Brothers and located in Koronadal City, South Cotabato, Philippines. Being the academic institution in Koronadal City with the highest number of K-12 online learners, it was chosen as the locale of the study.

Out of 1078 senior high school learners, 300 learners comprised the sample size of the study. The sample size was defined using Cochran's formula with a margin of error of 95%, level of confidence of 5% (0.05), and maximum data variability of 0.25. According to Kuzmanovic et al. (2019), an ideal 200-300 completed surveys are needed to perform the conjoint analysis; however, it could go down to 100 completed surveys if the sample size is small.

In order to ensure that the respondents can provide the necessary information needed to address the research questions of the study and to avoid any form of biases, the following inclusion criteria were employed (Ong et al., 2022): 1. a senior high school enrolled in the 2nd Semester of the school year 2021-2022, 2. of any age with no gender restrictions, and 3. officially enrolled in the online distance learning modality.

Sampling Technique

The respondents were selected using the disproportionate stratified random sampling technique. It is a type of random sampling procedure wherein the number of samples per stratum is not proportional to the total population; hence, equal allocations of the number of samples per stratum were performed (Hair et al., 2010). Due to the restrictions and health protocols brought by the COVID-19 pandemic, the researcher administered the survey questionnaire online using Google forms. Sethuraman et al. (2005) posited that the online distribution of the survey questionnaire is adequate and does not affect the survey result when using conjoint analysis.

A total of 300 respondents, or 50 respondents per strand in every grade level, were considered in the study. The actual list and number of the population were requested from the Record Section of the school through transmittal letters. The population was divided into six (6) strata with 50 respondents each (disproportionate stratification). The respondents in every stratum were identified randomly using a computer program. This was done to ensure that every learner had the chance to be selected as a respondent.

Research Instrument

A survey questionnaire was utilized as a research instrument in the study. The questionnaire was comprised of two major parts. The first part was about the respondents' socio-demographic profile and access to technological resources. Meanwhile, the second part was about the questionnaire proper with 18 profiles. The profiles refer to the combination of the different online learning attributes considered in this study. The profiles were generated through orthogonal design using SPSS 22.0 to determine the efficient combination of the online attributes. The profiles were comprised of delivery type, lecture, learning task, learning materials, and assessment methods. A 5-point Likert scale was utilized to evaluate the profiles, with the value 1 being the least preferred and 5 being

the most preferred.

Data Collection Procedure

The data gathering procedure employed in this study was primarily divided into three (3) phases: (1) preparation phase, (2) research implementation phase, and (3) the final phase, as shown in Figure 2.

Figure 2

Operational Framework of the Study
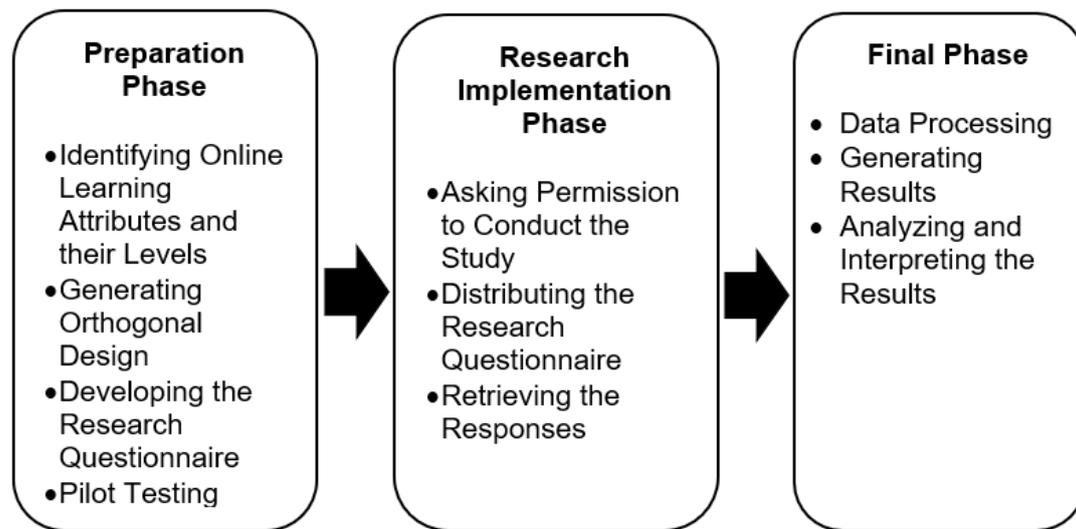
Preparation Phase

The different key online learning attributes and their levels were identified through reading and analyzing literature, online learning models, and frameworks. Learner-relevant online learning attributes to the learners with 2-4 levels that are adequate, credible, and capable of being traded off against each other (Kuzmanovic et al., 2019) were considered in the study. Table 1 shows the different online learning attributes and their levels.

Table 1

Online Learning Attributes and their Levels

Online Attributes	Levels
Delivery Type	Synchronous
	Asynchronous
	Mix (Synchronous and Asynchronous)
Lecture	Recorded lecture with slides
	Live online lecture with slides
Learning Tasks	Individual tasks
	Group tasks

Learning Materials	Reading materials
	Video materials
	Visual aids (pictures, charts, graphs)
	Hands-on learning materials
Assessment Methods	Multiple choice exam
	Essay exam
	Multiple types of exam
	Conference paper

The identified key online learning attributes and their levels were subjected to SPSS 22.0 using the orthogonal plan component to generate the orthogonal design with16 profiles. Two (2) holdouts were added and utilized to ensure internal consistency among the respondents' responses (Kuzmanović et al., 2019). A total of 18 profiles comprised the second part of the questionnaire generated from the orthogonal design to represent each combination of the online learning attributes to determine the learners' preferences.

Prior to the conduct of the study, a pilot test of the questionnaire was done among 30 respondents who were selected through purposive sampling. The pilot test result registered a Pearson's R correlation of 0.956, close to the cut-off value of 1.00, implying that the generated orthogonal design has high goodness of fit (Hair et al., 2010).

Research Implementation Stage

Permission was sought from the School Director and Principal prior to the conduct of the study. With the approval, the researcher commenced the gathering of the data. The link to the questionnaire, in Google form, was sent to the identified respondents through the learning management platform of the school. The respondents were asked to fill out the informed consent form before answering the survey. A 5-point Likert scale was utilized to evaluate the 18 profiles. The responses of the respondents were retrieved through the Google form.

Final Stage

The gathered data were processed, analyzed, and interpreted to gain insights into the preferred online learning attributes of the learners. Furthermore, the part-worth utilities and importance scores of the attributes were determined, analyzed, and interpreted. The Kendall's Tau value was utilized to measure the questionnaire's internal consistency. According to Hair et al. (2010), the questionnaire must have a Kendall's Tau value of greater than 0.70 and closer to 1.00 to be considered acceptable with internal consistency. The results of the analyzed part-worth utilities of the attributes were further utilized for segmentation.

Statistical Treatment of Data

The respondents' socio-demographic profile and access to technological resources were analyzed and interpreted using frequency and percentage. Meanwhile, the results on the preferred online learning attributes were analyzed using conjoint analysis. To interpret the results generated by the conjoint analysis, the part-worth utility model was utilized (Kuzmanović et al., 2019). This model presumes that the sum of the partial utilities in a particular profile is equal to the total utility of that profile. Likewise, cluster analysis was utilized to segment learners with similar preferences. The similarity of learners' preferences was measured using the Euclidean distance. Once the similarity measure had been derived, segments (clusters) were formed using the hierarchical clustering method. The clusters were then validated by cross-tabulation using the Ward's method and the number of clusters considered was determined based on the number of respondents per cluster. Clusters with less than 20% of respondents were considered not desirable (Kuzmanović et al., 2019). The clusters generated were profiled and labeled using the extraction method based on their significant difference in terms of their socio-demographics, educational information, and access to technological resources using the chi-square test at 0.05 level of significance. The researcher utilized SPSS 22.0 to perform the conjoint analysis, cluster analysis, and chi-square test.

Ethical Consideration

This study was conducted based on the established protocols. Before conducting the study, the researcher informed the respondents that their participation was voluntary and confidential. Only the respondents who agreed and signed the informed consent form were allowed to participate in the study.

Results

Socio-Demographics and Access to Technological Resources

This study sought to determine the respondents' socio-demographic characteristics and access to technological resources. The frequency and percentage of the variables were computed and analyzed. Table 2 shows the socio-demographic and access to technological resources of the respondents.

Table 2

Respondents' Socio-Demographic Characteristics and Access to Technological Resources (n=300)

Socio-Demographic Variables		Frequency	Percentage
Gender	Male	109	36.3
	Female	180	60.0
	Non-binary	6	2.0
	Prefer not to say	5	1.7

Family's Total Annual Income	Low-income	217	72.3
	Lower-middle income	70	23.3
	Upper-Middle Income	12	4.0
	High Income	1	0.3
			Mean ± SD
Age			17.21 ± 0.864

Access to Technological Resource Variables			
Device Ownership	Smartphone	249	83.0
	Laptop computer	225	75.0
	Desktop computer	64	21.3
	iPad or Tablet	22	7.3
Internet Access	Do not have Internet access and have to go somewhere else	5	1.7
	Prepaid mobile data	53	17.7
	Postpaid subscription service (Connection is slow and/or unreliable)	174	58.0
	Postpaid subscription service (Connection is fast and reliable)	68	22.7

Based on Table 2, females (n=180, 60.0%) outnumbered males (n=109, 36.3%), while there were 6 (2.0%) respondents who identified as non-binary, and 5 (1.7%) who preferred not to disclose their gender identity. The mean age was 17.21 ± 0.864 years. Most respondents belonged to the low-income (n=217, 72.3%) bracket.

Regarding access to technological resources (Table 2), most respondents (n=249, 83.0%) had a smartphone. Accordingly, 225 (75%) had a laptop computer, 64 (21.3%) had a desktop computer, and 22 (7.3%) had an iPad or tablet. Most respondents subscribed to postpaid internet service (n=242, 80.7%); however, 175 (58%) of the respondents stated that they have slow and/ or unreliable internet connection. Furthermore, 53 (17.7%) respondents access the internet through prepaid mobile data. Meanwhile, 5 (1.7%) respondents do not have internet access and have to go somewhere else to connect to the internet.

The limitations on internet infrastructures is a common problem in low-income countries such as lack, slow, and unreliable internet connectivity and devices (Baticulon et al., 2021), and the situation was reported to be even worse in remote areas (Muthuprasad et al., 2021). According to Muthuprasad et al. (2021), the digital divide and the lack of access to reliable internet connectivity posed serious constraints among learners in the online learning setup. These give the insights that if any country and academic institutions want to move forward in online education, they should prioritize the establishment of internet facilities and should utilize online learning applications that can be accessed through smartphones and laptops.

Preferred Online Learning Attributes

This study also sought to determine the learners' preferred online learning

attributes. The different part-worth utilities and importance scores of the online learning attributes are shown in Table 3. The higher the part-worth utility value implies a higher preference toward the attribute level. Likewise, the higher the averaged importance score indicates a stronger attribute preference by the learners. The values generated by the conjoint analysis were used to generate patterns for the most and least valued online learning attributes and levels (Kuzmanović et al., 2019).

Table 3

Part-worth Utilities and Importance Scores of Online Learning Attributes

Attributes	Levels	Part-worth Utilities	Std. Error	Averaged Importance Scores
Delivery Type	Synchronous (S)	0.066	0.026	20.056
	Asynchronous (A)	-0.075	0.030	
	Mix (Synchronous and Asynchronous) (M)	0.009	0.030	
Lecture	Recorded lecture with slides (RLS)	-0.032	0.019	11.263
	Live online lecture with slides (LLS)	0.032	0.019	
Learning Tasks	Individual tasks (IT)	0.062	0.019	11.432
	Group tasks (GT)	-0.062	0.019	
Learning Materials	Reading Materials (RM)	0.016	0.034	24.790
	Video Materials (VM)	-0.044	0.034	
	Visual aids (pictures, charts, graphs) (VA)	0.034	0.034	
	Hands-on learning materials (HLM)	-0.007	0.034	
Assessment Methods	Multiple Choice Exam (MC)	0.122	0.034	30.536
	Essay Exam (E)	-0.119	0.034	
	Multiple types of Exam (MT)	0.122	0.034	
	Conference Paper (CP)	-0.125	0.034	
Constant		3.612	0.020	

Table 4

Correlations

	Value	Significance
Pearson's R	0.963	<0.001
Kendall's Tau	0.867	<0.001
Kendall's Tau for Holdouts	1.000	

Table 3 shows that the assessment methods were found to have the greatest significant influence on the preferred online learning attributes of the learners with an average importance score of 39.536. In contrast, the lecture was regarded as the least-valued online attribute (11.263). In general, the online attributes have an importance value pattern of: Most-valued→ Assessment Methods - Learning Materials - Delivery Type - Learning Tasks – Lecture ← Least-valued.

Meanwhile, the learners preferred the attribute level of having a synchronous session (0.066) in online learning. Although learners were positive towards mix delivery (0.009), it can be interpreted as an attribute level with lower preference. On the other hand, the asynchronous delivery type (-0.075) negatively impacted learners' preferences in online learning.

Furthermore, it can be observed in Table 3 that an online learning which utilizes synchronous session (S) (0.066), live online lecture with slides (LLS) (0.032), individual tasks (IT) (0.062), learning materials that utilize visual aids (VA) (0.034), and either of multiple choice or multiple-type exams (MC or MT) (0.122) generated the highest total utility. This can be summarized as: 0.066 S + 0.032 LLS + 0.062 IT + 0.034 VA + 0.122 MC/MT + 3.612 = 3.928.

The Kendall's Tau and Pearson's R registered values of 0.867 and 0.963, respectively (Table 4). The values ($\geq$0.700) indicated a high internal consistency and confirmed the validity of the estimated model parameters. Likewise, Kendall's Tau for holdouts has registered a value of 1.000 for the two holdout profiles, implying a high quality of responses from the respondents. These generally revealed that the results generated were valid.

Segmentation of Learners

Segmenting learners based on their preferred online learning attributes was also the objective of this study. The result of hierarchical cluster analysis (Figure 2) and the close inspection and cross-matching revealed that learners can be significantly segmented into two (2) clusters: Cluster 1 (n=163, 54.2%) and Cluster 2 (n=137, 45.5%) (Table 5).

Figure 3

Result of the Hierarchical Cluster Analysis

Dendrogram using Ward Linkage
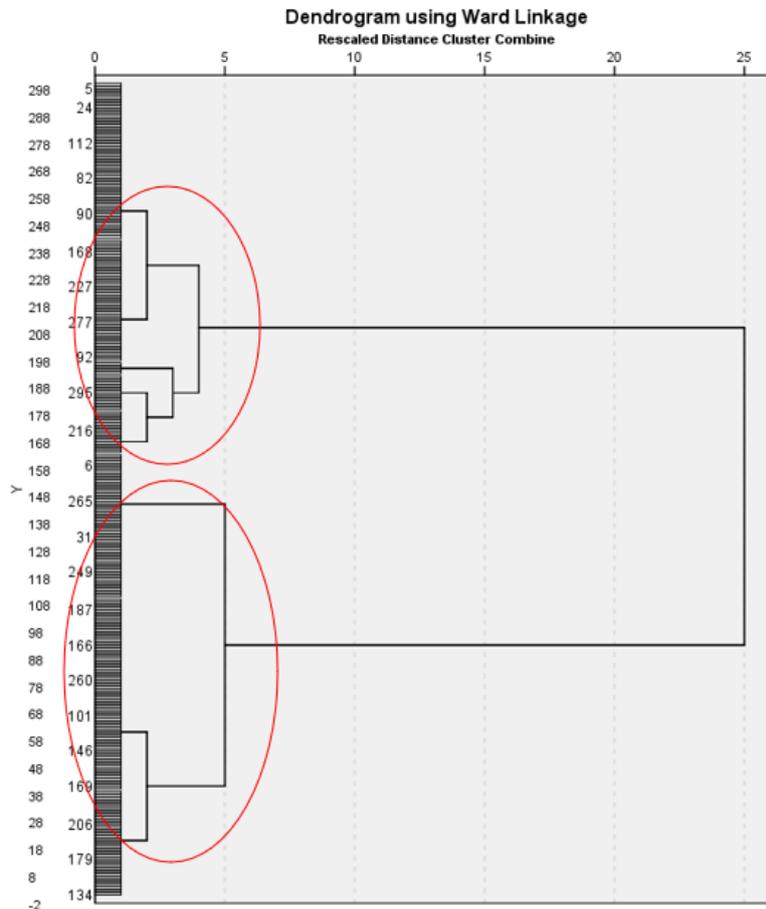
Table 5

Part-worth Utilities of the Segments (n=300)

Online Learning Attributes	Levels	Segment 1 (n=163)		Segment 2 (n=137)	
		Part-worth Utilities	Averaged Importance Score	Part-worth Utilities	Averaged
Delivery Type	Synchronous (S)	0.054	20.179	0.080	19.924
	Asynchronous (A)	-0.064		-0.087	
	Mix (Synchronous and Asynchronous) (M)	0.010		0.007	

Lecture	Recorded lecture with slides (RLS)	0.004	10.592	-0.071	11.986
	Live online lecture with slides (LLS)	-0.004		0.071	
Learning Tasks	Individual tasks (IT)	0.036	11.625	0.090	11.224
	Group tasks (GT)	-0.036		-0.090	

Online Learning Attributes	Levels	Segment 1 (n=163)		Segment 2 (n=137)	
		Part-worth Utilities	Averaged Importance Score	Part-worth Utilities	Averaged Importance Score
Learning Materials	Reading Materials (RM)	-0.033	24.792	0.069	24.787
	Video Materials (VM)	-0.018		-0.071	
	Visual aids (pictures, charts, graphs) (VA)	0.019		0.051	
	Hands-on learning materials (HLM)	0.032		-0.049	
Assessment Methods	Multiple Choice Exam (MC)	0.128	30.590	0.115	30.478
	Essay Exam (E)	-0.131		-0.105	
	Multiple types of Exam (MT)	0.112		0.133	
	Conference Paper (CP)	-0.109		-0.143	
Constant		4.092		3.093	

Based on Table 5, the combination of online learning attribute levels that generated the highest total utility for the learners that belonged to segment one can be summarized as: 0.054 S + 0.004 RLS + 0.036 IT + 0.032 HLM + 0.128 MC + 4.092 = 4.346. Accordingly, the learners in segment one greatly valued assessment methods, whereas they regarded lecture as the least-valued online attribute. The preferred online attributes for segment one has an importance value pattern of: Most-valued→Assessment Methods - Learning Materials - Delivery Type - Learning Tasks –Lecture ←Least-valued (Table 5).

On the other hand, the combination of online learning attribute levels that generated the highest total utility for segment two can be summarized as: 0.080 S + 0.071 LLS + 0.090 IT + 0.069 RM + 0.133 MT + 3.093 = 3.536. Learners that are classified under segment two greatly valued assessment methods, while the learning tasks were regarded as the least-valued online attribute. The preferred online learning attributes for segment two have an importance value pattern of: Most-valued→Assessment Methods - Learning Materials - Delivery Type - Lecture - Learning Tasks ←Least-valued (Table 6).

The two (2) segments of learners were further analyzed for profiling using the

extraction method to give insights into their characteristics. The segments were profiled based on their socio-demographics, educational information, and access to technological resources as shown in Table 6. The segments were described below:

Segment 1: This segment comprises 54.3% (n=163) of the respondents who are mostly Grade 12 learners (n=105, 64.4%) from the different strands. They greatly value the assessment method that utilizes multiple-choice, hands-on learning materials, and synchronous session type of instructional delivery. They prefer to record the lecture with slides and do the learning tasks individually (Table 5). The majority had smartphones (n=132, 81.0%) and laptop computers (n=118, 72.4%), while 38 (23.3) and 12 (7.4) had a desktop computer and iPad or tablet, respectively. Regarding internet access, most respondents subscribed to postpaid internet service (n=122, 74.8%); however, 51% (n=84) of the respondents reported that their internet connection is unstable and/or unreliable. Using prepaid mobile data to access the internet was still common in this group of learners (n=37, 22.7%). In contrast, 4 (2.5%) respondents did not have internet access and had to go somewhere else to connect to the internet during online classes. Regarding the family's annual income, low-income dominated the group (n=126, 77.3%).

Table 6

Profile of Segmented Learners (n=300)

		Segment 1 (n=163)		Segment 2 (n=137)		Chi-square
Socio-Demographic		**f**	**%**	**f**	**%**	
Gender	Male	56	34.4	53	38.7	0.028*
	Female	105	64.4	75	54.7	
	Non-binary	0	0.0	6	4.4	
	Prefer not to say	2	1.2	3	2.2	
Family's Total	Low-income	126	77.3	91	66.4	0.035*
	Lower-middle income	28	17.2	42	30.7	
Annual Income	Upper-Middle Income	8	4.9	4	2.9	
	High Income	1	0.6	0	0.0	
Educational Information						
Grade Level	11	58	35.6	92	67.2	<0.001*
	12	105	64.4	45	32.8	

Strand	ABM	53	32.5	47	43.3	0.948
	HUMSS	55	33.7	45	32.8	
	STEM	55	33.7	45	32.8	
Access to Technological Resources						
Device Ownership	Smartphone	132	81.0	117	85.4	0.936
	Laptop computer	118	72.4	102	74.5	
	Desktop computer	38	23.3	31	22.6	
	iPad or Tablet	12	7.4	10	7.3	
Internet Access	Do not have Internet access and have to go somewhere else	4	2.5	1	0.7	
	Prepaid mobile data	37	22.7	16	11.7	0.028*
	Postpaid subscription service (Connection is slow and/or unreliable)	84	51.5	90	65.7	
	Postpaid subscription service (Connection is fast and reliable)	38	23.3	30	21.9	

Note. *significant at p<0.05.

Segment 2: This group comprises 45.7% (n=137) of the respondents, mostly Grade 11 learners (n=92, 67.2%). They preferred multiple-choice exams as assessment methods, reading learning materials, and synchronous sessions as instructional delivery. They also value live lectures with slides and individually do the different learning tasks (Table 5). The majority of the respondents had smartphones (n=117, 85.4%) and laptop computers (n=102, 74.5%), while 31 (22.6) had desktop computer and 10 (7.3) had an iPad or tablet. Most of the respondents in this group subscribed to postpaid internet service (n=120, 87.6%); however, 65.7% (n=84) described their internet connection as unstable and/or unreliable. Also, 16 (11.7%) respondents could access the internet using prepaid mobile data. Consequently, 1 (0.7%) respondent did not have internet access and had to go somewhere else to connect to the internet. The respondents that came from low-income dominated the group (n=91, 66.4%).

Furthermore, a significant difference between the segments in terms of their socio-demographics, educational information, and access to technological resources was confirmed using the chi-square test (Table 6). The two segments differ significantly (p<0.05) in their profiles in terms of gender, family's total annual income, grade level, and internet access, while no significant difference was observed in terms of their strand and device ownership. This gives insights into what variables must be considered to maximize online learning, especially in designing online instructional materials and pedagogical approaches (Kuzmanovic et al., 2019; Muthuprasad et al., 2021).

Discussion

Table 7 shows the summary results of the aggregated preferred online learning

attributes by the learners. The online learning attributes were ranked based on the learners' perceived preferences. The attribute with the first rank was regarded as the most valued, while the fifth rank was perceived as the least valued among the online learning attributes.

Table 7

Summary of the Aggregated Preferred Online Learning Attributes

Rank	Online Learning Attributes
1st	Assessment Methods (Multiple choice and Multiple types of exams)
2nd	Learning Materials (Visual Aids)
3rd	Delivery Type (Synchronous)
4th	Learning Tasks (Individual Tasks)
5th	Lecture (Live online lecture with slides)

As shown in Table 7, assessment methods utilizing multiple-choice and multiple types of exams were found to have the greatest significant influence on senior high school learners' preferred online learning attributes. This finding agrees with the study of Ong et al. (2021) and Butler (2018). Assessment becomes vital in developing skills and competence and measuring learners' concept attainment in the online learning setup. The assessment scores serve as the primary determinant of the learners' progress toward a particular subject; hence, learners tend to be more cautious with their assessment performance. Furthermore, Butler (2018) posited that learners mostly preferred the multiple-choice exam because it allows them to narrow down their choices, giving them a higher chance of getting the correct answer, unlike essays and conference papers. Accordingly, assessment significantly influences their grade component; hence, learners prefer to be assured of getting better or higher scores, thereby passing the subject (Ong et al., 2021).

The second online learning attribute valued by the learners was the learning materials that utilize visual aids. As learning materials in an online setup, visual aids can be considered a media-centered strategy. It is a known strategy that supports learning among learners after the content has been introduced to them (Cano et al., 2022). Utilizing learning materials supported by visual aids is the most effective way of enhancing learning (Aghababaeian et al., 2019). Meanwhile, Cano et al. (2022) posited that learners tend to be motivated to learn and acquire better concept attainment using visual aids since learners can directly observe and imagine the concepts that could result in a more deepened concept acquisition of the topic discussed. Furthermore, learners could easily be guided to organize their ideas logically using illustrations, charts, or graphs.

The third highest valued online attribute was the delivery type, wherein learners preferred to have synchronous sessions. In this particular delivery type, the teaching-learning process happens in real-time. The teacher and the learners accessed the internet simultaneously despite the geographical differences. Literatures of Ong et al. (2021) and Kuzmanović et al., (2019) revealed that

learners prefer online classes with synchronous sessions because it reduces transactional distance. The teacher gives a live online lecture, and the learners learn directly from the teacher, interact with their peers, and exchange feedback in real-time. This instructional delivery strengthens interaction, a vital component of the educational process that enhances learner motivation and academic performance (Garrison & Arbaugh, 2007; Moore & Diehl, 2018). Literature suggests that most theories of formal education place emphasis on learner-teacher interaction, wherein learners receive feedback on how well they learn. Accordingly, learner-to-learner interaction allows learners to engage in social interaction, boosting motivation and social knowledge construction (Garrison & Arbaugh, 2007). Transactional distance posed by online distance learning is reduced through dialogue from learner-teacher and learner-learner interactions that can eventually help improve learners' academic performance.

The fourth online learning attribute preferred by the learners was the individual learning tasks. This particular preference relates to the behavior and attitude of the learners towards autonomy. According to Ruzek and Schenke (2019), the learners' interaction in the online distance learning setup greatly influenced their mastery goal. With the shift of instructional implementation into online learning, the learners are left with no choice but to interact virtually. Thus, it affects their preferences for doing their academic tasks (Ong et al., 2021). This gives insights into how the changes in the educational landscape have greatly influenced the learners' sense of autonomy.

The fifth online learning attribute valued by the learners was the lecture, wherein learners preferred to have a live lecture with slides. The second and the third highest attributes from this study justify that learners want to have real-time interaction and prefer to have a direct observation of the concepts that they are learning. The live lecture with slides allows the learners to organize their ideas better through the guidance of their teacher (Cano et al., 2022). More so, the real-time interaction between the teacher and the learners immediately corrects possible misconceptions due to communicative and psychological gaps posed by the online learning setup (Moore & Diehl, 2018).

Meanwhile, the results of the segmentation using cluster analysis revealed that the learners could be classified into two profiles based on their preferences. The significant difference (p<0.05) between the segments in terms of their gender, family's total annual income, grade level, and internet access (Table 6) gives insights that these are the primary variables that should be taken into consideration in grouping the learners. However, it is noticeable from the table the great extent of the difference in the number of learners in the two segments based on their grade level. From the educators' perspectives, the grade level can be considered as the most important and practical variable to label the segments in general (Kuzmanovic et al., 2019). Hence, the grade level was the variable used to label the segments.

Table 8 compares the preferred online learning attributes of the two segments labeled based on grade level.

Table 8

Comparison of the Preferred Online Learning Attributes of the Segments

Rank	Online Learning Attributes	
	Segment 1 **(Grade 12 Learners)**	**Segment 2** **(Grade 11 Learners)**
1st	Assessment Methods (Multiple choice exam)	Assessment Methods (Multiple choice exam)
2nd	Learning Materials (Hands-on learning Materials)	Learning Materials (Reading Materials)
3rd	Delivery Type (Recorded Lecture with Slides)	Delivery Type (Live online lecture with slides)
4th	Learning Tasks (Individual Learning Tasks)	Lecture (Synchronous)
5th	Lecture (Synchronous)	Learning Tasks (Individual Tasks)

It can be deduced in Table 8 that learners in higher class rank (Grade 12 learners) greatly value recorded lectures with slides and hands-on learning materials. According to Palvia et al. (2018), learners with more experience and who were able to adapt to the online learning environment such as the Grade 12 learners are said to be more focused on the procedures of how the contents of a certain topic are being delivered. The recorded lecture enables them to review the lessons afterward, giving them the venue to acquire skills and knowledge better and reflect on their learning (Lee et al., 2021). The utilization of technology applications that promote learner-content interactions must be considered in this group of learners. More so, online learning that is highly valued with experiential, hands-on opportunities such as computer simulations must also be taken into account in designing pedagogical approaches. In the study of Cano et al. (2022) on the concept acquisition of Grade 12 learners on the topic of the central dogma of molecular biology, learners are found to be motivated to learn and acquire better concept attainment through experiential online learning activities.

Meanwhile, the younger learners (Grade 11) prefer live lectures with slides and reading learning materials. In this particular group of learners, the online learning system should be designed to promote learner-teacher and learner-learner interactions. Real-time feedbacking and acquisition of concepts through reading are vital in this group of learners (Butler, 2018). The utilization of different technology in online learning should promote interactions between the teacher and the learners that are more similar to the conventional face-to-face learning modality. Different applications such as messenger, Zoom Meetings, and MS Teams, among others, were frequently utilized in online education as effective communication tools (Kuzmanovic et al., 2019). Furthermore, various social media platforms such as Facebook, Twitter, LinkedIn, and vlogs can be utilized to enhance learners' interactive work (Muthuprasad et al., 2021).

Although the results showed that learners, considering their preferences, can be segmented based on their grade level, the researcher believes that

regardless of learners' grade level, the most commonly valued online learning attribute between the segments: the assessment methods (multiple-choice type of exam) must be given of great importance. It has been discussed earlier that learners perceived assessment scores as the primary determinant of their progress in a particular subject. Therefore, the general recommendation is that real-time feedback on the acquisition of concepts is essential to achieve better assessment performance among learners (Butler, 2018). On that note, the quality of assessment should be designed with an appropriate formative assessment. Technology must be properly utilized in the teaching-learning process as learner-centered to enhance learners' academic performance through instant feedbacking on their test results and conducting immediate academic consultations.

The literature examination highlighted three critical factors that can significantly affect learners' preferences toward online learning: access to technology, interaction, and learner autonomy (Garrison & Arbaugh, 2007; Kuzmanovic et al., 2019; Moore & Diehl, 2018). The concern for access to technology is vital to online distance learning; however, the study's results revealed that the number of learners with limited access to technology was not negligible. Limited access to technology is common in low-income countries (Baticulon et al., 2021). If learners have limited access to technology, the interaction in the teaching-learning process and the learner's autonomy might be affected (Cano et al., 2022). Interactions such as learner-teacher, learner-learner, and learner-content are the essence of the teaching-learning process. Ong et al. (2021) concluded that learners who interact during class discussions with their teacher and peers complete and pass the subject successfully. Therefore, it is imperative to consider the logistical requirements of particular online instructional designs, such as the compatibility of the device, bandwidth for accessing the learning management system, participating in synchronous sessions, accessing learning materials, and using specific content formats like videos (Ali et al., 2022). This gives the general insights that pre-requisite requirements for establishing and strengthening internet facilities should be taken into account to move forward in online education.

Meanwhile, Moore and Diehl (2018) pointed out that the more organized an instructional design is, the fewer opportunities for discourse between the teacher and the learner. In this context, learners exercise greater autonomy; however, it must be balanced with the other elements that influence transactional distance, such as good access to technology. A learner with competing life demands without good access to technology may be forced to drop out if there is too much organization in the assessment pace, sequencing, and timing. At the same time, too little structure may lead to confusion and alienation (Garrison & Arbaugh, 2007; Moore & Diehl, 2018). Designing appropriate instructional materials by the teachers has been acknowledged as an effective measure for bridging educational gaps since it intensifies interactions among the teacher, learner, and the content (Kuzmanović et al., 2019; Muthuprasad et al., 2021). Therefore, it is imperative that the pedagogy to be utilized in the online learning setup should take into account the nature, needs, and preferences of the learners.

Conclusions

In this paper, the researcher examined learners' preferred online learning attributes in the K-12 program and explored their segmentations. Addressing these concerns and examining the most valued online attributes by the learners allow us to reflect on the online pedagogies that could leverage learning. The findings of this study present the first empirical insights into the senior high school learners' preferences and their segmentation in an online learning environment. Five online learning attributes were considered in this study: delivery type, lecture, learning tasks, learning materials, and assessment methods. Assessment methods using multiple-choice and multiple-type exams, synchronous delivery type with slides, individual tasks, and learning materials with visual aids were considered the most preferred online attributes by the learners.

Further analysis revealed that learners could be classified into two segments, considering their preferences and profiles, based on their grade levels. This adds to the body of knowledge that, indeed, learners in different grade levels differ in their learning approaches in the online setup. Therefore, it would be ideal to adjust and redesign the online learning system based on the grade levels of the learners. On the contrary, the limitation of this study is in analyzing the data of the learners' perceptions of the online learning setup. Learners with less experience in online learning perceived the online learning system as a better venue for learning (Kuzmanović et al., 2019). The results give the insights to re-think what pedagogical activities and practices in the online learning system secure educational advantage despite the global health crisis. The teaching-learning process in this context becomes challenging, as it needs to be recalibrated with the contemporary educational landscape. If we look at our learners as our customers, these online learning attributes must be considered to retain them. Academic institutions offering senior high school programs should revisit and redesign their instructional design tailored to the needs and demands of their learners to leverage learning in the online environment.

Recommendations

The COVID-19 pandemic necessitated the researcher to conduct this investigation; however, the quest has just begun. More focused studies need to be conducted, considering other online attributes that were not included in the study. Furthermore, studies need to be conducted using different approaches to draw definitive conclusions about the preferred online learning of the learners and their segmentation. Despite these limitations, the findings of this study are beneficial for future researchers to conduct further studies related to the key factors that are imperative to the implementation of online learning modalities and provide insights for the educational institutions in re-evaluating and redesigning their online learning systems.

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Towards an Age-friendly University: An Intergenerational Study among FICS-UPOU Graduates

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Abstract

In this study, the educational experience of graduates under the Faculty of Information and Communication Studies (FICS) for A.Y. 2017-2018 was assessed through an intergenerational lens. Respondents' age range was categorized into three generations: Baby Boomers (1945-1965), Generation X (1966-1985), and the Millennials (1986-2005). A survey questionnaire was used to gather data on the respondents' socio-demographic profile (age, gender, and employment status) and educational experience. Educational experience was assessed through five variables: relevance of curriculum, usefulness of the program, quality of instruction, effectiveness of online delivery, and current employability. Generational disaggregation of data was done before data analysis. Afterward, the collected data were analyzed using both descriptive and inferential statistics. Aside from measures of central tendency, the means test, Kruskal-Wallis test, and Spearman correlation were also used to determine the relationship between the respondents' socio-demographic characteristics and educational experience. On average, the respondents found their UPOU learning experience to be quite positive – indicating an age-friendly curriculum flexible to the needs of different generation cohorts. Results showed that there was no association between gender and learning experience; and age group and learning experience. On the other hand, employment status was found to have a weak inverse correlation with two indicators: effectiveness of online delivery; and current employability. The results of the study presented implications for instructional design and improvement of online delivery to achieve an age-friendly university consistent with its lifelong learning philosophy.

Keywords: *intergenerational learning experience, generational disaggregation, evaluation of student experience, exit interview, age-friendly university*

Introduction

The University of the Philippines Open University (UPOU) seeks to provide education for all, regardless of their socio-economic background, through open and distance e-Learning (ODeL). Republic Act 10650, also known as the Open and Distance Learning Law, has mandated UPOU to promote inclusive

education through effective open and distance e-Learning practices (Republic Act No. 10650, 2014). This involves sharing best practices, offering technical assistance, and conducting capacity building and research, to name a few.

The university's dedication to openness is in line with the Commission on Higher Education's (CHED) mandate to ensure that quality higher education will be accessible to those who wish to pursue it (CHED, n.d.). As part of its commitment to the democratization of education, UPOU has designed many programs and projects to promote inclusivity. This includes the implementation of initiatives such as the development of Massive Open Online Courses (MOOCs) and Open Educational Resources (OERs) – free courses and materials that tackle relevant topics and cater to different audiences.

In its pursuit to provide opportunities for continuing education and in line with lifelong learning principles, the university has made additional efforts to cater to its diverse student body. Taking into consideration the presence of learners from different backgrounds, especially noting the varying age groups, UPOU has joined the Age-Friendly University (AFU) Global Network, an association of universities and higher education institutes (HEIs) committed to principles, programs, and policies that promote an age-friendly university.

At the core of inclusive and lifelong education is the commitment to acknowledge the diverse needs of learners by improving participation and reducing exclusion within and from education. Many scholars have examined the experience of e-Learning students extensively; whether it be the performance of the students with the applied technologies such as learning management systems (LMS) and social networks (Mozhaeva et al., 2014); the effect of e-Learning to the student's motivation (El-Seoud et al., 2014); the impact of e-Learning, the effectiveness of e-Learning in general, and others. Fewer have sought to examine or assess student learning experiences from an intergenerational standpoint. To be able to design an open learning environment within the university, it is necessary to explore on the perceptions of the different age groups with regard to e-Learning.

The initiative to promote an age-friendly university encourages UPOU to employ different methods of teaching and modes of instruction that will accommodate the needs of students of all ages. It also promotes 'intergenerational learning', which allows knowledge exchange between students from different age groups.

This study, a generation-disaggregated exit survey, is in line with UPOU's initiatives to exemplify an age-friendly university. Three generations were examined: Baby Boomers (aged 53-73), who were born from 1945 and 1965; Gen X (aged 33-53), who were born from 1966-1985; and Millennials (aged 13-33), who were born from 1986-2005.

Results of the study provided relevant information on students' perception of the university and of online learning, cataloging the university's perceived contribution to their personal and professional development. It gave insights and recommendations for the improvement of the implementation of the university's programs and instructional design, ensuring appropriate policies and practices are in place to cater to and engage with varied age groups.

Objectives

In general, this study aimed to examine the educational experience of the Faculty of Information and Communication Studies (FICS) graduates for the academic year 2017-2018 from an intergenerational perspective.

Specifically, it aimed to:

1. Describe the graduates' sociodemographic profile;
2. Determine the graduates' assessment of their learning experience in UPOU in terms of relevance of curriculum, usefulness of academic program, quality of instruction, effectiveness of online delivery, current employability; and
3. Identify the relationship between the graduates' socio-demographic profile and educational experience.

Review of Related Literature

There is an abundance of literature evaluating the learning experience of open and distance education students. Studies range from describing perception and attitude towards e-learning to assessing academic performance and determining best practices, among others. These factors are examined in relation to the student's unique characteristics, such as socio-demographics, learning styles, emotional intelligence, and communication-related factors. There are noticeably fewer studies focusing on the online learning experience of distance education graduates. According to Millington (n.d.), studies on ODeL graduates' experiences can provide the information needed to reform educational programs and bring about the fit between the requirements of the employment world and study.

Exit surveys aim to gain feedback on study programs (Egesah & Wahome, 2013) or to determine how the students perceive the curriculum, teaching, and assessment (Bahroom et al., 2014). Schomburg (2003) suggests that these studies assess the quality of services delivered by their respective schools. Moreover, it determines the performance of the institution based on the performance of the graduates, and how their education played a role in their career promotions, decisions to pursue higher studies, and in gaining entry to schools that offer post-graduate programs (Bahroom et al., 2014).

There is an increasing trend in the number of graduates in open universities. Many students turn to open universities to ensure a successful academic path without compromising their existing careers, as open universities enable them to do both at the same time (Burnside, 2001).

> "A deep need among workers to ensure that they have the means for a successful career path. To attain this, they first need skills that bring success in their current jobs, that are portable to their next jobs, and that increase market value . . . they need legitimation that degrees such as MBAs can bring but delivered in a way that fits into their daily lives." (Burnside, 2001)

Margaret Jarmin Suarez, Patricia Calora, Yrelle Mae Lleva, & Germaine Basan

However, there is a lack of existing exit and tracer studies in open and distance e-Learning universities. Boettcher (2006) suggests that trends in distance education will be on "updating knowledge and skills, building perspectives, contextual problem solving, networking" and a shift to "competency-   based outcomes." Thus, to be able to identify and address the problems of an open university, many ODeL universities find the conduct of these studies to be helpful. For example, a study was done for the Nigerian Teachers' Institute (NTI), showing that the performance of ODeL graduates was as effective as graduates from traditional universities. The way of teaching in the classroom, preparation of lessons, motivation of students, record-keeping and communication in English were just as good as the traditional way of learning. The instructional materials were also provided excellently; thus, getting high ratings from their students. However, the study also revealed the students' dissatisfaction with the audio-visual materials. It also showed the need for the teachers to be trained in the techniques of ODeL. These problems shown in the study were addressed, and the Institute itself had improved its management and monitoring systems, and efforts had been made to address these inadequacies (Umar, 2006). This launched the Nigeria Certificate in Education by ODL in 1990 in response to the brought-up need to train more teachers in the ways of open and distance eLearning.

Scanlan (2003) notes that despite the plethora of guidelines issued for evaluation and quality assurance in education, including for distance education, "none provide the actual measurement tools needed to conduct quality assessment. Indeed, in its preliminary review of distance learning, the Institute for Higher Education Policy (1998) emphasized the need for reliable and valid performance measurements."

Millington (n.d.) admits that there is no standardized measurement tool and instrument to conduct exit surveys and tracer studies. Best practices for course evaluation are still under debate, for there are differences in the kinds of questions asked, the utilization and processing of information gathered, the weighing and measurement of the student responses, and the purpose, whether it is being used to improve the educational processes.

Strengthening an institution's commitment to inclusive education in the face of the increasing diversity of online students requires the implementation of policies and practices that support issues such as intergenerational learning.

Generational Satisfaction with e-Learning

Patricio and Osorio (2016) conducted a study that emphasized the importance of intergenerational learning in the promotion of digital literacy and social inclusion. The study employed multiple case studies which examined different participants and situations with regard to their learning satisfaction and motivation. It has been determined that intergenerational studies on ICT use can enhance "lifelong learning, intergenerational solidarity, and active ageing" among adults and seniors. They have also discovered that e-Learning can stimulate creativity and expressiveness among the audience. As they quote:

> "We need a global educational and social policy to emphasize the importance of intergenerational learning for a successful and sustainable economy, promote the active ageing and lifelong learning of all citizens, and foster intergenerational cohesion by addressing social and digital engagement"

Ahmad and Tarmudi (2012) examined the perceived satisfaction for e-Learning of four age groups in a corporate setting. In particular, the study juxtaposed the e-Learning satisfaction of traditionalists and Baby Boomers against those of Generation X and Generation Y. Data obtained was analyzed with ANOVA. Results showed the lack of a statistically significant difference in the age groups' e-learning satisfaction and success.

Williams et al. (2014) conducted a correlational study that sought to determine the generational differences among higher education institution distance learners in terms of learning styles and learning satisfaction. The study's generational age cohorts consisted of three groups – Baby Boomers, Gen X, and Millennials. Data gathered through survey instruments were analyzed using a mix of descriptive and inferential statistics. Specifically, frequency counts, chi-square correlation coefficient, and ANOVA were used. Results showed that the difference among the three generations' learning styles was statistically significant. Mean score comparisons for their online learning satisfaction also showed significant differences.

Smith (2014) determined the significant differences in the learning outcomes of asynchronous mLearning (mobile and asynchronous e-Learning (computer) by identifying the perception and learner satisfaction of Generations X, Y, and Z through a quasi-experimental study. Participants were given online modules and were asked to take pre and post-test. Results of the study showed that the Baby Boomers preferred computer learning and the Millennials preferred mobile learning. The study failed to show the statistical significance of the difference between the two modes of learning but showed an increase in satisfaction and learning across the generations.

De la Hera et al.(2017) examined the differences between the different generations with regard to considerations in designing digital games. The result showed that younger players are motivated to play digital games if they are collaborative, and the older ones require demonstration of the game itself. Though there may be a difference in the motivations of the younger and older generations in learning, these types of activities increase intergenerational interaction and exchange of ideas.

Age-Friendly University Principles

Age-friendly university principles can facilitate intergenerational learning experiences, especially as it relates to "educational programming, accessibility, and inclusivity" (Silverstein et al., 2019). Furthermore, Pstross et al. (2017) note that programs that cater to diverse age groups and follow the principles of the age-friendly university have positive impacts – one of which is having a more collaborative environment for younger and older learners.

Studies have been done extensively on online students' learning experiences . However, there is a dearth of research in the Philippine context that focuses specifically on the perspectives of different generations about their online learning experience. This study aims to address that gap.

Conceptual Framework

This study aimed to evaluate the learning experience of FICS graduates from an intergenerational standpoint. Three independent variables were examined: generation, gender, and employment status. The dependent variable, learning experience, was assessed with five criteria: relevance of curriculum, usefulness of program, quality of instruction, effectiveness of online delivery, and current employability. These were measured using a 7-point Likert scale, with seven (7) being the highest and one (1) being the lowest.

In this study, relevance of curriculum referred to course content that is up to date and applicable to students' interests, personal aspirations, and cultural experiences. It also covered the program's ability to prepare its students for emerging issues and occupations through the development of new skills and qualifications.

Usefulness of the program referred to whether the curriculum equips students with the knowledge to solve problems outside the context of school. It measured their perception of the applicability of the program's curriculum to their current situation and future endeavors.

Quality of instruction encompassed respondents' views on student engagement, course resources, and communication with instructors. It measured students' perception of whether the program met their learning needs and expectations, as well as the extent it adhered to established standards.

Effectiveness of online delivery referred to the degree to which the mode of instruction was conducive to the achievement of clearly articulated learning outcomes. It captured students' assessment of the adequate delivery of instruction online.

Lastly, current employability measured the recent graduates' perception on the program's ability to prepare students for the demands of their current or future job, and to enhance their ability to seek continuous professional improvement.

The study's framework in Figure 1 shows the hypothesized relationships between these variables.

Figure 1

Conceptual Framework of the Study
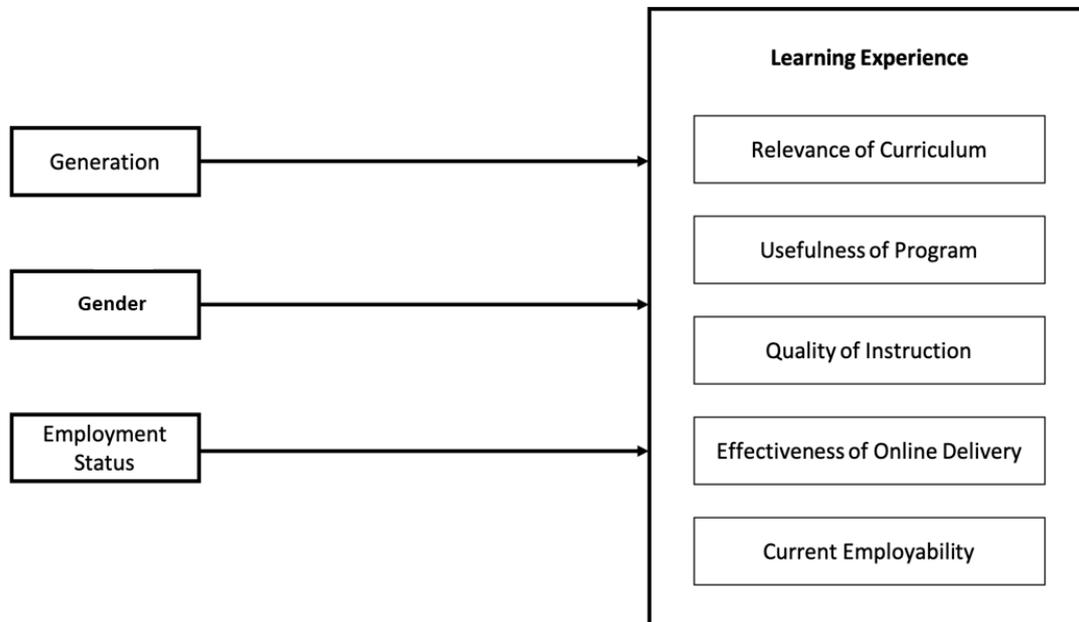
Methodology

With the objective of assessing learning experience, the respondents of this study included all students under the faculty's five programs – Bachelor of Arts in Multimedia Studies (BAMS), Diploma in Computer Science (DCS), Master of Information Systems (MIS), Master of Development Communication (MDC), and Doctor of Communication (DComm) – who completed all their academic requirements in A.Y. 2017-2018.

Data was collected through a survey questionnaire administered both online and face-to-face. The survey questionnaire consisted of questions about the respondents' socio-demographic profile, including their age, gender, and employment status. Their educational experience was assessed in terms of five variables: relevance of curriculum; usefulness of program; quality of instruction; effectiveness of online delivery; and current employability. These variables were evaluated through a 7-point Likert scale with one as the lowest rating and seven as the highest.

Data gathered were disaggregated by age group – Baby Boomer, Gen X, and Millennial. Baby Boomers referred to those who were born from 1945 to 1965; Gen X to those who were born from 1966 to 1985; and lastly, the Millennials referred to those who were born from 1986 to 2005. Both descriptive and inferential statistics were used for data analysis. Specifically, measures of central tendency, means test, Kruskal-Wallis test, and Spearman correlation were employed. The relationships between socio-demographic characteristics and the educational experience were also examined.

The Kruskal-Wallis test was used to determine the association between variables in lieu of Analysis of Variance (ANOVA). The non-parametric test counterpart of ANOVA is ideal for categorical variables such as age group and employment status. Employing ANOVA would have decreased the power to reject a false hypothesis. The following hypothesis was tested:

Ho: There is no difference among the populations
Ha: At least one group is different from the rest

Test Statistic:
$$H = \frac{12}{n(n+1)}\sum_{j=1}^{m}\frac{R_j^2}{n_j} - 3(n+1)$$

Decision Rule: Reject Ho if p-value $< \alpha = 0.05$

Spearman Correlation was used to further test the association between variables. It provided the degree of association, which can either be direct (positive) or inverse (negative). The following statistical hypotheses were tested:

Ho: There is no association between variables
Ha: There is an association between variables

Test Statistic:
$$r_s = 1 - \frac{6D}{n(n^2-1)}, \text{ where } D = \sum d_i^2$$

Decision Rule: Reject Ho if p-value $< \alpha = 0.05$

The direction of an association can be either direct (positive) or inverse (negative). The lack of an association is indicated by a value of 0. On the other hand, a value of 1 indicates a perfect association. The interpretation for other values is as follows:

Table 1

Interpretation of Spearman Correlation Values

Value	Interpretation
0.01 to 0.19	Very weak
0.2 to 0.39	Weak
0.4 to 0.59	Moderate
0.6 to 0.79	Strong
0.8 to 0.99	Very strong

Results and Discussion

This study aimed to determine the relationship between FICS graduates' sociodemographic profile and learning experience, with particular focus on their age group. Results of the statistical analysis are discussed below.

Generational Disaggregation

As shown in Figure 2, majority of the respondents were Millennials (50.72%), followed by Gen X (44.93%), and then Baby Boomers (4.35%). There is a slight disparity with the target population, of which Gen X was the majority (53.4%), followed by Millennials (42.7%), and then by Baby Boomers (3.9%).

A small percentage of Baby Boomers pursuing higher education through e-Learning is consistent with previous generational e-Learning studies. In Bialik and Fry's (2019) study, there was a higher number of Millennials who have attained a bachelor's degree or higher compared to the number of Baby Boomers and Gen X. Baby Boomers also comprised the smallest segment of Williams et al., (2014) generational study on e-Learning styles.

Garcia and Qin (2007) also identified the differences of four groups consisting of students of different ages: under 20 years old (Age Group 1), 21-25 years old (Age Group 2), 26-35 years old (Age Group 3), and 36 years old and over (Age Group 4). They found out that those from Age Group 3 and Age Group 4 were less comfortable using online learning tools and computer networks as opposed to those in the younger age groups.

Figure 2

Generational disaggregation of respondents
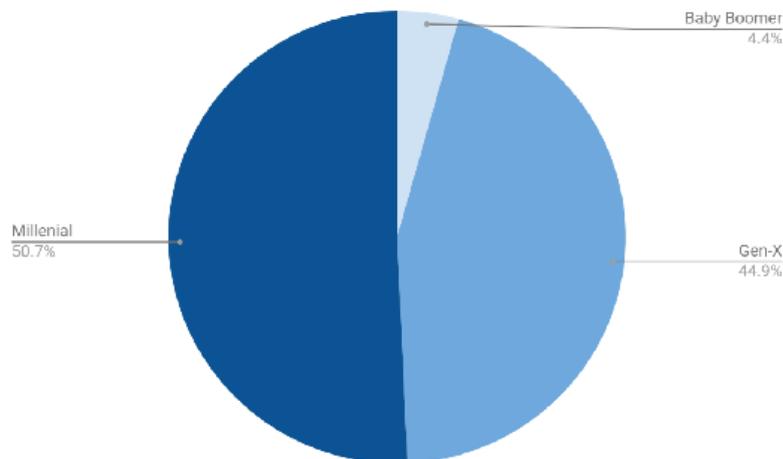
Gender

In terms of gender, there were slightly more males (52.86%) than females (47.14%). This is possibly because most of the courses under the faculty's programs include technology and computer science related fields. The graduate population is mostly comprised of students from MIS, DCS, and BAMS – all of which deal largely with information and communication technology (ICT).

This assumption is supported by Hardin and Longhurst (2016) study on social-cognitive differences of males and females in terms of science, technology, engineering, and mathematics (STEM) courses. They measured the social-cognitive-career-theory variables and found out that women have lower STEM

self-efficacy, coping self-efficacy, and interest in computer science and other related courses than men. It is also noted that gender stereotyping, traditional gender roles, inflexibility toward women with children, alienation and other factors contribute to the decrease in the number of women who pursue STEM programs (Kulturel-Konak et al, 2011).

Some studies suggest the contrary. In a study by Alip (2002) UPOU students showed that there were more women e-Learners. At the time, it was argued that women tended to strive for a college degree more than men. Perhaps the results of this study differ due to the larger scope. Since then, the student population of, and programs offered by UPOU has grown. The number of different nationalities who have chosen to pursue their studies through the university has also grown. This may explain the contrasting results.

Figure 3

*Percentage of Male and Female Respondents*
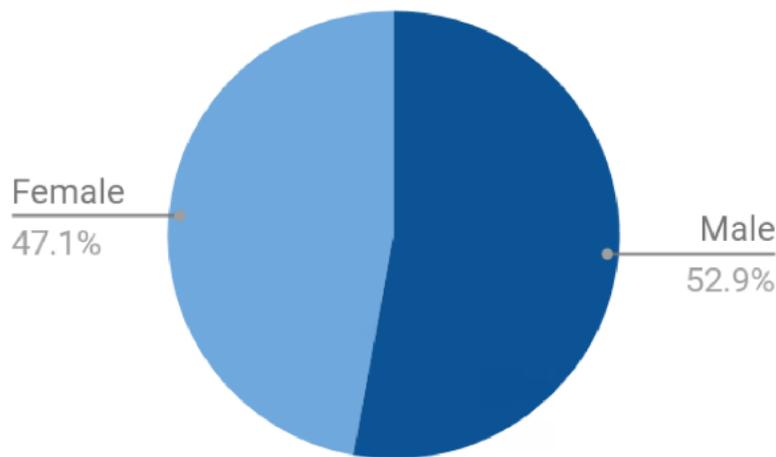
Employment Status

A great majority of the respondents (71.83%) were employed full time. This supports the notion that ODeL is well-suited to support the continuing education of working professionals. It answers the "growing demand of geographically dispersed professional groups seeking access to flexible, lifelong learning opportunities" (Bandalaria, 2007). The respondents' employment status is summarized in Figure 4.

Figure 4

Employment status of UPOU-FICS A.Y. 2017-2018 graduates
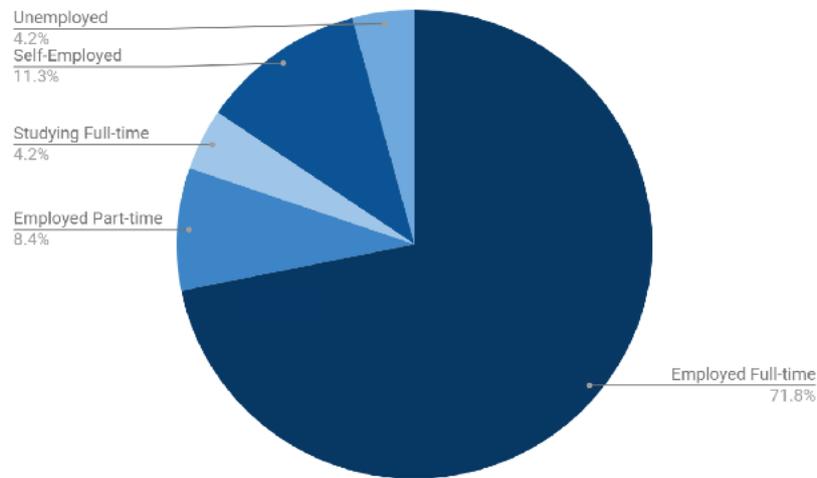
UPOU-FICS Learning Experience

The respondents' learning experience was assessed using five criteria: relevance of curriculum, usefulness of program, quality of instruction, effectiveness of online delivery, and current employability. A seven-point scale was used to record the respondents' answers, with 7 being the highest. On average, respondents had a positive learning experience, with the means ranging from 6.26 to 6.42 across all indicators. The usefulness of the program earned the highest mean score (6.42), followed by relevance of curriculum (6.41), quality of instruction (6.34), current employability (6.31), and then effectiveness of online delivery (6.26).

This implies that the program curriculum and implementation is age-friendly. However, it can be noted that of the five indicators of learning experience, only relevance of curriculum had all respondents in agreement about the programs' currency and applicability to students' personal and professional aspirations. This is indicated by how the responses were clustered in the positive side of the scale - scores ranged from 4-7. On the other hand, responses for the other indicators of learning experience are more scattered. While still mostly positive, these results show that there is more variance in the respondents' learning experience when discussed in terms of utility of program, quality of instruction, effectiveness of delivery, and current employability.

The respondents' learning experience is summarized in Table 2.

Table 2

UPOU-FICS Learning Experience

Variables	Mean	Standard Deviation	Min	Max
Relevance of Curriculum	6.41	0.85	4	7
Usefulness of Program	6.42	0.94	3	7
Quality of Instruction	6.34	0.97	2	7
Effectiveness of Online Delivery	6.26	1.09	1	7
Current Employability	6.31	1.10	1	7

Gender and Learning Experience

Gender and learning experience were examined using means test and spearman correlation. Means test was used to determine if the indicators of learning experience were independent of gender while spearman correlation was used to further ascertain if there is an association between gender and any of the variables. Results of the means test (Table 3) showed that the learning experience variables are independent of the respondents' gender.

Table 3

Relationship of Learning Experience and Gender

Variables	Test Statistics	p-value	Conclusion
Relevance of Curriculum	0.4629	0.6449	Independent
Usefulness of Program	0.9342	0.3535	Independent
Quality of Instruction	0.3202	0.7498	Independent
Effectiveness of Online Delivery	-0.4108	0.6825	Independent
Current Employability	0.4081	0.6845	Independent

Further analysis with spearman correlation yielded the same results (Table 4). The respondents' gender is not associated with their learning experience. This is in contrast with the results of a previous study (González-Gómez et al., 2012) which showed females having a higher satisfaction rating for e-learning.

Table 4

Correlation of Learning Experience and Gender

Variables	p-value	Conclusion
Relevance of Curriculum	0.4523	Not Associated
Usefulness of Program	0.3079	Not Associated
Quality of Instruction	0.2663	Not Associated

Effectiveness of Online Delivery	0.8332	Not Associated
Current Employability	0.4753	Not Associated

Employment Status and Learning Experience

The association between employment status and learning experience was examined using Kruskal-Wallis Test and Spearman Correlation. Results of Kruskal-Wallis test (Table 5) showed that employment status is associated with effectiveness of online delivery and current employability.

Table 5

Association of Employment Status and Learning Experience

Variables	Test Statistics	p-value	Conclusion
Relevance of Curriculum	5.716	0.2214	Not significant
Usefulness of Program	6.922	0.1401	Not significant
Quality of Instruction	9.015	0.0607	Not significant
Effectiveness of Online Delivery	9.796	0.044	Significant at alpha=5%
Current Employability	14.058	0.0071	Significant

To determine the degree of association between employment status and the significant variables, Spearman correlation was used. Results (Table 6) showed that both variables had a weak inverse association with employment status, meaning as level of employment decreases, scores for effectiveness of delivery and current employability increase. This suggests students with full-time jobs can be hindered from achieving their learning outcomes from online modes of instruction. It also somewhat affects their perception of continuing professional development online.

Table 6

Degree of Association between Employment Status and Learning Experience

Variables	Spearman	Interpretation
Effectiveness of Online Delivery	-0.2835	Weak Inverse
Current Employability	-0.3314	Weak Inverse

Generation Cohort and Learning Experience

Kruskal-Wallis test was used to determine the association between age groups and learning experience. Results of the analysis (Table 7) showed that there is no significant association between these variables. This means there is not much difference between the learning experience of Baby Boomers, Gen X, and Millennials. A previous study by Hill (2017) also found no significant relationship between age group and e-Learning satisfaction.

Perhaps this result could be attributed to similar learning style preferences, computer literacy levels, or other factors such as the small sample size. Kriegel (2013) compared the learning style preferences of different generations and found little variance, challenging the notion of one generation's predisposition to excel in an online learning environment. Since these are outside the study's scope, further research must be done to understand the generational learning differences of UPOU's student body. Additionally, the lack of significant association between learning experience and age group is a testament to the age-friendly curriculum of UPOU-FICS' programs.

Table 7

Comparison of Learning Experience by Age Group

Variables	Test Statistics	p-value	Conclusion
Relevance of Curriculum	3.594	0.1658	Not significant
Usefulness of Program	2.969	0.2266	Not significant
Quality of Instruction	4.309	0.1159	Not significant
Effectiveness of Online Delivery	4.129	0.1269	Not significant
Current Employability	4.779	0.0917	Not significant

Summary and Conclusion

As an educational institution that values openness and inclusivity, it is important for UPOU to ensure its programs cater to its diverse student body. This study aimed to examine UPOU-FICS graduates' learning experience from an intergenerational perspective. This stems from the premise that due to various socio-economic and socio-cultural factors, generational cohorts differ in their optimal learning styles.

The learning experience of ODeL graduates from five different programs were assessed with five criteria – relevance of curriculum, usefulness of program, quality of instruction, effectiveness of online delivery, and current employability – using a 7-point scale, with one being the lowest and seven being the highest rating. In addition to age groups, the relationship of gender and employment status to learning experience was also examined. Data was analyzed using both descriptive and inferential statistics.

A little over half of the respondents were male (52.86%) and majority (47.14) were employed full-time. Most of them were Millennials (50.72%). On average, the respondents had a positive learning experience. Each indicator's mean score ranged from 6.26 to 6.42. However, it can be noted that though minimal, the presence of lower scores indicates possible areas of improvement for program implementation. Means test, Kruskal-Wallis test, and Spearman correlation were used to determine if respondents' sociodemographic profile was associated with their learning experience. Results showed that gender and age group were independent of the respondents' learning experience while

employment status had a weak inverse association with effectiveness of online delivery and current employability.

In conclusion, the respondents' generation was not a significant predictor of their learning experience. However, their employment status can influence their perception of employability and effectiveness of e-Learning. On one hand, these results affirm the university's efforts in open and inclusive education, showing that it is able to cater to different age groups. Still, it presents avenues for improvement, particularly in online delivery and instructional design.

Recommendations

Results showed that an e-Learner being part of the Baby Boomer, Gen X, or Millennial generation does not influence their learning experience. Their status of employment is more likely to influence their ODeL experience. However, these results cannot be generalized because the samples were obtained through non-probability sampling. To get a more thorough picture of the factors that influence online learning experience, more studies may be conducted on the following:

1. Online student engagement may also be examined from an intergenerational standpoint. For instance, in a society like the Philippines, where a hierarchy according to age or seniority is the norm, participation in discussion boards and interaction among different generational cohorts online can be studied.
2. The preferred learning styles of each generational cohort may be examined in juxtaposition with their learning experience. This will allow researchers to determine if indeed learning style varies between generations in an ODeL environment.
3. Instead of conducting a cross-sectional study, future research may explore longitudinal research designs, still focusing on learning experience and generational cohort differences. The addition of Gen Z learners to the respondents may also be explored. Additional demographic information may also be leveraged as it will help explain variance in statistical analysis and allow for a more comprehensive discussion of the topic. A longitudinal study may also serve as a review of programs, to see if they evolve and cater to the changing characteristics of its student body.
4. This study may also be replicated with a different population of e-Learners. For instance, examining the intergenerational learning experience of students from different faculty offices will give instructional designers more insight for course development.
5. A study focusing on technology-related courses could also be done to determine the acceptability of the different generational cohorts of the curriculum design. It could also be done to identify the factors that affect their acceptability of the course itself.
6. Future studies may also be done to compare the learning experience between students of each program. This may offer insights into the university's quality assurance initiatives.

Margaret Jarmin Suarez, Patricia Calora, Yrelle Mae Lleva, & Germaine Basan

Furthermore, the study only had a 67% response rate. Going forward, future studies may employ the following methods:

1. The results of this study are limited to its respondents and cannot be generalized for the populations. For this reason, future studies may employ probability sampling methods. Stratified sampling is recommended to ensure each subpopulation – generation and program – is represented accurately.
2. Aside from non-probability sampling, this study had a relatively low response rate. For future studies, researchers may explore the Tailored Design Method (Dillman et al, 2009) to improve response rates for online surveys.

Institutionally, this study revealed possible areas of improvement for program and policy implementation. In line with the university's commitment to open and inclusive education, this study may inform age-friendly strategies of guidelines for student interaction. A few recommendations based on this study's results are:

1. In selecting and training instructional designers, understanding the learning needs of the student population should be central. This will allow them to optimize the e-Learning experience for diverse age groups.
2. The results of this study made apparent the need to improve students' perception on effectiveness of online delivery and current employability, specifically for those who are fully employed. For this reason, a more in-depth study should be done to ensure appropriate measures are developed and implemented to enhance the learning experience.

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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 findings, 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's 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.