INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact Factor: 6.078
(Volume 9, Issue 2 - V9I2-1357)
Available online at: https://www.ijariit.com

Evaluation of the Performance and Skills of the Civil Engineering Students Batch 2023 and Civil Engineering Instructors of Don Honorio Ventura State University with the Transition of Different Learning Setups

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ABSTRACT

The government decided to temporarily close all educational institutions due to the COVID-19 pandemic for the protection of students, teachers, and the school community. This paper intended to evaluate the performance and skills of the Civil Engineering Students Batch 2023 of Don Honorio Ventura State University and Civil Engineering Instructors who experienced the transition of education to different learning setups. A descriptive-quantitative study design has been utilized wherein analyzing data, statistical treatments such as weighted mean, standard deviation, and analysis of variance, were used in order to identify the particular problems. Survey questionnaires were used in this study where 251 of 4th-year Civil Engineering Students and 14 Civil Engineering Instructors served as the respondents. The results revealed that the traditional learning setup was found to be the most effective platform for the students and instructors that suits their chosen program. While the students' performance and skills during online learning varied in terms of adaptability and convenience. Blended Learning is the balance method between traditional and

digital learning approach. On the other hand, the level of agreement of the instructors in the Civil Engineering Department regarding the different educational setups also varied. They generally prevailed that face-to-face classes were the most efficient way to impart proficiency on certain topics and enhance students' skills with regard to the civil engineering program. The results will serve as the foundation for developing an academic intervention program for Civil Engineering Students in order to adapt to the academic transition

Keywords: *Transition, Different Learning Setups, Performance and Skills*

1. INTRODUCTION

Education is the most powerful instrument for achieving the desired goals in life. It is the basis of every individual's success where opportunities are given in different ways. But when the pandemic hits, the movement of the world seemed to stop. It greatly impacted everyone's way of living where the movement of people was restricted, all businesses and establishments were forced to stop, and most especially the educational institutions were required to close for safety purposes. The pandemic restricted the students and instructors from engaging in full face-to-face learning. This resulted in the transition of education through different learning setups.

According to the Commission on Higher Education's (CHED) Memorandum Order No. 4 Series of 2020, the traditional learning setup where face-to-face interaction exists, was needed to switch to flexible learning. The best solution was online learning for continuing education, especially in tertiary (Mahyoob M., 2020). However, different concerns were raised upon adopting this mode of learning. Various challenges were faced by the students and instructors which include unfamiliar teaching and learning methods, not clear expectations, and feelings of detachment as well as students' absence of feedback (Khaild et al, 2020).

On the contrary, advantages are also seen with online modes of learning. These advantages include reduced costs, flexibility, more free time as well as repeated access to course materials (Drexel University). According to Mukhtar et. Al, (2020), various advantages can be seen online. These advantages are comfort and accessibility. Likewise, those in higher education benefit from online learning in terms of flexibility. It has also been established that learning online reduces the pressure of those in colleges and universities when unexpected occurrences necessitate time off. The student's and faculty's characteristics as well as the technology influence the efficiency in delivering of knowledge and skills. Thus, in the long run, online learning might be a significant benefit to higher education. (Jitendra Singh et. Al, 2022). There are also limitations involved such as inefficiency and difficulty when it comes to maintaining academic integrity

The emergence of online education in the Philippines where more than 28 million learners (UNESCO, 2020) is a big challenge to the students and teachers of Higher Education Institutions (HEIs) (Bao, 2020). According to Zeeshan H. Khan and Muhammad I. Abid (2021), one of the most affected by distance learning is the field of engineering education because this field must be in hand-in-hand operations and presentations in the laboratory needed to be performed in actual experiences. Courses in the engineering program are infrequently conducted through full-scale online mode. Thus, the sudden switch to full-scale online learning has been challenging for engineering students as well as for their instructors (Khalid et al, 2020). Furthermore, shifting to different learning modalities intensified the number of dropouts (Hernando-Malipot, M., 2021). This indicates that online learning does not apply to all students especially those who do not have access to technology.

As the post-pandemic arises, the government of the Philippines decided to take the opportunity to re-open the establishments and schools with proper restrictions. New modes of learning were introduced to the students and instructors. From the chalk-to-talk method, it was switched to the digital learning method, and now blended learning has been implemented in higher educational institutions. A blended learning environment is being implemented in which students can attend their classes on-site and online simultaneously (Raes et al, 2020).

In recent years, blended learning has been used in engineering curricula. Because of the early criticism from educators and institutions, this new learning strategy hasn't yet been broadly embraced in programs for engineering education. (Pisoni et al., 2018, Pisoni, 2019). The education system for engineering study has numerous significant flaws. Due to poor teaching practices and the insufficient relevancy of activities in the classroom, students only gain a minimal level of competence in their topics. Students frequently focus primarily on obtaining short-term objectives rather than gaining actual knowledge. Due to these issues, the industry has generally stopped recognizing that many universities can provide high-quality technical education. It begs the question of whether alternative methods of instruction and learning, such as blended learning and online education, could help to address this problem (Asst. Professor (Sr.Sc), 2022).

Considering the challenges and difficulties of Civil Engineering Students and Civil Engineering Instructors in switching to different learning modes with their 4-year program is not easy, since their chosen program requires the necessary skills in constructing structures like tall buildings, roads, bridges, houses, etc.

This motivated the researchers to evaluate the performance and skills of the Civil Engineering Students Batch 2023 and Civil Engineering Instructors of Don Honorio Ventura State University in experiencing the transition of three (3) modes of learning such as traditional learning, online learning, and blended learning.

Literature Review

Before Covid-19, numerous educational institutions were transitioning from traditional learning to online learning, and then to a hybrid of traditional and online education known as blended learning (Wenceslao & Felisa, 2021). According to Jitendra Singh et al.,(2021), face-to-face learning setup provides numerous advantages, including fast interaction between educators and learners, as

well as student-to-student conversations, which may produce unique questions and discussions. Students may additionally reach out for clarification or answers to their concerns in the classroom. Engineering students require access to laboratory settings, technical machinery, resources, and equipment in order to conduct actual experiments, collaborate with one another, and learn all social and technical skills related to their technical field (Ozadowicz, 2020). In the study of García-Castelán, (2021), the majority of students concur that face-to-face interactions increase their motivation to attend class, acquiring knowledge, and interaction between peers. The absence of interpersonal interaction, the lack of recreational activities, and the challenge of meeting new acquaintances were further deterrents to distance learning. Diverting attention, stress, and despair increased in the online model along the same lines.

In comparison to developing countries such as the Philippines, many developed countries have acquired and utilized technical and online learning tools such as online educational platforms, e-mail, and video communication via Zoom, Microsoft Teams, and Skype. Prior to the Coronavirus outbreak, many educators were hesitant to embrace online learning where laboratory work and engineering subjects posed significant challenges for universities, individual instructors, and learners (Palvia et al., 2018).

One of the first transitions was from in-person to distant or online learning. The quick change to remote education had evident repercussions on learners and instructors because the preparations for online teaching and learning were finished in an exceptionally short period of time. Similar events happened in industrialized nations all across the world, depending on the country's prior experience with online learning, the results may change slightly. (Gourlay et al., 2021). A major challenge, according to studies, is making the transition from face-to-face learning to online learning. When instructors are not adequately ready with technology and method of instruction, students' preparedness and involvement with online learning, such as online engagement and connections, be affected. (Kebritchi et al., 2017). Instructors also struggled to adjust to their new responsibilities in online instructional support

Research conducted on the use of online learning in engineering education concentrated on the development and assessment of educational systems and methods, as well as student and teacher perspectives and suggestions. The advent of immersive visualization and interaction technologies, as well as their educational applications, have recently received attention (Radianti et al., 2020). These immersive environments are said to have number of benefits, including the integration of digital learning, virtual world, and reality to enhance students' focus and command of the academic environment (Wang et al., 2018), the development of students' psychological, intellectual, and interpersonal skills, as well as the enhancement of engineering-related skills such as problem-solving abilities integrating what has been imparted, interaction, and teamwork (Wohlgenannt & Fromm, 2020).

According to Lee Y. et al., (2022), Civil Engineering students who are experiencing an online mode of learning are not performing well in their evaluations, particularly in their final exams. It shows that most Civil Engineering students lack adaptability and peer support when it comes to online mode of learning. Ayatad et al., (2021) stated that, regardless of the workplace, the majority of students strongly agreed that conducting lab experiments or completing computer modeling simulation exercises are more difficult5 when learning virtually. Additionally, they perceived and acknowledged that performing engineering design exercises for online learning is more difficult.

However, analysis of Lemay et al., (2021) reveals that the pandemic's specific environment had a greater impact on teaching and learning activities when compared to usual. Even though the majority of students welcomed the transition, their hesitation to continue learning online, as well as the added strain and workloads, point out the limitations of this large-scale social experiment. To appropriately support students' performance and skills in digital environments, teachers and educational technology professionals must pay emphasis to the societal and affective aspects of online instruction in addition to its technical and educational components.

Furthermore, students may feel less satisfied, have fewer interactions with teachers and companions, and have less desire to complete the necessary curriculum. A full-scale online approach, for instance, is uncommon in courses like engineering design since it requires technical expertise such as problem-solving capabilities (Alkhatib, 2018). This might be because engineering curricula have special requirements for hands-on experiences and successful skill development during active and interactive laboratory sessions (Potkonjak et al., 2016). As a result, for engineering programs, a sudden switch to totally online synchronous learning is challenging which is crucial to examine both planning and early encounters.

On the other hand, the transition to blended learning provided flexibility typically associated with a fully online course had an impact on crowded classrooms and was perceived to increase the standard of learning and instruction. Although there may be advantages, it can be difficult for both students and faculty to shift from traditional learning modality to blended learning modality. According to Sutisna and Vonti (2020), blended learning offers flexibility to students regarding their time and place. In addition, learning must not only be done offline but can also be conducted with the use of technology. It also helps the students and instructors overcome their differences in terms of distance, time, and space between them.

However, it also serves several disadvantages such as the students, can skip or avoid attending their classes and doing their school works on time. This type of educational and instructional style may be appropriate for particular programs or courses, but it is usually not appropriate for undergraduate engineering programs because the requirement for these programs should demonstrate the possession of established specific skills (Rashid 2013). Likewise, there are tools and equipment that the students and instructors should have in order to conduct their classes online. So, technologies such as laptops and smartphones became necessities in learning and teaching to take part in attending online classes.

Most of the developing countries that were affected by the pandemic opted to focus on blended learning in continuing education (Avila, et al., 2021). Based on the result of the study by Wenceslao and Felisa, (2021) The influence of online learning on teaching quality was rated as Good by 72% of faculty participants. Whereas students indicate that online education has a fair (39%) to good (42%), impact on overall learning quality. Furthermore, after Covid-19, instructors (60%) choose Blended Learning (BE), and students (65%) prefer traditional learning engagement. The blending of traditional and high-tech e-learning makes blended learning unique since it allows to receive the greatest results owing to the synergy of the strengths (Noho, et. Al., 2021). Aside from it, blended learning helps students to become more flexible compared to traditional (Garcia et al., 2021). In addition, (Alsalh, 2019) stated that blended learning can reduce learning expenses while maintaining the benefits of the old approach.

Conceptual Framework

The research objective was to determine the performance and skills of the civil engineering students of batch 2023 and their instructors with the transition of different learning set-ups during their face-to-face, online, and blended classes. To properly visualize the flow of the research, the researchers conceptualized the figure below. As it was seen in the figure, there were five (5) phases.

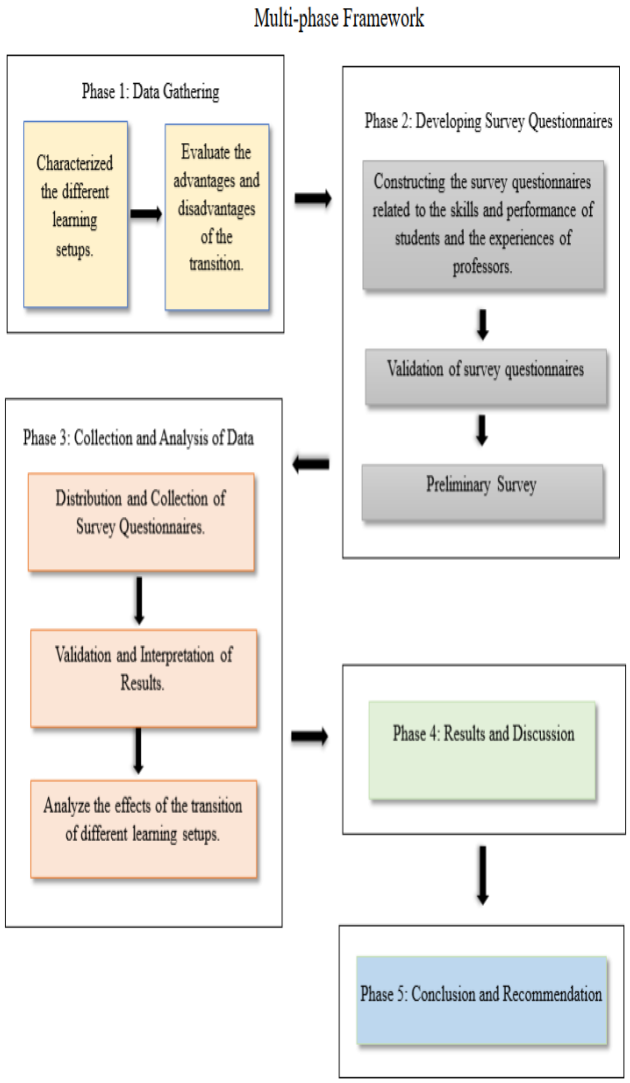

Figure 1. Research Paradigm

Phase 1 (Data Gathering) included the characterization and pre-evaluation of the three learning setups to identify the current academic problems of the civil engineering batch 2023. Phase 2 (Developing Survey Questionnaires) houses the creation of a validated research instrument to describe the present situation followed by pilot testing. Phase 3 (Collection and Analyzation of Data) was employed to distribute and interpret of gathered data and it was immediately followed by Phase 4 (Results and Discussions) wherein the gathered data was discussed in the research paper. Lastly, Phase 5 (Recommendation) hold the suggestions of the researchers on their current study.

2. METHODS

This chapter described the researchers' particular methodology for the study where data concerning the study was selected, processed, and analyzed. This section can be used by the reader to evaluate the overall reliability and validity of the study.

Research Design

A descriptive research strategy may use multiple research methodologies to analyze more than one variable. Additionally, quantitative methodologies are concerned with statistical, objective assessment, and mathematical, or arithmetic analysis of data collected by surveys, questionnaires, and polls, including the manipulation of unfiltered data from statistics using computing tools. Quantitative analysis (QA) is a type of behavior study that includes statistical and mathematical simulation, research, and computation. Quantitative analysis is used to assess a problem that can be used for estimating, calculating, and evaluating used instruments, as well as forecasting real-world occurrences (McLeod,2019).

Respondents

The respondents of this study were the Civil Engineering 4th-year Students of Don Honorio Ventura State University and the Civil Engineering Instructors. Respondents were chosen using purposive sampling. Purposive sampling, also known as judgmental sampling, is the purposeful selection of a respondent based on the traits the subject demonstrates. It is a non-random procedure that requires no theoretical foundations or a predetermined number of individuals. Simply said, the researcher determined what needs to be learned and then sought out persons who can and are willing to supply the data through their expertise or knowledge (Etikan et al., 2015). By using the Raosoft sample size calculator, the researchers were able to know the number of respondents needed with a 5% margin of error and 95% of confidence level. In this study, 251 fourth-year Civil Engineering students out of 721 total enrollees were the respondents. Also, 14 Civil Engineering instructors served as respondents to the study.

Research Instruments

To collect data and information, the researchers used survey questionnaires about the performance and skills of Civil Engineering students and instructors of Don Honorio Ventura State University to the different learning setups. The researchers employed selfmade survey questionnaires, a tool employed when gathering primary data, to acquire the necessary details, and reliable and accurate information

(Maclion, 2018). This method allowed the researchers to know the effect of the transition of different learning setups on the performance and skills encountered by the respondents. A five-point scale called the Likert scale was used to let respondents show how much they agree with the given statement. The questionnaires for CE students were divided into two parts: Part I consist of their experiences during the transition. Part II was all about skills. The questionnaires for the CE instructors were about their experiences during the transition of different learning modalities. The instrument used in the study was validated by a psychometrician and validators. In addition, a Cronbach Alpha Item Analysis was performed on the survey questionnaire to ensure that each indicator was valid and accepted scientifically. The 30 statements with 5 points Likert scale have passed the reliability using Cronbach's Alpha measure of internal consistency with 0.97 excellence

Data Collection

The researchers asked for consent from the instructors to do a study. After getting the approval, the researchers provided and used survey questionnaires. The questionnaires were checked and validated by the research adviser, validators, and psychometrician. The survey questionnaires were handed to the respondents who were the Civil Engineering Students of Batch 2023 and some of the Civil Engineering Instructors. The survey questionnaires that they answered helped the researchers with the statistical data required for their study. Through the data and information collected, the researchers were able to tabulate the results and came up with conclusions and recommendations.

Data Processing and Analysis

The information and data gathered from the respondents were transcribed and finalized using Descriptive Statistics. According to Dr. Manju Kaushik & Bhawana Mathur (2014), it is a process of analyzing data that is presented in terms of tables and graphs. It gathers significant amounts of data in a structured manner.

The Statistical Package for Social Sciences, generally known as SPSS edition 26.0, was the software utilized to analyze and calculate all of the data effectively. Also, to evaluate differences between the means or averages of many groups, a statistical approach known as Analysis of Variance (ANOVA) was performed. It is employed in a wide range of scenarios to determine whether there are significant variations in the means of different groups.

Ethical Consideration

For each research study, it is necessary for the researchers to comply with the code of ethics and principles (Bhasin, 2020). Researchers were obligated to advise their respondents that the data they provided will be kept private (Allen, 2017). Researchers followed the provisions of the Data Privacy Act (R.A. No.10173), which stated that all types of data, whether private, personal, or sensitive, must be secured. The respondents' full agreement were obtained before the study. To protect their privacy, strict laws were put in place. Each respondent received a permission letter outlining some of the study's key components, as well as information to assist them manage their concerns. The individuals' participation in the survey was entirely voluntary.

3. RESULTS AND DISCUSSION

In order to address the particular problems raised in Chapter 1, Chapter 3 presented the data analysis and interpretation of the data obtained using the study's instrument which was the survey questionnaires.

Table 1. Likert Scale Interpretation table

Numerical Value	Scale of margin			Interpretation
1	1.00	-	1.80	Strongly disagree
2	1.81	-	2.60	Disagree
3	2.61	-	3.40	Neutral
4	3.41	-	4.20	Agree
5	4.21	-	5.00	Strongly agree

Numerical Value	Scale of margin			Interpretation
1	1.00	-	1.75	Poor
2	1.76	-	2.50	Fair
3	2.51	-	3.25	Good
4	3.26	-	4.00	Excellent

Table 2. Descriptive Statistics on the advantages and disadvantages during face-to-face class

During Face-to-face Class		Mean	Std. Deviation	Response Category
2.1	During face-to-face classes, I pay attention and listen to every class discussion	4.1474	0.72538	Agree
2.2	I can participate well during class discussions	3.7729	0.79512	Agree
2.3	I can manage my time well during face-to-face class	3.7331	0.93620	Agree
2.4	I am always motivated in attending my face-to-face classes	3.7809	0.94857	Agree
2.5	Face-to-face class is more effective for me	4.2869	0.90630	Strongly agree
2.6	Face-to-face classes had a huge impact on my performance as a civil engineering student	4.4263	0.73590	Strongly agree
2.7	Face-to-face classes help me improved my skills in doing my plates and other activities	4.2908	0.80937	Strongly agree
2.8	There are more advantages in learning through face-to-face classes.	4.3705	0.80633	Strongly agree
2.9	Solving different problems is much easier during face-to-face class	3.9442	0.92783	Agree
2.10	I have good grades during face-to-face class	3.3307	0.86615	Neutral
	Grand Mean	4.0084	0.84572	Agree

Table 2 showed the descriptive statistics on the advantages and disadvantages during face-to-face encountered by the respondents. As shown on the table above, an overall mean of 4.0084 was obtained. This indicated that the respondents agreed on the statements regarding face-to-face mode of learning. Participation, time management, paying attention to every class discussion, and being motivated to come to class, and makes it easier to solve a variety of problems were all found to be advantages in this classroom setting. Additionally, respondents strongly agreed that face-to-face instruction was effective, had an impact on their performance as a student studying civil

Table 3. Descriptive Statistics on the advantages and disadvantages during online class

During Online Class		Mean	Std. Deviation	Response Category
3.1	During Online Classes, I pay attention and listen to every class discussion	3.1873	0.849	Neutral
3.2	I can participate well during class discussions	3.2311	0.91782	Neutral
3.3	I can manage my time well during online class	3.6215	1.01399	Agree
3.4	I am always motivated in attending my online classes	3.1116	0.96515	Neutral
3.5	Online class is effective to me	2.7928	1.03774	Neutral
3.6	Online classes had a huge impact on my performance as a civil engineering student	3.4064	1.10372	Neutral
3.7	Online classes help me improved my skills in doing my plates and other activities	3.0677	1.02732	Neutral
3.8	There are more advantages in learning through online classes.	2.9283	1.00142	Neutral
3.9	Solving different problems is much easier during online class	3.0558	1.08299	Neutral
3.10	I have good grades during online class	3.7052	0.91254	Agree
	Grand Mean	3.2108	0.99117	Neutral

engineering, improved skills in doing plates and other activities, and has more benefits for learning. On the contrary, statement *2.10: I have good grades during face-to-face class.*, had a mean value between 2.61 to 3.40, which means that respondents neither agree nor disagree.

According to the study of Hotle and Garrow (2015), the students had an excellent experience in traditional learning, with 33.3% of the respondents admitting they loved it and 63 % saying they liked it most of the time. Because they had familiarity and experience with the face-to-face learning method, many students stated that they are confident in the traditional classroom setting.

Table 3 displayed the descriptive statistics on the advantages and disadvantages during online class encountered by the respondents. Based on the results, an overall mean of 3.2108 was obtained. This demonstrated that the respondents were neutral towards the statements made about online learning. The respondents were found to benefit from time management and receiving good grades in online class setup. On the other hand, all claimed about online classes obtained a mean value between 2.61 to 3.40, which means that respondents neither agree nor disagree.

In the conducted study of Gautam (2021), the efficacy of online classes is determined by the technology proficiency of both students and instructors. Additionally, Zaurin et al., (2020) stated that civil engineering students believe that using online learning helped them manage their time properly and achieve their goals in class.

Table 4 displayed the descriptive statistics on the advantages and disadvantages during blended learning encountered by the respondents. As shown on the table above, an overall mean of 3.4283 was obtained. This indicated that the respondents agreed on the statements regarding blended mode of learning. Participation, time management, paying attention to every class discussion, and being motivated to come to class, had an impact on class performance as a student studying civil engineering, and improved skills in doing plates and other activities, were all found to be advantages in this classroom setting. Contrarily, respondents neither agree nor disagree on the statements regarding the effectiveness of blended learning, its advantages, making it simpler to solve a variety of difficulties, and getting good grades while in blended learning.

According to Mcdonald et al., (2020), students were more engaged in blended learning, which were found to lack social connectedness or possibly to cause detachment from peers.

Table 5. Descriptive Statistics on the level of agreement of the instructors during face-to-face class

During Face-to-face Class		Mean	Std. Deviation	Response Category
5.1	I can efficiently teach my lessons, especially problem-solving during full face-to-face classes	4.9286	0.26726	Strongly agree
5.2	My students are more attentive during full face-to-face classes	4.7143	0.46881	Strongly agree
5.3	There is effective communication between instructors and students during full face-to-face classes	4.7857	0.42582	Strongly agree
5.4	It is effective for me to use the traditional learning method	4.6429	0.49725	Strongly agree
5.5	It is easier for me to mold my student's skills during full face-to-face classes	4.7143	0.46881	Strongly agree
5.6	Face-to-face learning setup is convenient for me especially when it comes to time management	4.1429	0.86444	Agree
5.7	I can pay more attention to my students during face-to-face classes	4.6429	0.63332	Strongly agree
5.8	I can discipline the students well in full face-to-face classes	4.8571	0.36314	Strongly agree
5.9	I can attest that full face-to-face class can be more encouraging to students to study well	4.6429	0.49725	Strongly agree
5.10	Face-to-face classes are more effective when it comes to enhancing students' skills	4.8571	0.36314	Strongly agree
	Grand Mean	4.6929	0.48492	Strongly agree

Table 5 showed the descriptive statistics on the level of agreement of the instructors during face-to-face mode of learning. As shown on the table above, an overall mean of 4.6929 was obtained. This showed that the assertions about face-to-face learning were strongly agreed upon by the respondents. All of the respondents gave favorable feedback (with a mean value between 4.21 to 5.00 indicating a strong level of agreement) on all the statements related to face-to-face setting, except for statement 5.6: *"Face-to-face learning setup is convenient for me, especially when it comes to time management."*, which the respondents agreed.

As stated by Weightman et al., (2017), traditional (face-to-face) instruction raises information literacy dramatically, when directly evaluated both before and after teaching, (IL) competencies.

Table 4. Descriptive Statistics on the advantages and disadvantages during blended learning

During Blended Learning		Mean	Std. Deviation	Response Category
4.1.	During Blended Learning, I pay attention and listen to every class discussion	3.7649	0.74063	Agree
4.2.	I can participate well during class discussions	3.4223	0.73549	Agree
4.3.	I can manage my time well during blended learning	3.5538	0.90338	Agree
4.4.	I am always motivated in attending my online classes and face-to-face classes (blended learning)	3.4462	0.84858	Agree
4.5.	Blended Learning is more effective for me	3.259	1.04339	Neutral
4.6.	Blended Learning had a huge impact on my performance as a civil engineering student	3.5538	0.93386	Agree
4.7.	Blended Learning help me improved my skills in doing my plates and other activities	3.4143	0.90091	Agree
4.8.	Blended Learning has more advantages compared to face-to-face classes and online classes	3.1793	1.05249	Neutral
4.9.	Solving different problems is much easier during blended learning	3.2948	0.89484	Neutral
4.10.	I have good grades during blended learning	3.3944	0.80487	Neutral
	Grand Mean	3.4283	0.88584	Agree

Table 6. Descriptive Statistics on the level of agreement of the instructors during online class

During Online Class		Mean	Std. Deviation	Response Category
6.1	I can efficiently teach my lessons, especially problem-solving during online classes	3.7857	0.57893	Agree
6.2	I am more comfortable when I'm teaching online	3.6429	0.49725	Agree
6.3	I prefer the online learning setup rather than the two different setups which are the face-to-face and blended learning	3.0000	0.78446	Neutral
6.4	Powerpoint Presentations and other online platforms are effective rather than chalk and blackboard	3.3571	0.74495	Neutral
6.5	I have the ability to stimulate the interest of the student in the subject in using the online modality	3.2143	0.57893	Neutral
6.6	I can attest that online class can be more encouraging to students to study well	2.7857	0.80178	Neutral
6.7	Online classes are more effective when it comes to enhancing students' skills	2.4286	0.64621	Disagree
	Grand Mean	3.1735	0.66179	Neutral

Table 6 displayed the descriptive statistics on the level of agreement of the instructors during online. As shown on the table above, an overall mean of 3.1735 was obtained. This indicated that the respondents neither agreed nor disagreed on the statements regarding the online learning modality. The respondents agreed that using an online setup increases their convenience and efficiency. In comparison, they disagree that it is more effective in enhancing students' skills. Moreover, statements on the preferred method of learning, the efficiency of the platform utilized, the capacity to stimulate students' interest in the subject, and the ability to motivate students obtained a mean score between 2.61 to3.40,

indicating that respondents neither agree nor disagree

Table 9. Descriptive Statistics on the level of performance on the skills obtained during online class

During Online		Mean	Std. Deviation	Response Category
9.1	Analysis of Math-related problems	2.6932	0.66145	Good
9.2	Conceptualization of Ideas	2.7570	0.65169	Good
9.3	Critical thinking	2.6773	0.68952	Good
9.4	Visualization of concepts	2.7570	0.66385	Good
9.5	Decision Making	2.6773	0.72349	Good
9.6	Adaptability	2.6972	0.72385	Good
9.7	Attention span	2.3466	0.81693	Fair
9.8	Leadership Skills	2.5259	0.76048	Good
9.9	Communication Skills	2.6215	0.77729	Good
9.10	Creativity	2.8127	0.74350	Good
	Grand Mean	2.6566	0.72121	Good

on the statements about online class.

According to Hamdan and Amorri (2022), online teaching approaches are getting less efficient in motivating learners throughout the learning process, and new instructional approaches and concepts that positively impact distance learning are needed to be investigated.

Table 7 displayed the descriptive statistics on the level of agreement of the instructors during blended learning. Results showed that an overall mean of 3.4048 was obtained. This indicated that the respondents neither agreed nor disagreed on the statements regarding the blended learning. The respondents agreed that employing a blended learning setup increases their efficiency, allows them to complete tasks concurrently, makes blended learning as a teaching strategy easier to adapt, promotes time management, and allows them to assess students' performance. However, a mean score between 2.61 to 3.40, indicating that respondents neither agree nor disagree on the statements about how convenient it is, how well it maximizes teaching abilities, how it is more motivating for students, and how well it improves students' capabilities.

Using blended learning instruction with less instructional time is neither more or less as efficient compared to traditional mode of learning. This is in accordance with the findings of (Nortvig et al., 2018), which indicate that learning style is not the most important factor in achieving academic success, rather, instruction and learning are highly evident and contextually based. There's been no inherent instructional style; thus, the efficiency is heavily dependent on implementation quality.

Table 8 above displayed the level of performance

Table 8. Descriptive Statistics on the level of performance on the skills obtained during face-to-face class

During Face-to-face		Mean	Std. Deviation	Response Category
8.1	Analysis of Math-related problems	3.0159	0.59979	Good
8.2	Conceptualization of Ideas	3.1514	0.60744	Good
8.3	Critical thinking	3.1394	0.62648	Good
8.4	Visualization of concepts	3.1793	0.64787	Good
8.5	Decision Making	3.1633	0.59432	Good
8.6	Adaptability	3.2112	0.61906	Good
8.7	Attention span	3.0996	0.71697	Good
8.8	Leadership Skills	2.9283	0.80674	Good
8.9	Communication Skills	3.1833	0.76307	Good
8.10	Creativity	3.1474	0.67984	Good
	Grand Mean	3.1219	0.66616	Good

on the skills obtained during face-to-face setup. All skills listed on the table above obtained a good level of performance during face-to-face mode of learning. This included analysis of math-related problems, conceptualization of ideas, critical thinking, visualization of concepts, decision-making, adaptability, attention span, leadership skill, communication skills, and creativity.

According to Ahmed S. et al., (2020), their participants agreed that face-to-face learning increases professionalism through improved teamwork. Cognitive, communicative, and communication skills are obtained mostly during face-to-face classes.

Table 9 showed the level of performance on the skills obtained during online class setup. The respondents obtained a good level of performance on the skills regarding the analysis of math-related problems, conceptualization of ideas, critical thinking, visualization of concepts, decision making, adaptability, leadership skill, communication skills, and creativity. On the contrary, a fair level of performance was obtained on attention span.

A student's attention span is a crucial factor in online

Table 7. Descriptive Statistics on the level of agreement of the instructors during blended learning

During Blended Learning		Mean	Std. Deviation	Response Category
7.1	I can efficiently teach my lessons, especially problem-solving during blended learning	3.5714	1.01635	Agree
7.2	Blended learning is more convenient rather than traditional learning and online learning in teaching CE students	3.3571	1.00821	Neutral
7.3	Blended learning helps me perform well in doing my task simultaneously as an instructor	3.7143	0.72627	Agree
7.4	Blended learning is easier to adapt as a method of teaching	3.5000	0.85485	Agree
7.5	Blended Learning helps me in managing my time efficiently	3.5714	0.75593	Agree
7.6	Blended Learning helps us to evaluate the performance of students since it is a combination of face-to-face and online class	3.4286	0.93761	Agree
7.7	Blended learning helps me maximize my teaching skills	3.2143	1.05090	Neutral
7.8	I can attest that blended learning can be more encouraging to students to study well	3.2143	0.97496	Neutral
7.9	Blended learning is more effective when it comes to enhancing students' skills	3.0714	0.91687	Neutral
	Grand Mean	3.4048	0.91577	Neutral

education. If the learner is frequently admonished by the instructor for not listening and paying close attention, the entire period will be disrupted and the permitted amount of time will be compromised (Cicekci & Sadik, 2019).

Table 10 displayed the level of performance on the skills obtained during blended learning setup. All skills such as analysis of math-related problems, conceptualization of ideas, critical thinking, visualization of concepts, decision

Table 10. Descriptive Statistics on the level of performance on the skills obtained during blended learning

During Blended Learning		Mean	Std. Deviation	Response Category
10.1	Analysis of Math-related problems	2.9801	0.57585	Good
10.2	Conceptualization of Ideas	2.9880	0.60321	Good
10.3	Critical thinking	2.9522	0.64939	Good
10.4	Visualization of concepts	2.9761	0.61921	Good
10.5	Decision Making	2.9960	0.62288	Good
10.6	Adaptability	2.9841	0.65096	Good
10.7	Attention span	2.8685	0.65928	Good
10.8	Leadership Skills	2.8924	0.74322	Good
10.9	Communication Skills	3.0080	0.68113	Good
10.10	Creativity	3.0199	0.64777	Good
	Grand Mean	2.9665	0.64529	Good

making, adaptability, attention span, leadership skill, communication skills, and creativity, had obtained a good level of students' performance during blended learning.

Based on the study of Tong et al., (2022), blended learning strengthens students by enhancing their communication skills, boosting their thinking abilities, improving their abilities in solving mathematical problems, and developing technological-related skills.

Table 11. Descriptive Statistic

	Mean	Std. deviation
Face-to-face	4.0088	.58365
Online Learning	3.1837	.70491
Blended Learning	3.4303	.69808
Total	3.5409	.74846

Table 12. ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	90.047	2	45.023	101.951	.000
Within Groups	331.214	750	.442		
Total	421.260	752			

Table 13. Multiple Comparison

Dependent Variable: Rating

Tukey HSD

(I) Mode of Learning	(J) Mode of Learning	Mean Difference (I-J)	Std. Error	Sig.	Interpretation
Face-to-face	Online Learning	.82510*	.05932	.000	Significant
	Blended Learning	.57849*	.05932	.000	Significant
Online Learning	Face-to-face	-.82510*	.05932	.000	Significant
	Blended Learning	-.24661*	.05932	.000	Significant
Blended Learning	Face-to-face	-.57849*	.05932	.000	Significant
	Online Learning	.24661*	.05932	.000	Significant

**The mean difference is significant at the 0.05 level.*

Table 11, 12 & 13 showed the comparison between the ratings of the respondents towards the different mode of learning. Based on the results, there was a significant statistical difference among the groups, as demonstrated by one-way ANOVA. ($F(2,750) = 101.951$, $p = 0.000$). A Tukey post hoc test showed that the ratings of students towards face-to-face mode of learning was statistically higher ($M = 4.0088$, $SD = 0.58365$) compared to online mode of learning ($M = 3.1837$, $SD = 0.70491$) and the blended learning ($M = 3.4303$, $SD = 0.69808$). Therefore, face-to face learning method was the most effective learning platform for the students that suits their chosen program.

4. CONCLUSION

In conclusion, it was found that face-to-face mode of learning is more effective for students when it comes to enhancing their practical skills and improving their performance. The results indicated that a large number of students found e-learning or online classes advantageous in terms of adaptability and convenience. After conducting thorough research, it was deduced that the most desirable method of acquiring knowledge for students is through face-to-face learning. This mode integrates both physical and digital instruction styles to maximize student comprehension and retention.

On the other hand, the level of agreement of the instructors in the Civil Engineering Department regarding the different educational setups varied. They generally prevailed that face-to-face classes were the most efficient way to impart proficiency on certain topics, whereas respondents disagreed regarding online classes being effective when it comes to enhancing students' skills. Meanwhile, blended learning was seen as a way to provide a balance between traditional and modern teaching methods.

Furthermore, an evaluation was conducted to assess students' capacity across different learning modes in connection to the knowledge they gained in the program. It was revealed that the student's performance across all three learning modes may vary. However, they reported having more opportunities for practical application in physical classroom settings.

In light of the statistical analysis conducted, face-to-face learning presented as the most effective educational method for Civil Engineering Students of Batch 2023, as it improves students' technical skills and critical thinking, and it was preferred by the students based on the data.

Recommendations

In order to develop better education systems, researchers recommend that higher education institutions (HEIs) implement and adapt teaching innovations that have been found essential throughout the different learning phases. These innovations will be beneficial to the students and instructors in enhancing their skills.

Researchers recommend that the Civil Engineering department should have an academic intervention program to monitor the progress of Civil Engineering Students who are experiencing difficulties in adapting to the transition of different learning setups which affects their academic performances and skills. This program will help the department for sudden uncertainties that may come.

In order to generate concepts, materials, and techniques, Civil Engineering instructors need to attend webinars/seminars and trainings in order to optimize the best methods of teaching in terms of sudden transition, especially for instructors who are not well-equipped with the technology

The researchers recommend that students should focus and allocate more time to learning the fundamental principles of their lessons and practicing problem-solving. These would improve their academic performance and enhance their skills at present and future endeavors since their chosen program requires technical skills and application in real-world environment.

5. REFERENCES

Ahmed S. et al., (2020). Model for utilizing distance learning post COVID-19 using (PACT) a cross-sectional qualitative study. Retrieved from 10.1186/s12909-020-02311-1

Allen, (2017). Confidentiality and Anonymity of Participants. From https://methods.sagepub.com/reference/the-sage-encyclopedia-ofcommunication-research-methods/i3126.xml

Anna Kamille Balan and Thomas Anthony Montemayor (2020). The Influence of Online Learning towards the Attention Span and Motivation of College Students. Retrieved from https://www.researchgate.net/publication/348916010_The_Influence_of_Online_Learning_towards_the_Attention_Span_and_Motivation_of_College_Students

Ayadat et al., (2021). Effects of Students' Home Environment, Tools, and Technology Used on Online Learning Experience in a Civil Engineering Program. Retrieved from https://pdfs.semanticscholar.org/22cf/e98486fd40a661882a9e84a0cec0d5bd6fdd.pdf

Bhasin (2020). Research Ethics – Importance and Principles of Ethics in Research. From https://www.marketing91.com/research-ethics/

Carie Justine Estrellado (2021). Transition to Post-Pandemic Education in the Philippines: Unfolding Insights. Retrieved from https://doi.org/10.29322/IJSRP.11.12.2021.p12074

CHED (2020). CHED Memorandum Order No. 4 Series of 2020. Guidelines on the Implementation of Flexible Learning. Retrieved from https://chedro3.ched.gov.ph/wp-content/uploads/2020/10/CMO-No.-4-s.-2020-Guidelines-on-the-Implementation-of-Flexible-Learning.pdf

Chitra Ravi (2022). Impact Of Blended Learning On the Education System. Retrieved from https://www.entrepreneur.com/en-in/technology/impact-of-blended-learning-on-the-education-system/419375?fbclid=IwAR011zu7qkVIA5SyrhvA0wtpsnWhW3u6XHgGEDRlUzVgLxBhJjQ4kQjWLgQ

Claude Müller and Thoralf Mildenberger (2021). Facilitating flexible learning by replacing classroom time with an online learning environment: A systematic review of blended learning in higher education. Retrieved from https://doi.org/10.1016/j.edurev.2021.100394

Danielle Evans, Giulia A. Borriello, and Andy P. Field (2018). A Review of the Academic and Psychological Impact of the Transition to Secondary Education. https://www.frontiersin.org/articles/10.3389/fpsyg.2018.01482/full?fbclid=IwAR3k5PkW1bLEnsEN7ODQCoHffXjUPsLzwujto8FVZ0ZYT3j6sb1-9PwbreY

Dhruba Kumar Gautam and Prakash Kumar Gautam (2021). Transition to online higher education during COVID-19 pandemic: turmoil and way forward to developing country of South Asia-Nepal. Retrieved from https://doi.org/10.1108/JRIT-10-2020-0051

Drexel University School of Education (n.d). The Benefits of Online Education in a Virtual Classroom. Retrieved from https://drexel.edu/soe/resources/student-teaching/advice/benefits-of-online-and-virtual-learning/

Dr. Debbie Emery (2014). 5 KEY INDICATORS OF SCHOOL PERFORMANCE. Retrieved from https://flippengroup.com/5-key-indicators-school-performance-2/?fbclid=IwAR3TqSdG9RV-Grt_xS4fZvan_4d2tO7Cp7gcag7e01NFB2INaOMemxTGU_E

Dr. Manju Kaushik & Bhawana Mathur (2014). Data Analysis of Students Marks with Descriptive Statistics. Retrieved from https://doi.org/10.17762/ijritcc.v2i5.3136

Entis Sutisna and Lungguh Halira Vonti, (2020). Innovation Development Strategy for Hybrid Learning Based English Teaching and Learning. Retrieved from https://journal.uniku.ac.id/index.php/ERJEE/article/view/3783/2307

Estrellado (2021). Transition to Post-Pandemic Education in the Philippines: Unfolding Insights. Retrieved from http://dx.doi.org/10.29322/IJSRP.11.12.2021.p12074

Etikan et al., (2015). Comparison of Convenience Sampling and Purposive Sampling. Retrieved from https://doi: 10.11648/j.ajtas.20160501.11

García-Castelán, (2021). Face-to-face vs. Online learning in Engineering Courses. Retrieved from https://ieeexplore.ieee.org/abstract/document/9637177

Hamdan and Amorri, (2022). The Impact of Online Learning Strategies on Students' Academic Performance. Retrieved from https://www.intechopen.com/chapters/74314

Heanoy et al., (2022). COVID-19 Pandemic as a Transitional Event: From the Perspective of the Transition Theory. From https://doi.org/10.3390/encyclopedia2030109

Inovatif (2022). Penerapan Model Pembelajaran pace Dalam Meningkatkan Kemampuan Menggambar Mahasiswa Pada Konsep Vektor. From https://www.mendeley.com/catalogue/ea6af86d-d654-33ed-82dc-495aa33c3e04/?fbclid=IwAR0Qg8vtK2zpP8PZq3bh7Utb5srzkHlS3nJB8E-AIMjtZ42L0pmLTSPIDEw

Jitendra Singh et al., (2021). Combining the Best of Online and Face-to-Face Learning: Hybrid and Blended Learning Approach for COVID-19, Post Vaccine,

& PostPandemic World. Retrieved from https://journals.sagepub.com/doi/pdf/10.1177/00472395211047865

Jorge Olmedo Montoya Vallecilla and Galena Pisoni (2019). Understanding Students Views and Preferences towards Blended Learning in a Civil Engineering Course. Retrieved from https://ijisrt.com/assets/upload/files/IJISRT19JUL372.pdf

Jose Z. Tria (2020). The COVID-19 Pandemic through the Lens of Education in the Philippines: The New Normal from International Journal of Pedagogical Development and Lifelong Learning. Retrieved from https://www.ijpdll.com/download/the-covid-19-pandemic-through-the-lens-of-education-in-the-philippines-the-new-normal-8311.pdf

Kamal et.al., (2020). Engineering Students Readiness to Transition to Emergency Online Learning in Response to Covid-19: Case of Qatar. Retrieved from https://eric.ed.gov/?id=EJ1284842

Karen Quevillon (2018). Instructor vs Professor: What's In An Academic Name. From https://tophat.com/blog/instructor-vs-professor/#:~:text=Most%20of%20the%20time%2C%20%E2%80%9Cprofessor,professor%20is%20the%20first%20rank.

Kelum A. A. Gamage, Achini Gamage, and Shyama C. P. Dehideniya (2022). Online and Hybrid Teaching and Learning: Enhance Effective Student Engagement and Experience. Retrieved from https://doi.org/10.3390/educsci12100651

Khalid Kamal Naji et al., (2020). Engineering Students' Readiness to Transition to Emergency Online Learning in Response to COVID-19: Case of Qatar. Retrieved from https://doi.org/10.29333/ejmste/8474

Lee et al., (2022). Civil Engineering Student Performance Observation During COVID-19 Pandemic Period. Retrieved from https://ajee.utm.my/index.php/ajee/article/view/83/68

Levi Olmstead (2022). Online Learning vs. Face-to-Face Learning: Which Is Best?. Retrieved from https://whatfix.com/blog/online-learning-vs-face-to-face-learning/?fbclid=IwAR0yIfZkkRKFJzOqByu9m7vlDcBmwPv3Y4qtOcg4MyK7H28ALBdI8AytJjk

Maclion, (2018). Research Instrument. Retrieved from https://www.coursehero.com/file/87954005/Research-Instrumentdocx/

Mahyoob, Mohammad (December 2020). Challenges of e-Learning during the COVID-19 Pandemuc Experienced by EFL Learners (December 2020). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3652757

Mcdonald et al., (2020). Defining Students Learning Experience Through Blended Learning. Retrieved from https://link.springer.com/article/10.1007/s10639-020-10100-y?fbclid=IwAR08AfSbFsxIC_hn28Srd0cywl8NbMXlyL8whf0PxqTBClNGlR6gFsjCiAE

McLeod, (2019). What's the difference between qualitative and quantitative research?. Retrieved from https://www.simplypsychology.org/qualitative-quantitative.html

Nannette P. Napier, Sonal Dekhane, Stella Smith (n.d). Transitioning to Blended Learning: Understanding Student and Faculty Perceptions. Retrieved from https://files.eric.ed.gov/fulltext/EJ918216.pdf?fbclid=IwAR3GAslFYgmGOphT8V3-w53i9wLJZmTszS5Z-nIYjxEg-Eq-xezSHAHzg5M

Ozadowicz, (2020). Modified Blended Learning in Engineering Higher Education during the COVID-19 Lockdown-Building Automation Courses Case Study. Retrieved from https://sci-hub.hkvisa.net/10.3390/educsci10100292

Perante Wenceslao and Gomba Felisa (2021). Challenges to Online Engineering Education during the Covid-19 Pandemic in Eastern Visayas, Philippines. Retrieved from https://doi.org/10.26803/ijlter.20.3.6

Raes, A., Detienne, L., Windey, I. et al., (2020). A Systematic Literature Review on Synchronous Hybrid Learning: Gaps Identified. Retrieved from https://link.springer.com/article/10.1007/s10984-019-09303-z#citeas

Rehana Khalil et al., (2020). The sudden transition to synchronized online learning during the COVID-19 pandemic in Saudi Arabia. Retrieved from https://doi.org/10.1186/s12909-020-02208-z

Shivangi Dhawan (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. Retrieved from http://dx.doi.org/10.1177/0047239520934018

Shrestha, S. (2015). Implementation of blended learning strategies in a core civil engineering subject: an experience. Retrieved from https://researchdirect.westernsydney.edu.au/islandora/object/uws:33341/

Singh et al., (2021). Online, Hybrid, and Face-to-Face Learning Through the Eyes of Faculty, Students, Administrators, and Instructional Designers: Lessons Learned and Directions for the Post-Vaccine and Post-Pandemic/COVID-19 World. Retrieved from https://doi.org/10.1177/00472395211063754

TIBCO (2023). ANOVA. Retrieved from https://www.tibco.com/reference-center/what-is-analysis-of-variance-anova#:~:text=Analysis%20of%20Variance%20(ANOVA)%20is,the%20means%20of%20different%20groups.

Tong et al., **(2022).** The effectiveness of blended learning on students' academic achievement, self-study skills and learning attitudes: A quasi-experiment study in teaching the conventions for coordinates in the plane. Retrieved from https://doi.org/10.1016/j.heliyon.2022.e12657

Weightman et al., (2017). A Systematic Review of Information Literacy Programs in Higher Education: Effects of Face-to-Face, Online, and Blended Formats on Student Skills and Views. Retrieved from https://doi.org/10.18438/B86W90

Wenceslao & Felisa, (2021). Challenges to Online Engineering Education during the Covid-19 Pandemic in Eastern Visayas, Philippines Retrieved from https://doi.org/10.26803/ijlter.20.3.6

Zaurin et al., (2020). A Comparison between Mixed-Mode and Face-to-Face Instructional Delivery Approaches for Engineering Analysis: Statics. Retrieved from https://doi.org/10.18260/1-2--33985

