

The Perception on the Effectiveness of Hybrid Learning of Civil Engineering Students A.Y. 2022-2023 in Don Honorio Ventura State University- Main Campus, Philippines

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Abstract:

The learning environment in higher education today includes hybrid learning, a combination of online and in-person discussion. This applies to both campus-based courses and courses created specifically for distant learners. The main objective of this study is to utilize the effectiveness of the hybrid learning method based on the perceptions of Civil Engineering students of Don Honorio Ventura State University, Main Campus. This aim intends to address the challenges, influence, and effectiveness of hybrid learning. Also, the things needed to consider and improve in the current setup of hybrid learning at DHVSU.

To accomplish that purpose, the researchers conducted face-to-face data collection using the validated self-made questionnaire gathered at DHVSU. Using a mixed-method approach, the participants of this study are 334 Civil Engineering students and 31 Civil Engineering instructors. Moreover, four-point and five-point Likert Scale and Thematic Analysis were used in analyzing the gathered data among three variables.

As a result of the analysis, it was concluded that students maintain excellent academic resilience during hybrid learning, as seen by their determination in accomplishing their goals and have a high sense of self-efficacy amidst distractions yet there are still factors needed to be considered for the improvement of hybrid learning which is divided into three themes: Leniency, Intercommunication, and Setup.

Overall, this study offers an excellent basis for suggestions for improving hybrid learning programs. Finally, suggested actions for the stakeholders are revealed, along with ideas for how this study might be expanded in the future.

Keywords —Hybrid Learning, Academic Resilience, Self-Efficacy, Leniency, Intercommunication

I. THE PROBLEM AND A REVIEW OF RELATED LITERATURES AND STUDIES

1.1 Introduction

The COVID-19 pandemic has changed the world. The virus has affected human behavior, relationships, and lifestyles due to its nature, particularly the way it spreads, and it has an impact on the economy, political, and cultural environment of countries all over the world. The youth are susceptible to the effect of the pandemic, and many are now exposed to less progress when it comes to economic possibilities, health and well-being, and education at a crucial stage in their life development. The greatest and most significant disruption to educational systems has ever occurred

because of the pandemic. The resume of classes presents another problem because of the implementation of the various new standard operating procedures.

In the year 2020, there is a possibility of academic loss, or worse, many people will be lost in the future. Because of the COVID-19 pandemic, we now have the opportunity to introduce digital learning, and this is according to (Dhawan, 2020) wherein the students and teachers may experience different educational surroundings when switching from traditional face-to-face classes to online learning, and they have no choice; that’s why they are forced to accept the fact that they should adjust. Through the different online mediums, the educational system and teachers have accepted the fact that they are forced to use a system for which they are not

familiar. But now that the pandemic is gradually disappearing, the mode of learning is slowly returning to normal. It is a transition from an online learning to a hybrid learning environment. In a hybrid learning environment, students allocate half of their time learning online and other half in face-to-face classes. It is also one of the necessary means of learning and development for students and allows them to have more time with their friends and family and follow a schedule that works for them.

Some students who are in hybrid learning environments face challenges in the said learning environment. Some of them are having a hard time understanding their lessons, and some of them learn best when interacting with their peers. Students in hybrid classrooms may find that their classmates don't pay attention regularly or contribute as much as they want because they are only concerned with passing the subject. This non-engagement may be difficult because students are required to change their way of learning, which not everyone can do. Despite the exceptional focus of the Civil Engineering students on producing research regarding innovation, assessment, experimentation, and awareness, there has been no evidence that this topic has been tackled or brought up in detail since it is a new implementation of the learning environment. The study revolves around the perspectives of Civil Engineering students at Don Honorio Ventura State University-Main Campus towards the effectiveness of hybrid learning in the academic year 2022-2023. The researchers aim to know the different challenges of Civil Engineering students in the hybrid learning setup, as well as the influence of hybrid learning on the learning capacity of the respondents.

The research being conducted is undeniably essential as it is timely and relevant and can contribute to the development of the new education system. In addition, the study can also serve to be knowledgeable about the pulse of Civil Engineering students toward their perception on the effectiveness of hybrid learning through the use of appropriate research methods.

1.2 Review of Related Literature

The term hybrid learning is a course where students participate in class in person and through an online platform. This mode of learning is supported by the evolution of physical-virtual systems and artificial intelligence (Asikin, 2019). In their publication titled *Hybrid Learning in Mathematics Education: How Can It Work?* According to the description provided above, it is important to develop and investigate the possibility of implementing hybrid learning models that are appropriate and consistent with a level of

excellence that is expected and guaranteed for student learning. This study employed an explorative research approach to address the "how can" research issue concerning evaluating the possibilities of implementing a hybrid learning model for the university's teaching and learning process for mathematics. Several offline learning activities were also developed, a series of tests was put up, and an online learning system with related teaching and learning activities was designed. This study featured 30 students and was conducted as a pilot project at Universitas Negeri Semarang's Mathematics Department in Indonesia. This study was carried out in three initial phases: a prototype design, a small-scale field experiment, and a large-scale experiment. The researchers carried out observations as participating researchers in all of the experiments.

A debriefing session was held after taking notes and obtaining data. The data was first organized, annotated, and described before analysis began. The analysis was conducted throughout 2017 and 2018. The preliminary phase of this research was used to establish the specification process and create the technical requirements that would serve as the basis and direction for creating the system. The design of the online learning system and the creation of the learning activities took place in the next phase, which was based on a theoretical framework. The lecturer produced the course materials for both online and traditional classroom instruction. Following that, they were checked and graded by experts. An orientation session, a hybrid learning run, and a debriefing session were also included in both the small-scale and large-scale field trials. Several pilots were run during this phase.

According to Larry Cormicle (2015), hybrid learning can be effective, depending on the implementation. It is crucial to consider the goals of the hybrid learning program through asynchronous classes as well as maintaining face-to-face education. Online content may be employed in addressing the thinking process, comprehension, and implementation levels of intellectual activities while undertaking actual learning in classrooms through assessments, creation, and evaluation while sustaining knowledge at the previously described levels. When professors put less work into preparing well-structured asynchronous online activities, more of that effort may be used to boost student participation in real classes by actually meeting them in person access the learners to explore at a more advanced intellectual level.

Online and face-to-face components are both included in hybrid learning (Boelens, 2018). According to Daisy Lee and Stephanie Wing (2022), some schools are using a hybrid model of education depending on what they are interested in, learners can take classes via the Internet or in a

typical onsite classroom. Students are expected to attend class, but there are some legitimate excuses because they can't. For instance, if a student's family member interacts with confirmed cases, due to seclusion, students are expected to skip classes. There is an abundance of reasons why several students are opting for online education which also involves the readiness of the students for online learning. Such preparation involves autodidacticism, internet communication through self-beliefs, technological preparedness, self-regulated control, and a passion for being knowledgeable. They received responses from two groups of college students. Each mode, face-to-face and online, had a different group that was allocated at random. While classes were arranged to guarantee that both parties will receive comparable education despite the differences. Structural equation modeling (SEM) was performed using the application Smart PLS 3.0. Given the 100-person sample size's limited size, partial for the current investigation, least squares (PLS) of SEM were advised. A sample size of greater than 50 should be used, while the expected result for structural pathways employed for student preparedness is 5. The survey's required illustrative measurements should be at least identical to or more than 10 times the greatest value of ways intended for the given form of framework model." The research was carried out in October 2021. The research involved students from two different classes. One class was comprised of graduating college students in the field of marketing studies. The subject matter was a qualitative inquiry. We conducted both observations and in-depth interviews. Another batch of first-year college students was studying management organization. The issues covered included the external environment, company literature, and international administration. A total of 55 final-year students engaged as respondents in the Marketing Research course, while 45 first-year students participated in the Managing Organization course. Teachers have to use online education throughout the COVID-19 period. Some professors were afraid to create educational recordings before the epidemic because of technical problems. For student review, the majority of teachers record their lessons (Wut Taiming et al., 2021).

A recently developed age of tremendous chances—the epoch of technology and viable modifications in the educational procedure—was started. To accommodate the needs of all learners, hybrid learning environments have been developed. Freshmen enrollees can apply onsite with many different courses. Working students can enroll in online courses, and professors can provide synchronous lessons from their academic facilities (Sébastien Jacques et al., 2022).

The purpose of this study, titled Grade Prediction Modeling in Hybrid Learning Environments for Sustainable Engineering Education, is to extensively investigate the factors influencing students' academic achievement in environments that integrate actual and virtual education. Naturally, the findings will have an accustomed usage from circumstances that were only conducted virtually, particularly those that occurred during a patient's most vulnerable time crisis. In an era when educational systems are undergoing digital change, this effort strives to bestow the creation of sustainable higher education. The study discussed here was completed at the Mechanical Engineering Department of the School at the University of the West Attica, Greece. The first period happened in the first semester, and also in the second semester of the academic year 2021-2022. At the very beginning of the term, learners solely put an effort to create a virtual education environment. Mixed styles of instruction were employed in the next phase.

The scrutiny concentrated on a digitally programmed automatic plan syllabus called "Mechanical Design CAD I" as a means to assure the redundancy of the suggested study regardless of the time allotted. The purpose of this first-semester laboratory module is to familiarize students with the ideas behind three-dimensional drawings and related employing tools for computer-aided design to portray anything. The same learning strategy that was previously utilized was used as actual and virtual learning as a parallel support for asynchronous mechanisms, in the developing environment as health conditions gradually improved throughout the world. The COVID-19 virus is an epidemic that influenced the entire universe started in mid-March 2020, and traditional university education institutions have been completely disrupted. Countless innovative devices and manifestos have been implemented into the academic operation by trainers, instructors, and teachers as a result of the sudden and often precipitous change of physical learning environments into virtual online places (Kanetaki, Z. et al., 2021).

The educational process underwent a major change. Universities were forced to switch from traditional teaching and learning methods to entirely online instruction as a result of mobility constraints (Manea & Macavei, 2021). Some attendees from school at the UTCB were given a questionnaire that includes queries in general, overload responses to be rated on a 5-point Likert scale, and various rhetorical questions to learn how students felt about the online lectures during the pandemic. This research focuses on two open-ended inquiries about the alleged benefits of online courses and instances of appropriate use. 110 students responded to the questionnaire.

One observation was deleted due to insufficient data, leaving 109 attendees that include 67 male and 42 female learners, 101 were still undertaking college years, while 8 of them are graduates. There are students studying project management (9), urban engineering and regional development (12), trains, roads, and bridges engineering (26), and Civil Engineering (62).

This study is a qualitative one and a part of a bigger one that focuses on the students' opinions on how they feel about online learning. What are the benefits of online lectures? Is the research topic that this study seeks to address? The multiple-question responses have already been evaluated to identify keynotes before being categorized and organized into topics. Nine issues in all have been identified, five of which are related to education (e.g., reviewing lectures that have already been recorded, improving the approach to educational sources, refining contribution, enhancing education, and developing the way of speaking), and the other 4 of which are general topics are private issues (solace, laborsaving, careful usage of money, and well-being). 8 out of 109 respondents didn't name any advantages, and 21 of them did. Noted at least four benefits of online lectures. The remaining pupils spoke about one (24), two (38), and three (18) benefits. There are 249 benefits of online lectures in total, according to research. Up until today, learning activities took place face-to-face in universities or classrooms, but this has shifted to include learning virtually from home through a variety of platforms (Zaharah & Kirilova, 2020). Hybrid learning offers a wide range of exciting opportunities, including flexible schedules, simple access, the incorporation of multimedia resources, and more (J. Las-Heras-Casa et al., 2016). The main objective in engineering is education to offer the students the analytical thinking and information-gathering skills they will need to work in interdisciplinary teams to solve issues in the real world. (Erica J. Hagen & Dante Fratta 2014).

According to Rahman, A., Vojislav (2016), building a course that successfully combines online and in-person content, fully engages students, and is "learning focused, content centered, community-centered, and evaluation based" is one of the largest problems for educators. Any subject will find it challenging to maximize the potential of both the F2F sessions and the online content. It becomes extremely challenging in practical disciplines like engineering. The examinations and all of the content are available online, and students can access online help without having to interact face-to-face. Unfortunately, this method of instruction can make some students feel worried, bored, frustrated, and confused, which leads to a greater attrition rate. Blended

learning has been implemented in the Civil Engineering course at La Trobe University in Sydney, Australia. While academic staff saw benefits from introducing blended learning ideas into the way that subjects were taught, student feedback was less than favorable. Students believed that the use of blended learning had greatly increased their workload.

According to the researchers' observations of Engineering students at the University of Alberta in Canada, the early adoption of blended learning was time-consuming and expensive, especially when emerging combining online textbook resources and video tutorials to cover the entirety of a course's syllabus. In addition to these initial difficulties, the instructor must continue to maintain and pay attention to the quality of the online resources. There may be some "growing pains" involved with switching to more active learning techniques in face-to-face situations for both the students and the teacher (Samer Adeeb et al., 2017).

An essential course in Civil Engineering and Engineering Management is engineering project management. In order to apply what they have learned to real-world engineering management tasks, students in this course are expected to master the concepts of cost management, contract management, schedule management, and quality management. However, in the College of Construction Engineering, Jiangsu Open University in Nanjing, China, there are significant shortcomings in practical education, specifically, the capacity of students to apply their knowledge to real projects. The course's teaching materials are not updated as regularly as they should be, the content of the materials lags behind the development of the construction industry, and there is not enough time during the course's planned teaching hours to add new material. As a result, there is a disconnect between the classroom and real-world engineering, and the knowledge that students obtain cannot be effectively applied to real-world engineering management (Xiaolei Ji et al., 2020).

Based on a case study of Chung Yuan Christian University entitled Chung Yuan Christian University Establishes World's First ViewSonic Hybrid Teaching Classroom (2022) the online teaching process has been simplifying, the instructors are allowing to immediately learn about and utilize the latest technologies. A university's interest in studying pre-recorded videos could not be sustained due to a lack of participation, leading to instructors spending an enormous quantity of time adjusting to and preparing for online classes. Since it is unknown whether this pandemic is going to end or become worse, hybrid learning is expected to become increasingly common.

According to the video discussion of Commonwealth of Learning last 2018, hybrid learning is a word that has gone a long way, yet it may still be difficult to define and express. Many people who are considering or are now using mixed approaches have done so with minimal assistance or expertise. Administrators, academics, instructors, and students are frequently unaware of the requirements for engaging procedures and great outcomes.

In the development and evaluation of blended learning, four general characteristics must be represented:

- The method of delivery patterns those sequences and integrates physical or personal participation with autonomous and interactive digital social and conceptual activities.
- The resources, technology, and media applied.
- The use of several instructional approaches that reflect different learning methods and student engagement such as productivity, their attitude, experiential, question based, and others; and
- The usage of live video discussion and pre-recorded video discussion techniques.

Blended learning is basically more than combining online and face-to-face learning via the use of various media and methodologies. It might be tough to choose among the many conceivable combinations of components, patterns, and paces. A blended learning program or program's quality must be evaluated using proper parameters that represent the granular methods and consequences of combining many diverse teaching and learning options. When evaluating the efficacy of blended learning, it is beneficial to think about the use of online settings and the educational advantages they give. Certain characteristics must be satisfied for a blended environment to enable high-quality learning online; however, these conditions are also applicable to synchronous or face-to-face activities, which comprise the more conventional elements of the combined.

Online learning can:

- expand access; promote fairness in the educational setting by being colorblind, gender blind, and class neutrality.
- make studying more affordable and convenient, and
- increase students' learning skills in independence, self-control, and cooperation.

The Community of Inquiry theoretical framework led to the formulation of a survey instrument to help in evaluation. This survey is conducted from the instructor's perspective and analyzes the amount to which each of these existences is present in a hybrid program. The survey instrument's item

signals are able to be used both during and after a course to assess the activities in relation to each presentation, as well as during the planning stage. Adapted from Weimer (2002), the following learner-focused concepts can assist lead the evaluation of mixed-learning methods:

- Student based learning transfers the balance of control in the classroom from the instructor to the students, encouraging active learning and interaction between classmates.
- Student based learning promotes conceptualizing and is an approach to developing knowledge instead of just a collecting of information and questioning existing knowledge.
- Student based learning sees the instructor as an administrator and collaborator rather than an actual educator.
- Student based learning evolves the importance of learning towards students, allowing them to identify their abilities and constraints and participate in managing their knowledge development.
- A successful evaluation is used in student-centered learning to encourage student growth and inform potential practice (Commonwealth, 2018).

There is a study in the American Society for Engineering Education last 2016, where they conducted a study where they observed and studied the academic performance of students between the hybrid method and the traditional method. According to the findings, there are only 37% of students who took the hybrid course scored A's, compared to 49% of received A's in the traditional manner. In both versions, there were almost the same numbers of (37%) B's in students' performance. Nonetheless, the proportion of C's decreased to 12% in the hybrid version from 21% in the traditional methods. Only 1.92% of students attained a grade of D or below in the modern educational method, compared to 4.52% in the traditional learning method. The study also surveyed the students on how often they reviewed their online lectures, and it shows that 57% according to the learners, that they are not able to view the video again more than once. The proportion of students who stated that they had viewed less than a third of the presentations several times was 39%. Focus group interviews, however, revealed that students preferred to pause, rewind, and replay selected segments of movies rather than the online lecture. (Igu, A.K, & Jahren, C., 2016).

According to Hart (2018), to measure the efficacy of hybrid learning, others - an instructor, adviser, or peer - must analyze the learner's behavior for a more objective assessment. Personal observation, an interview, a skills

performance, exercise, or another sort of skills exam may be used in this type of evaluation. Based on the study of Springer Open (2017), according to survey, the learners grew adept at navigating the learning management system, and it was simple for them to discover course information, tools, and resources such as course works, news, conversations, and journal entries. They used communication technologies successfully, and they collaborated with peers by posting posts. They stated that online materials were well-organized, user friendly, and simple to put as well as properly structured and intelligible. As a result, using online resources for more course units in the future, because said they'd been happy. Overall, the online materials were satisfactory and 8for valuable as an educational instrument. The learners' LMS capabilities enabled them to communicate and work with other people, and what they were learning. They claimed computer program helped them acquire new concepts, facts, and skills, as well as communicate what they knew or learned. They appreciated the course modules and were increased their technological abilities. Learner interactions were investigated using intellectual development, group instruction, and student to teacher interactions. Learning with the group on the average, with low percentages of learners providing online difficulties and sharing online reading ideas for fellow students. Nonetheless, frequently meet online and arrange the way they were going to engage in studies during personal interactions. The most prevalent kind of communication medium utilized by learners throughout the blended learning experience was the phone, followed by WhatsApp, Facebook, discussion board, and email. At the intellectual level, learners interacted with material via reading submitted content, providing data via the LMS, participating in conversations on forums, and receiving information course goals and structure delivered during personal discussions. The of the student and instructors' engagement in which instructors engaging with them online and being properly led toward learning goals. They did obtain advice from instructors regarding resources to employ in their learning, and they did receive learning input from instructors to come up with their individual responses.

Based on an article in Manila Bulletin last 2022, Dr. Rosario-Braid said that the University of the Philippines implemented this year, blended learning will be used as the medium of delivery, this understanding of the necessity for integrated learning to equip human resources bodes well for the future. They can only provide learners with the so-called modern capabilities by significantly modifying learning and delivery techniques and providing a diverse range of learning resources in different formats. They include critical thinking, creativity, interpersonal skills, teamwork and compromise

abilities, logical process, and self-reliant learning. Personal qualities like responsive to challenge, interest, cautious, ready for changes, and active listening is required by the complexity of the contemporary world. The Department of Education (DepEd) required all public and private as a response, schools will open to traditional methods to the general public's assessment of the relative benefits of the latter over in-person instruction. But it seems that Initial surveys conducted around the world revealed, among other things, that "extended remote learning had harmed students." There was also demanded to return to the traditional method because on the Philippines were one of the last countries to return to traditional education method (Rosario-Braid, 2022).

Technologies that change quickly have forced educational institutions worldwide to re-evaluate how they teach and accommodate growing student populations while honoring their individuality and igniting their innate potential. The constraints and inability of traditional educational strategies and approaches to adapt to these developments consider how both teachers' and students' roles are evolving (Kundu, 2022). In addition to their obligations to the world, every country has made commitments, such as SDG-4 (UNESCO), to implement in order to offer affordable and equal quality education and to encourage possibilities for continuous development for every learner.

1.3 Research Gap

Hybrid learning is still something that is relatively new and has only just been embraced as a teaching strategy in the Philippines. The cited studies and literature in this study were from international sources and very few in the Philippines, but because of insufficient studies on local challenges and other things that were needed in this study, the researchers decided to focus on the international literature and studies. However, there are still disadvantages in this situation where the researchers needed to include information that is out of date depending on the subject area. To address this gap, this study can be used as relevant local literature for further study, wherein it focuses on the perceptions of Civil Engineering students with the newly implemented mode of learning.

1.4 Objectives of the Study

1.4.1 General Objectives

The goal of this study is to evaluate the effectiveness of Hybrid Learning to Civil Engineering students of Don Honorio Ventura State University-Main Campus.

1.4.2 Specific Objectives

- To know the challenges in a Hybrid Learning set up among the Civil Engineering students in Don Honorio Ventura State University-Main Campus.
- To know the influence of hybrid learning on the learning capacity of Civil Engineering students.

1.5 Statement of the Problem

The COVID-19 pandemic has made it necessary for us to maintain personal distance, which has caused a significant problem for the educational system, particularly to the students. Hybrid Learning is a learning technique that combines online and traditional discussion and learning that is provided for students to prepare themselves during the widespread of the COVID-19 virus (Perdani et al., 2021). This type of learning technique also combines in-person teaching with online distance learning. This paper aims to target to know how hybrid learning might affect the study essentials especially the Civil Engineering students of DHVSU-Main Campus. The following research questions were posed to find solutions for this key goal:

1. What are the major challenges of Civil Engineering students face in hybrid learning?
2. How does hybrid learning influence the learning capacities of Civil Engineering students?
3. How effective the hybrid learning is to the Civil Engineering students?
4. What are the recommendations that the students and instructors may give to improve the hybrid learning setup?

1.6 Significance of the Study

The study was made with the aim to provide information and knowledge about hybrid learning and its effectiveness. As stated in the studies that were cited, students have different preferences in different modes of learning because they have their own advantages and disadvantages. This study aimed to state the circumstances of Civil Engineering students in hybrid learning setups, as well as the influence of hybrid learning on the learning capacity of Civil Engineering students, and the effectiveness of hybrid learning to Civil Engineering students at Don Honorio Ventura State University (DHVSU)-Main Campus. This study will be a significant endeavor in providing methods to improve the hybrid learning method based on students' perceptions.

The outcome of the study could be significant and beneficial, particularly to the following:

Students. The direct recipients of the output of this study are the Civil Engineering students. Any improvement

stated for the new hybrid learning method can pave the way for producing a better mode of learning and discipline to survive and cope with the new normal.

Teachers. The outcome of this research may be useful to teachers to determine how to make a hybrid learning setup more conducive to learning. This serves as a guide on how teachers handle the difficulties encountered by students in the new learning method.

Educational Institutions. The outcome of this study may contribute to the improvement of the hybrid learning method for it to be more conducive for students to take.

Future Researchers. The study may provide information to the future researchers and their studies about the effectiveness of hybrid learning. The study showed the perceptions of Civil Engineering students on the effectiveness of hybrid learning, which can be used as data for future research and studies.

1.7 Scope and Limitation

The scope this research study is the perceptions on the effectiveness of hybrid learning and the target participants are the Civil Engineering students in Don Honorio Ventura State University-Main Campus, Philippines. The survey was conducted on 14.39% of the total population in the Civil Engineering Department of DHVSU-Main Campus. The study was done from November 2022 – May 2023.

1.8 Definition of Terms

Perception – a way of regarding, understanding, or interpreting something.

Hybrid Learning – it is the combination of the traditional way of learning and online learning.

Covid-19 – it is a transmissible virus from China that occurred in 2019. It is an infection caused by the novel strain of highly contagious corona virus (SARS-CoV 2) that was first discovered in late 2019.

Pandemic – a disease outbreak that spreads worldwide and affects a large number of the population.

Effectiveness – specifies things that are sufficient to achieve a goal or that lead to the desired or anticipated outcome.

Data – information and statistics gathered for reference or analysis.

Impact – pertaining to the strong effect or influence that something has on a circumstance or person.

Validate – to prove something based on facts.

Synopsis – it is a summary of the data.

Disruption – it is a pause or interruption in the on-going performance of a procedure, activity, etc.

Asynchronous – it is neither simultaneous nor on-going at the same time.

Susceptible – it is the ability to submit to a procedure, action, or operation.

1.9 Conceptual Framework

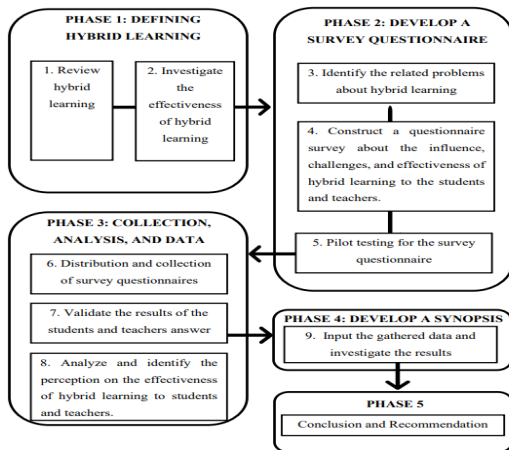


Fig. 1: Conceptual Framework

II. METHODOLOGY

2.1 Research Design

The research is mixed methods because it has broad methodological approaches, and its aim was to gather information about the effectiveness of hybrid learning. Furthermore, quantitative research includes collecting and analyzing numerical data in order to speculate or find correlations in the data. On the other hand, qualitative research refers to gathering and analyzing non-numerical data in order to understand their insights and opinions. It is also descriptive research where the researchers sought to know the perceptions on the effectiveness of hybrid learning among Civil Engineering students at Don Honorio Ventura State University-Main Campus. Furthermore, the researchers specifically wanted to know the challenges of Civil Engineering students in hybrid learning setups, the influence of hybrid learning on the learning qualities of Civil Engineering students, and more specifically, the effectiveness of hybrid learning for Civil Engineering students.

2.2 Population and Sample

The study was conducted at Don Honorio Ventura State University-Main Campus in the academic year 2022-2023. The researchers used the Raosoft Software, wherein 5% margin of error and 95% confidence level were used to acquire the accepted sample size for the survey.

This study involves 334 respondents that were selected randomly over 2,496 Civil Engineering students that are currently enrolled and 31 respondents over 40 Civil Engineering instructors who also experience hybrid learning setup in Don Honorio Ventura State University-Main Campus. Simple random sampling was used as the sampling technique, it is a type of probability sampling method in which every individual from the entire population is being selected equally.

2.3 Research Instrument

In this study, the researchers utilized a self-made questionnaire to gather the needed data for this study. The content of the questionnaire is a set of questions arranged in order, carefully prepared by the researchers to answer by the Civil Engineering students of Don Honorio Ventura State University-Main Campus to collect information needed in the study. The questionnaire consists of three parts. Part I gathered Civil Engineering students’ information pertaining to their age, gender, and year level. Part II is a survey questionnaire, a checklist that assesses the perception of Civil Engineering students and is divided into three parts: A. Challenges B. Influence C. Effectiveness. Part III gathered suggestions from the Civil Engineering students regarding things needed to improve hybrid learning. A four-point Likert scale was used in the Part II-A of the survey questionnaire since it is called a "forced" Likert scale. It indicates no neutral option and a good scale to record the participants’ thoughts on hybrid learning. A Likert scale with five-point options was used in the Part II-B and C of the survey questionnaire considering that the five-point Likert scale produce better data distribution and enable participants to express their views precisely (Joshi et. al, 2015).

TABLE I
The Likert Scale (Four-point)

SCALE	RANGE	DESCRIPTION
4	3.26-4.30	Nearly everyday
3	2.51-3.25	More than half the days
2	1.76-2.50	Several days
1	1.00-1.75	Not at all

TABLE II
The Likert Scale (Five-point)

SCALE	RANGE	DESCRIPTION
5	4.21-5.00	Strongly Agree
4	3.41-4.20	Agree
3	2.61-3.40	Neutral
2	1.81-2.60	Disagree
1	1.00-1.80	Strongly Disagree

2.3.1 Survey Questionnaire for Students

Age:

Gender:

Year level:

I. Survey Questionnaire - The Perception on the Effectiveness of Hybrid Learning of Civil Engineering Students at Don Honorio Ventura State University, Bacolor, Pampanga

The questions in this scale ask you about your feelings and thoughts during the last 2 months of hybrid learning. Use the scale to indicate your answer.

1-Not at All 2-Several Days

3-More Than Half the Days 4-Nearly Everyday

TABLE III

Survey Questionnaire A. Challenges

Direction: Please respond to the following items that best reflect your own perceptions using the following scale:

A.Challenges	1	2	3	4
1. I have trouble concentrating on things. <i>Nahirirapan akong mag-concentrate sa mga bagay-bagay</i>				
2. I have trouble in studying at my own pace. <i>Nahirirapan akong magtakda ng bilis at iskedyl sa aking pag-aaral.</i>				
3. I have trouble in participating and catching up in class. <i>Nahirirapan akong makilahok at makahabol sa klase</i>				
4. I have trouble in meeting the deadline of schoolworks. <i>Nahirirapan akong magpasa ng mga gawain sa tamang oras</i>				
5. I have trouble in transitioning from online classes to onsite classes. <i>Nahirirapan akong makaagapay sa paglipat mula online classes patungong onsite classes</i>				
6. I feel pressured/ running out of time. <i>Nakakaramdam ako ng presseure/ tila nauubusan ako ng oras</i>				
7. I feel less motivated. <i>Hindi ako gaanong nagaganyak</i>				
8. I have trouble forming good connections with my classmates and instructors. <i>Nahirirapan akong makikipag-ugnayan sa aking mga kaklase at guro</i>				
9. I have trouble in getting enough sleep and rest. <i>Nahirirapan akong magkaroon ng sapat na tulog at pahinga</i>				
10. I am having trouble with managing my time wisely for social life and studies. <i>Nahirirapan akong pangasiwaan nang tama ang oras ko para sa pakikisalamuha sa iba at sa aking pag-aaral</i>				

5 - Strongly Agree
4 - Agree
3 - Neutral
2 - Disagree
1 - Strongly Disagree

TABLE IV
Survey Questionnaire B. Influences

TABLE V
Survey Questionnaire C. Effectiveness

B.Influences	5	4	3	2	1
1.Hybrid learning influence the learning qualities of CE students. <i>Naïimpluwensyahan ng hybrid learning ang kalidad sa pag-aaral ng mga estudyante sa CE.</i>					
2.Hybrid learning affects my academic performance as a student. <i>Bilang estudyante, nakaka-apekto sa aking gawaing pang-akademikos ang hybrid learning.</i>					
3.Hybrid learning method helps me to initiate studying or learning more about a lesson. <i>Ang hybrid learning ay tumutulong sa akin na magkaroon ng kusang interes na mag-aral at matuto.</i>					
4.Hybrid learning is convenient for me as a CE student. <i>Magaan para sa akin ang hybrid learning bilang isang estudyante sa CE.</i>					
5.Hybrid learning makes classes more interesting. <i>Mas kawiki-wili ang hybrid learning sa klase.</i>					
6.Hybrid learning provides ease to communicate with the instructors. <i>Sa hybrid learning ay madaling makipag-komunikasyon sa mga guro.</i>					
7.It is easy meeting the deadlines in hybrid learning. <i>Madaling matugunan sa tamang oras ang mga gawain sa hybrid learning.</i>					
8.Hybrid learning matched my expectations and was implemented perfectly. <i>Ang hybrid learning ay tama sa aking inaasahan at naipapatupad ito nang maayos.</i>					
9.Hybrid learning increased access to learning and improved learning flexibility. <i>Dinagdagan ng hybrid learning ang daan sa pagkatuto at pinapabuti nito ang kakayahan na matuto.</i>					
10.Hybrid learning combined the strongest aspects of online and face to face learning. <i>Pinagsama-sama ng hybrid learning ang pinakamahalangang aspeto ng online at face-to-face na pag-aaral.</i>					

C.Effectiveness	5	4	3	2	1
1. Hybrid learning encourages me as a student to learn more actively. <i>Sa hybrid learning, nahihikayat akong matuto at maging aktibo bilang mag-aaral.</i>					
2. Hybrid learning gives me sufficient knowledge as a CE student. <i>Binibigyan ako ng hybrid learning ng sapat na kaalaman bilang isang CE student.</i>					
3. Participating in hybrid learning improved my skills. <i>Participating in hybrid learning method contributes to my skills.</i>					
4. The class maintain the learning progress with hybrid learning. <i>Ang hybrid learning method contributes to my understanding of the course.</i>					
5. Hybrid learning is efficient and provides distance both online and on-site classes. <i>Ang hybrid learning ay madaling mag-aaral sa online at on-site classes.</i>					
6. Hybrid learning helps me to focus more on my studies. <i>Ang hybrid learning ay tumutulong sa aking pag-aaral sa pamamagitan ng madaliang access sa paghingi ng tulong sa online at on-site classes.</i>					
7. Hybrid learning gives me an opportunity to use a variety of mediums and techniques to study. <i>Ang hybrid learning ay tumutulong sa aking pag-aaral sa pamamagitan ng paggamit ng iba't ibang mga medium at teknika sa pag-aaral.</i>					

III. Recommendations

Based on your own experiences, what are the things needed to be considered and improved in the hybrid learning method?
Base sa iyong sariling karanasan, ano-ano ang mga bagay na kailangan pang isaalang-alang upang mapabuti ang pamamaraang hybrid learning?

Fig. 2: Recommendations (Students)

2.3.2 Survey Questionnaire for Instructors

I. Personal Information

Age:

Gender:

II. Survey Questionnaire -

The Perception on the Effectiveness of Hybrid Learning of Civil Engineering Students at Don Honorio Ventura State University, Bacolor, Pampanga

The questions in this scale ask you about your feelings and thoughts during the last 2 months of hybrid learning. Use the scale to indicate your answer.

1-Not at All **2-Several Days**

3-More Than Half the Days 4-Nearly Everyday

TABLE VI

Survey Questionnaire for Instructors A. Challenges

Direction: Please respond to the following items that best reflect your own perceptions using the following scale:

5 - Strongly Agree 4 - Agree 3 - Neutral 2 - Disagree
 1 - Strongly Disagree

TABLE VII

Survey Questionnaire for Instructors B. Influences

A.Challenges	1	2	3	4
1. I have trouble concentrating on teaching in the hybrid modality.				
2. I have trouble monitoring students' pace in learning my subject.				
3. I have trouble monitoring the participation of my students.				
4. It is hard to set deadlines during the hybrid modality.				
5. I have trouble transitioning from online teaching to onsite teaching.				
6. I feel pressured and running out of time during teaching in the hybrid modality.				
7. It is hard to feel motivated during the hybrid modality.				
8. It is hard to connect to my students during the hybrid modality.				
9. During the hybrid modality I have trouble getting enough sleep and rest.				
10. I have trouble managing my time wisely in teaching in the hybrid modality.				

B.Influences	5	4	3	2	1
1. Hybrid learning influences the teaching strategies of CE Instructors.					
2. Hybrid learning affects my teaching performance.					
3. Hybrid learning influences students' initiative in studying our lessons.					
4. Hybrid learning is convenient for me as a teacher.					
5. Hybrid learning makes classes more interesting					
6. Hybrid learning makes it easy to communicate with the students.					
7. It is easy monitoring deadlines in the hybrid learning					
8. Hybrid learning influences the subject expectation of the students to my teaching strategies					

9. Hybrid learning increased access to my teaching strategies and improved the learning flexibility of my students.					
10. Hybrid learning combined the strongest aspects of online and face-to-face teaching.					

TABLE VIII

C.Effectiveness	5	4	3	2	1
1. Hybrid learning encourages students to learn more actively during sessions.					
2. Hybrid learning gives CE students sufficient knowledge in learning their lessons.					
3. During hybrid learning, students are observed to improve their skills a lot.					
4. Hybrid learning maintains the learning progress of the students.					
5. During hybrid learning, students appear to be more focused.					
6. During hybrid learning, students were given the opportunity to learn at their own pace.					
7. Teaching using recorded videos is found effective by my students.					
8. Hybrid learning is an effective method to teach Civil Engineering students.					
9. Hybrid Learning is more conducive to teaching compared to purely face-to-face classes.					
10. Hybrid Learning is more conducive to teaching compared to purely online classes					
11. Hybrid learning creates a highly efficient environment for both teachers and students					
12. Hybrid modality contributes to my overall efficiency as a teacher of the course					
13. Hybrid modality is efficient in providing access to constant assistance in both online and on-site classes.					
14. Hybrid teaching allows me to use a variety of mediums and techniques to teach students.					

Survey Questionnaire for Instructors C. Effectiveness

III. Recommendations

Based on your own experiences, what are the things needed to be considered and improved in the hybrid learning method

Fig. 3: Recommendations (Instructors)

2.3.3 Validation

The self-made survey questionnaire was validated by the research adviser, the psychometrician, and the grammarian before distributing the actual survey questionnaire to the respondents. The words used and the construction of the questions were also checked and revised with the help of the grammarian to avoid inconsistencies in the survey. A preliminary survey was also conducted before the actual data collection to determine the potential effectiveness and validity of the questionnaire.

2.3.4 Reliability Test

To see if the study is reliable, the researchers used Cronbach’s alpha with the help of Microsoft Excel. This will help to check and prove the internal consistency of the scale that is used by the study and will be interpreted with the help of the tool called Rules of Thumb about Cronbach’s Alpha Coefficient Size (Joseph F. Hair, Arthor H. Money et al. 2007).

TABLE IX

CRONBACH’ S ALPHA	INTERPRETATION
≥ 0.9	Excellent
$0.8 < 0.9$	Very Good
$0.7 < 0.8$	Good
$0.6 < 0.7$	Moderate
< 0.6	Poor

Rules of Thumb about Cronbach’s Alpha Coefficient Size

2.4 Data Gathering Procedure

To determine the number of respondents, the researchers asked for the approval of the school officials through a letter to know the exact population of the Civil Engineering students that are currently enrolled at DHVSU-Main Campus in the academic year 2022-2023.

The data for this study were gathered using a survey questionnaire that was made by the researchers and validated by the grammarian and the psychometrician. The survey questionnaire consists of questions that are related to the research problems of this study, and it was distributed to the 334 Civil Engineering students and 31 Civil Engineering instructors at Don Honorio Ventura State University-Main Campus.

The descriptive research design was chosen by the researchers, and it was used in this study. It is a kind of research design in which the purpose was to gather data to analyze a situation or population. The researchers used random sampling as their sampling technique. The simple random sampling is a type of probability sampling where the researchers select random respondents from the entire population. The respondents were found in Civil Engineering Department at Don Honorio Ventura State University-Main Campus.

2.4 Data Analysis

The researchers used a Likert Scale to measure how often Civil Engineering students experience the challenges of hybrid learning and how many students agreed or disagreed with various questions about the influence and effectiveness of hybrid learning on Civil Engineering students. After the data was retrieved, it was organized, tabulated, and tallied manually by the researchers with the help of Microsoft Excel. The researchers used the formula of mean and percentage. Thematic Analysis was also used to seek the findings for the qualitative part of this study, and the findings were summarized through descriptive statistics.

Cronbach's Alpha Formula:

$$\alpha = \frac{k}{k - 1} \left(1 - \frac{\sum V_i}{V_t} \right)$$

Where:

α = the Cronbach's Alpha

K = the number of items

V_i = the individual variance

V_t = the variance of the total score

TABLEX
Reliability Test for Students

	CRONBACH' S ALPHA	NUMBER OF ITEMS	INTERPRETA TION
Responses from the Survey (students)	0.92	34	Excellent

TABLEXI
Reliability Test for Instructors

	CRONBACH' S ALPHA	NUMBER OF ITEMS	INTERPRETA TION
Responses from the Survey (Instructors)	0.83	34	Very Good

$$wm = \frac{\sum wv}{n}$$

whereas:

wm = Weighted Mean

$\sum wv$ = Summation of Weighted Value

n = No. of Respondents

is 1.40, and all of them have a verbal interpretation of Not at all. The General Scale of Challenges Category is 1.32 and its verbal interpretation is Not at all.

III. RESULTS AND DISCUSSIONS

3.1 Data Analysis of Students' Responses

3.1.1 Data Analysis of Challenges Category

TABLE XI
4-Point Likert Scale in Challenges Category

Challenges	Mean	Verbal Interpretation
C1	1.51	Not at all
C2	1.16	Not at all
C3	1.19	Not at all
C4	0.91	Not at all
C5	1.37	Not at all
C6	1.63	Not at all
C7	1.40	Not at all
C8	0.91	Not at all
C9	1.75	Not at all
C10	1.40	Not at all
General Scale	1.32	Not at all

Among the presented ten (10) challenges about hybrid learning; C3, C10, and C2 got the highest percentage. Item C3 got 54% wherein Civil Engineering students were not having trouble studying at their own pace. Item C10 has a percentage of 48; it stated that 48% of the respondents were not having trouble participating and catching up in class. In item, C2, 47% of the respondents were not having trouble managing their time wisely for their social life and studies.

Table 12 shows the Likert Scale of the challenges category, item C1 is 1.51, C2 is 1.16, C3 is 1.19, C4 is 0.9, C5 is 1.37, C6 is 1.63, C7 is 1.40, C8 is 0.91, C9 is 1.75 and C10

3.1.2 Data Analysis of Influence Category

TABLE XIII
5-Point Likert Scale in Influence Category

Influence	Mean	Verbal Interpretation
I1	3.83	Agree
I2	3.97	Agree
I3	3.23	Neutral
I4	2.95	Neutral
I5	2.78	Neutral
I6	2.98	Neutral
I7	3.32	Neutral
I8	3.00	Neutral
I9	3.25	Neutral
I10	3.29	Neutral
General Scale	3.26	Neutral

Among the ten (10) influences of hybrid learning, students' performance (I2, 46%), learning method (I3, 44%), and expectations in implementing hybrid learning (I8, 47%), had been ranked as the most valuable influence of hybrid learning among Civil Engineering students.

The table above is the 5-Point Likert Scale of the Influence of Hybrid Learning on the learning quality of Civil Engineering students. I1 has a range of 3.83 while I2 has a range of 3.97, both have a verbal interpretation of Agree. The items I3, I4, I5, I6, I7, I8, I9, and I10 have a verbal interpretation of Neutral, they have a range of 3.23, 2.95, 2.78, 2.98, 3.32, 3, 3.25, 3.29 respectively. The General Scale for the Influence is 3.26 and it has a verbal interpretation of Neutral.

of Neutral, and they have a range of 3.16, 3.04, 3.04, 3.04, 2.86, 3.31, 2.89, 2.69, 3.24, 3.13, 3.05, 3.21, 3.42 respectively. Only item E6 has an Agree verbal interpretation and it has a range of 3.46. The General Scale is 3.11 and its verbal interpretation is Neutral.

3.1.3 Data Analysis of Effectiveness Category

TABLE XIV
 6-Point Likert Scale in Effectiveness Category

Effectiveness	Mean	Verbal Interpretation
E1	3.16	Neutral
E2	3.04	Neutral
E3	3.04	Neutral
E4	3.04	Neutral
E5	2.86	Neutral
E6	3.46	Agree
E7	3.31	Neutral
E8	2.89	Neutral
E9	2.69	Neutral
E10	3.24	Neutral
E11	3.13	Neutral
E12	3.05	Neutral
E13	3.21	Neutral
E14	3.42	Neutral
General Scale	3.11	Neutral

Among the fourteen (14) presented items that show the effectiveness of hybrid learning, items E2, E13, and E4 got the highest percentage. Item E2 got 47% wherein hybrid learning gave sufficient knowledge to Civil Engineering students. Item E13 also got 47%, those 47 claimed that hybrid learning was efficient and provided access to constant assistance in both online and on-site classes. Item E4 has a percentage of 46, it states that 46% of the respondents maintain the learning progress with hybrid learning in class.

Table 14 states that items E1, E2, E3, E4, E5, E7, E8, E9, E10, E11, E12, E13, and E14 have a verbal interpretation

3.1.4 Data Analysis of Qualitative Category

Three hundred thirty-four (334) Civil Engineering students of Don Honorio Ventura State University were asked to answer the survey questionnaire about the things that needed to be considered and improved on the hybrid learning method. The analysis produced three themes.

Leniency:

46% of the recommendations conclude the first theme. They provided their suggestions for teachers to be more considerate and understanding so the respondents could adjust. It also suggests having easy access to online materials. As they shared:

“Way of teaching, minsan kapag nasa way of teaching yung problema kasi hindi nakacatch yung attention ng student para makinig but nasa student pa rin yon.” [R1]

(Way of teaching. Sometimes, the teachers’ way of teaching is the problem because it doesn’t catch the attention of the students to listen, but it still depends on the students.)

“I think the instructor must send a ppt of their lesson after their class so the students will have a time to study on their own.” [R22]

“The quality of teaching should be good and full of knowledgeable learnings.” [R2]

“Instructors need to evaluate more in how to encourage students to learn and cope up with the changes as well as to spend more time in answering students’ queries/questions.” [R21]

“The things that are needed to be considered to improve the hybrid learning method is that instructors must need to be more considerate since not all students have the same capacity to understand a lesson.” [R43]

The responses to this theme suggested that the methods, strategies, and quality of teaching should be improved. Professors should give time and attention to students' queries. The responses also focused on the considerations of the instructors to understand the situations of each student because some of them are having a hard time adjusting to switching from the learning environment of online classes to hybrid learning, while others don't have the opportunity or time to do so. According to the respondents, the instructors should send the PowerPoint presentation, provide the recorded video discussion, and provide the learning materials for them to review their lessons because they are struggling to understand their lessons. Moreover, these results are supported by Chang et al. (2021) as it was concluded in their study that, in order to improve the efficiency of student learning, numerous advanced teaching strategies, courses, and educational technology have been implemented. In addition, Ioannou (2020) inferred in his study that with the support of technology, a lot of labor and education have recently been carried out online.

Intercommunication:

Other participants stated their suggestions in terms of the interaction and discussion with their instructors. As they shared:

"It is needed to discuss every f2f classes on hybrid learning, so we can fully understand the hard difficult topic." [R47]

"Less video recorded discussions and imply more synchronous meeting classes." [R58]

"The availability of contact for both teachers and students, both parties should have multiple ways of contacting each other for queries." [R46]

17% of the recommendations suggested reducing recorded video discussions. Instead, the respondents recommended conducting face-to-face discussions so that the students could understand their lessons better. Also, the responses stated that proper communication between

instructors and students is needed. According to Annelies Raes (2021) prove that the fact that there is more room for action, a whiteboard is available, and most importantly, the visibility of the students on the screens, all the teachers agreed that teaching during hybrid learning feels more intuitive and natural.

Setup:

In terms of setup, the participants highlighted how it is hard to cope up with the adjustment of schedules, quizzes, and deadlines. As they shared:

"Kapag f2f po sana wag puro quiz ang nasa schedule dahil nagiging cause po ito ng stress sa mga students." [R65]

(Avoid conducting quizzes in every face-to-face classes because it causes stress to students.)

"Proper scheduling of f2f discussions and f2f exams" [R74]

"Teachers should be more considerate on deadlines." [R79]

"Discussion should be in face-to-face classes, and does not have quizzes because it's better to have a discussion so students will listen well" [R86]

"Reduce exams during f2f classes, knowing that the discussion happens online because we don't understand completely in the setup" [R82]

37% of the suggestions stated that the designation of schedules and rooms should be improved and asked for teachers to be more considerate with deadlines during hybrid learning, as it would give them enough time to finish all their tasks. According to the responses, students are having a hard time adjusting, and schedules should be balanced from face-to-face to online classes. It also suggests avoiding conducting quizzes simultaneously in all subjects in every face-to-face class. According to the participants, the recent setup of hybrid learning in the Civil Engineering Department of DHVSU puts too much pressure on them, making them feel exhausted from studying. According to Huang et al. in Raes (2021), 2021, remote students are experiencing a sense of conclusion since

they were physically cut off from the main class specially when remote class experienced problems or difficulties without urgent assistance. Also, the study of Weitze et al. in Raes (2021) stated that, remote learners reported finding it hard to inform the teacher when they wish to get a response to a question, which makes them feel excluded. As a result, it's crucial to keep this in mind when creating the classes and to be conscious of the fact that distant students need to feel more included in class activities.

3.2 Data Analysis of Instructors' Responses

3.2.1 Data Analysis of Challenges Category

TABLE XV
 4-Point Likert Scale in Challenges Category

Challenges	Mean	Verbal Interpretation
C1	0.77	Not at All
C2	1.65	Not at All
C3	1.84	Several Days
C4	1.19	Not at All
C5	0.61	Not at All
C6	0.61	Not at All
C7	1.06	Not at All
C8	1.29	Not at All
C9	0.71	Not at All
C10	0.94	Not at All
General Scale	1.07	Not at All

Among the ten (10) presented questions about the challenges of hybrid learning C1, C8, and C9 got the highest percentage. Item C1 states that 55% of Civil Engineering instructors were not having trouble concentrating on teaching in hybrid learning set up. Item C8 also has a 55% distribution where the instructors were not having a hard time connecting with their students during the hybrid learning setup. Item C9 has the highest distribution which is 58%, wherein the instructors were not having trouble getting enough sleep and rest during the hybrid learning setup.

The table above shows that items C1, C2, C4, C5, C6, C7, C8, C9, and C10 have a verbal interpretation of Not at All, and a range of 0.77, 1.65, 1.19, 0.61, 0.61, 1.06, 1.29, 0.71, 0.94 respectively. Only item C3 has a verbal interpretation of Several Days and has a range of 2.5. The General Scale of the challenges category for instructors is 1.07 and its verbal interpretation is Not at All.

3.2.2 Data Analysis of Influences Category

TABLE XVI
 5-Point Likert Scale of Influences Category

Influences	Mean	Verbal Interpretation
I1	3.74	Neutral
I2	3.55	Neutral
I3	3.72	Agree
I4	3.71	Agree
I5	3.19	Neutral
I6	2.87	Neutral
I7	3.45	Neutral
I8	3.87	Agree
I9	3.71	Agree
I10	3.65	Agree
General Scale	3.55	Neutral

Among the ten (10) presented questions about the influences on hybrid learning, I1, I5, I8, and I9 got the highest percentage. Item I1, wherein 52% of Civil Engineering instructors influence the teaching strategies in a hybrid setting, Item I9 also has 52% where hybrid learning setup increased the access of teaching strategies and improves the learning flexibility of their students. In item I5, 55% believed that the hybrid learning setup made the class more interesting. Item I8 has the highest percentage; it indicates that 68% of the instructors believed that hybrid learning influenced the subject expectations of the students and their teaching strategies.

The Likert Scale of items I1, I5, I6, and I7 have a range of 2.8, 3.1, 2.8, and 3.4 respectively, all of them are under the verbal interpretation of Neutral. While the item I2, I3, I4, I7, I8, I9, and I10 have an orderly range of 3.5, 3.6, 3.7, 3.8, 3.7, and 3.7, their verbal interpretation is Agree. The General Scale of the Influences on Instructors is 3.41 and its verbal interpretation is Neutral.

3.2.3 Data Analysis of Effectiveness Category

TABLE XVII

6-Point Likert Scale of Effectiveness Category

Effectiveness	Mean	Verbal Interpretation
E1	3.33	Neutral
E2	3.35	Neutral
E3	3.03	Neutral
E4	3.16	Neutral
E5	2.94	Neutral
E6	3.61	Neutral
E7	3.33	Neutral
E8	3.19	Neutral
E9	2.90	Neutral
E10	3.61	Agree
E11	3.52	Agree
E12	3.52	Neutral
E13	3.77	Agree
E14	4.00	Agree
General Scale	3.38	Neutral

Among the fourteen (14) presented items that show the effectiveness of hybrid learning, items E1, E3, E13, and E14 got the highest percentage. Item E1 has 58%, wherein the respondents claimed that a hybrid learning setup encouraged students to learn more actively during sessions. Item E3 and E14 got 65%, the instructors believed that during hybrid learning, students were observed to improve their skills a lot and allow the instructors to use a variety of mediums and techniques to teach students. While item E13 got the highest percentage 68% where hybrid modality was efficient in

providing access to constant assistance in both online and on-site classes.

The 5-Point Likert Scale for Table 7 shows that items E1-E9 and E12 have a range of 3.3, 3.3, 3, 3.1, 2.9, 3.2, 3, 2.8, 2.9, and 2.6 respectively, and their verbal interpretation is Neutral. Items E10, E11, E13, and E14 have a range of 3.6, 3.5, 3.7, and 4, all of which are under the verbal interpretation of Agree. The General Scale of the effectiveness category is 3.2 and its verbal interpretation is Neutral.

3.2.4 Data Analysis of Qualitative Category

Thirty-one (31) Civil Engineering instructors of Don Honorio Ventura State University were asked to answer the survey questionnaire about the things that needed to be considered and improved on the hybrid learning method. The analysis produced three themes.

Leniency:

19% of the instructors provide their recommendations and suggestion for their co-instructor to be more considerate about the improvement of providing online learning materials to students which concludes the first theme. As they shared:

“Improved teaching strategies and lessons or avoid providing recorded discussion as a substitute to teaching online/ synchronous class. More on online participation than activities” [R5]

“Constant monitoring of their learning process” [R25]

“We should take into consideration the wide accessibility and strong connectivity of all households with the internet. Students with weak internet connectivity are likely to suffer the consequences of weak WIFI signals where in lessons are more difficult to understand because of on and off connectivity” [R16]

“Learning Materials” [R7]

“The most important thing for me need to be improved are the learning materials given to the students.” [R27]

Instructors said that they need to improve their way of teaching and that monitoring the students is important. Also, they stated that the most important way for a student to learn his/her lesson during online class is to give enough learning materials to them and that they need to be more considerate, especially for those students who have slow connectivity and internet connection.

Intercommunication:

Other participants stated their suggestions in terms of the interaction and discussion with their students. As they shared:

“Hybrid learning method helps teachers/instructors identify who among the students are attentive and have a good critical thinking skill, and during this method the instructors need to motivate his/her students to focus more on their respective lessons” [R11]

“Improved selecting discussion and assessment” [R23]

13% of the instructors defined how students will think critically and they said that online class or face-to-face helps them to identify who are attentive in class. In contrast to Raes' (2021) accomplishments, it emerged that the setting in which students engage with the teacher had a positive effect on their involvement. They find it simple to follow along with the Lecture because they are required to pay closer attention than in any other kind of class.

Setup:

In terms of setup, participants highlighted how it is hard to find a learning facility and the difficulty of providing tasks and deadlines. As they shared:

“During hybrid modality we as instructors struggles with the schedule and as well as time management because of the very limited time or discussion and assessments. I think

hybrid learning can be more efficient if the schedule/time was sufficient enough or us to discuss all the topics.” [R3]

“Conduciveness or learning facilities” [R18]

“Deadline for submission must be followed” [R22]

“There should be strict monitoring of students' academic requirement and performance” [R10]

“Discussions must be divided among online and face to face while assessment (quiz/exams) should be face to face fairness among students” [R14]

19% of the instructors said that they struggle with the schedule and time management because of the very limited time for discussion and assessments and in finding enough learning facilities. Also, the instructors said that the students need to comply with their given tasks and pass them to the date of submission and that instructors need to be strict in giving quizzes and exams, and that they need to be fair to the students all the time.

The remaining 49% of the total respondents decided not to disclose their comments, suggestions, and recommendations about the things that needed to be considered in the hybrid learning method.

IV.SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

4.1 Summary

The COVID-19 widespread has caused substantial impact to the teaching and learning progress of this educational system. Hybrid Learning is a process of education that combines online and on-site learning that is used as a preparation for students during the pandemic (Perdani et al., 2021). The researchers intended to investigate the hybrid concept in its entirety since it's timely and relevant and can further develop the new learning system. This study can provide insight to Civil Engineering students and instructors regarding their perception of the effectiveness of hybrid learning through the use of proper methods.

To accomplish that purpose, the researchers conducted face-to-face data collection using the validated

self-made questionnaire. All data for this study were obtained from Civil Engineering students and Civil Engineering instructors at Don Honorio Ventura State University.

This study contributes to a deeper discussion about the effectiveness of hybrid learning to student learning experiences and instructor teaching strategies in general. The findings can help anyone to consider implementing hybrid learning in higher education. Responses of survey participants indicate the challenges, influences, and effectiveness of how students learn and how instructors teach with and without the use of internet-based educational technology.

- The results further demonstrated the possibility of hybrid learning challenges in terms of students' learning experiences, also in terms of instructors' teaching strategies, and interactions between both of them.
- In turn, the influence that hybrid learning provides students and instructors tends to be considered a benefit to the educational setting.
- The efficacy of hybrid learning maintains the learning of students in class and instructors can use a variety of mediums and techniques to effectively teach students.
- When students state that they are not having trouble catching up in class this will not create undesirable challenges, especially in the quality of hybrid education. It is also important that if learning technologies from schools does not implement properly, might pose some problems to educational experiences for students learning in the hybrid method. Instructors must then be able to implement effective learning techniques, particularly in laboratory classes. Students must also cooperate in adjustments.

4.2 Conclusions

The pandemic requires the world to depend on technology to reach its objectives. As a result, instructors and

students are encouraged to continue enabling online discussion and traditional learning. The findings of this research presented information into the application of hybrid learning pertaining to the future. This study concluded the challenges and influences that affect the learning capacity of the students and the effectiveness of a hybrid learning environment for Civil Engineering students and instructors.

After analyzing the gathered data and information, the following conclusions were drawn:

- The students are not having trouble studying at their own pace and didn't experience difficulty managing their time wisely for their social life and studies, also they are not having a hard time participating and catching up in class. Hybrid learning matched the student's expectations and was implemented perfectly, but the student's academic performance was affected, so the hybrid learning method influenced them to initiate studying and learn more about the lesson.
- As a Civil Engineering student hybrid learning gives them sufficient knowledge and provides access to constant assistance in both online and on-site classes, as a result, it is effective and maintains the learning progress in the class.
- Instructors didn't encounter challenges during the hybrid modality and didn't experience difficulty getting enough sleep and concentrating on teaching, which resulted that it's not a challenge to connect with their students.
- Hybrid learning influences the subject expectations of the students to the instructors' teaching strategies and improves the learning flexibility of their students, so it makes classes more interesting.
- Civil engineering instructors' teaching practices were influenced by hybrid learning.
- Hybrid modality is efficient for instructors in providing access to constant assistance in both online and on-site classes because during hybrid learning

students were observed to improve their skills a lot. Students should consider the teacher's literacy in providing it.

- Hybrid teaching allows instructors to use a variety of mediums and techniques to teach students so they can possibly encourage them to learn more actively during sessions.
- Students' and instructors' suggestions were useful for this study. A hybrid learning setup requires online discussions and face-to-face quizzes. Any kind of interaction must have good communication; instead of internet-based teaching, students prefer to have a face-to-face discussion because for them they can easily catch up and understand the lessons. But students should consider their safety, so even in online classes students must participate in class and study more.
- Online quizzes and exams were suggested by students in addition to the hybrid learning set-up, yet students should understand that instructors are just following the memorandum given by the school stating that students can only take exams face-to-face, and instructors can only give face-to-face exams.
- 46% of the students said that they were having a hard time adjusting from traditional face-to-face classes to fully online classes and had difficulty understanding their lessons in a hybrid learning setup. Instructors should therefore be concerned about students' situations and improve their way of teaching. Students should communicate properly and consider that instructors are also adjusting.
- In terms of schedules, students and instructors suggested improving it, according to how they can cope with the adjustments.
- Blended learning requires the internet to study, most students recommend that instructors must send the PowerPoint presentation of the lesson requiring recorded video discussion. The most important way

to learn the lessons is to give students enough learning materials. It is used to develop the learning performance of the students.

- Students and instructors didn't experience challenges in facing hybrid learning but they have recommendations for improving it.
- Completing the requirements on time is one of the things to do in order to pass the subject. Deadlines are such a challenge for students in hybrid learning setups. For them, the things that need to be considered and improved are that instructors must be more considerate with deadlines and reduce the tasks, but still, students need to comply with their given tasks and finish them before the date of submission.

4.3 Recommendations

Considering the results obtained at the end of the study, it was noticed that the effect of hybrid learning on the academic performance of the students was different. In light of the findings, it was found suitable to make the following recommendations:

1. It was concluded that hybrid learning had a significant impact on the educational performance of the students. For this reason, the researchers recommend to the university especially under Civil Engineering Department to be mindful of the interplay between the challenges of learners, influences of students' learning capacity and effectiveness of educational outcomes which are sign of blended learning effectiveness.
2. It was concluded that both students and instructors do not face challenges during hybrid learning and that it was perfectly implemented, but they provided their suggestions for the improvement of hybrid learning. For this reason, it is recommended to conduct an assessment regarding hybrid learning to further know the things that need to improve since the analysis focuses only on the effectiveness of hybrid learning.

3. With the constant need for considerations regarding internet connection, further studies about how the internet connection affects the academic performance of the students are recommended.
4. It was concluded that the allotment of schedule is one of the factors that affect the students. For this reason, it is recommended to conduct studies about the significant relationship between students' academic performance and class schedules.
5. This analysis focuses on the perceptions of Civil Engineering students about hybrid learning. Further research about the different learning methods in the Philippines is recommended because of the lack of local-related literature on the study. It would also be vital to conduct another study regarding hybrid learning that is focused on the perceptions of the instructors in hybrid learning.

REFERENCES

- [1] Adeeb, S., Brown, C., & Nocente, N. (2017). An Instructor's Experience of Implementing Blended Learning in Engineering: Benefits and Challenges. Proceedings of the . . . CEEA Conference. <https://doi.org/10.24908/pceea.v0i0.7377>
- [2] Boelens, R., Voet, M., & De Wever, B. (2018). The design of blended learning in response to student diversity in higher education: Instructors' views and use of differentiated instruction in blended learning. *Computers & Education*, 120, 197–212. <https://doi.org/10.1016/j.compedu.2018.02.009>
- [3] Braid, F. R. (2022). The future is 'blended' learning. Manila Bulletin. Retrieved June 4, 2023, from <https://mb.com.ph/2022/12/03/the-future-is-blended-learning>.
- [4] Cahyono, A. N., & Asikin, M. (2019). Hybrid learning in mathematics education: How can it work? *Journal of Physics*, 1321, 032006. <https://doi.org/10.1088/1742-6596/1321/3/032006>
- [5] Commonwealth of Learning. (2018, October 17). A Guide to Blended Learning Chapter 8: Evaluation of Successful Blended Learning [Video]. YouTube. Retrieved from <https://www.youtube.com/watch?v=B8L264ESRmA>.
- [6] Dhawan, S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems*, 49(1), 5–22. <https://doi.org/10.1177/0047239520934018>
- [7] Guo, Q., Xu, W., Wang, P., Ji, H., Zhang, X., Wang, K., & Li, J. (2021). Facing coronavirus disease 2019: What do we know so far? (Review). *Experimental and Therapeutic Medicine*, 21(6). <https://doi.org/10.3892/etm.2021.10090>
- [8] Hagen, Erica & Fratta, Dante. (2014). Hybrid Learning in Geological Engineering: Why, How, and to What End? Preliminary Results. *Geotechnical Special Publication*. 3920-3929. 10.1061/9780784413272.380.
- [9] Hart, S. (2018). Measuring The Effectiveness of Your Blended Learning Program. *eLearning Industry*. <https://elearningindustry.com/blended-learning-program-measuring-effectiveness>
- [10] Hybrid learning: impacts and challenges? (2021, September 3). BINUS UNIVERSITY BANDUNG - Kampus Teknologi Kreatif; BINUS UNIVERSITY. <https://binus.ac.id/bandung/2021/09/hybrid-learning-impacts-and-challenges/>
- [11] Jahren, C. T., Karabulut-Ilgü, A., Jeong, D. Y., & Cormicle, L. (2015). A case study of hybrid learning implementation in construction engineering. The University of British Columbia. <https://doi.org/10.14288/1.0076473>
- [12] Joshi, A., Kale, S., Chandel, S., & Pal, D. (2015). Likert Scale: Explored and Explained. *British Journal of Applied Science and Technology*, 7(4), 396–403. <https://doi.org/10.9734/bjast/2015/14975>
- [13] Kanetaki, Z., Stergiou, C. I., Bekas, G., Jacques, S., Troussas, C., Sgouroupoulou, C., & Ouahabi, A. (2022). Grade Prediction Modeling in Hybrid Learning Environments for Sustainable Engineering Education. *Sustainability*, 14(9), 5205. <https://doi.org/10.3390/su14095205>
- [14] Kanetaki, Z., Stergiou, C. I., Troussas, C., & Sgouroupoulou, C. (2021). Development of an Innovative Learning Methodology Aiming to Optimise Learners' Spatial Conception in an Online Mechanical CAD Module During COVID-19 Pandemic. In *Frontiers in artificial intelligence and applications*. <https://doi.org/10.3233/faia210072>
- [15] Karabulut-Ilgü, A., Yao, S., Savolainen, P. T., & Jahren, C. T. (2016). Student Perspectives on the Flipped-Classroom Approach and Collaborative Problem-Solving Process. *Journal of Educational Computing Research*, 56(4), 513–537. <https://doi.org/10.1177/0735633117715033>
- [16] Kazu, I. Y. (2022). Investigation of the Effectiveness of Hybrid Learning on Academic Achievement: A Meta-Analysis Study. From <https://eric.ed.gov/?id=EJ1332714>
- [17] Kintu, M. J., Zhu, C., & Kagambe, E. (2017). Blended learning effectiveness: the relationship between student characteristics, design features and outcomes. *International Journal of Educational Technology in Higher Education*, 14(1). <https://doi.org/10.1186/s41239-017-0043-4>
- [18] Kundu, A., & Bej, T. (2022). Time for Attitudinal Change and Critical Thinking. *International Journal of Information Communication Technologies and Human Development*, 14(1), 1–17. <https://doi.org/10.4018/ijcthd.297523>
- [19] Lestari, P. B. (2022, June 1). Effectiveness of Hybrid Learning Model Against Student HOTS in Learning Microbiology at IKIP Budi Utomo. *Lestari | Prisma Sains: Jurnal Pengkajian Ilmu Dan Pembelajaran Matematika Dan IPA IKIP Mataram*. From <https://ejournal.undikma.ac.id/index.php/prismasains/article/view/5174/3453%2022>
- [20] López-Ochoa, L. M., López-Ochoa, L. M., García-Lozano, C., & Las-Heras-Casas, J. (2016). Hybrid Learning and Its Future Applications. <https://doi.org/10.21125/edulearn.2016.1867>
- [21] Manea, V. I. (2021). Perceived Benefits of Online Lectures During the Pandemic: A Case Study in Engineering Education. *Pro Edu*, 3(4), 35–41. <https://doi.org/10.26520/peijes.2021.4.3.35-41>
- [22] Miremadi, A. (2013). Rules of thumb about cronbach's alpha coefficient size (Joseph F. Hair ... ResearchGate. Retrieved June 6, 2022, from https://www.researchgate.net/figure/Rules-of-thumb-about-Cronbach-s-Alpha-coefficient-size-Joseph-F-Hair-Arthur-H-Money_fig2_266136043.
- [23] Raes, A. (2021). Exploring Student and Teacher Experiences in Hybrid Learning Environments: Does Presence Matter? *Postdigital Science and Education*, 4(1), 138–159. <https://doi.org/10.1007/s42438-021-00274-0>
- [24] Rahman, A. (2016). Proceedings of International Conference on Engineering Education and Research, 21-24 November 2016, Western Sydney University, Parramatta Campus, Sydney, Australia. UWS Research Direct Website. From <https://researchdirect.westernsydney.edu.au/islandora/object/uws:3917/1/datastream>
- [25] Weimer, M. (2002). *Learner-Centred Teaching Five Key Changes to Practice*. San Francisco, CA Jossey-Bass. - References - Scientific Research Publishing. (n.d.). from <https://www.scirp.org/%28S%28lz5mqp453edsnp55rrgjt55%29%29/r-eference/referencpapers.aspx?referenceid=2075477>

- [26] Wut, T. M., & Xu, J. (2021). Person-to-person interactions in online classroom settings under the impact of COVID-19: a social presence theory perspective. *Asia Pacific Education Review*, 22(3), 371–383. <https://doi.org/10.1007/s12564-021-09673-1>
- [27] Wut, T. M., Xu, J., Lee, S. J., & Lee, D. R. (2022). University Student Readiness and Its Effect on Intention to Participate in the Flipped Classroom Setting of Hybrid Learning. *Education Sciences*, 12(7), 442. <https://doi.org/10.3390/educsci12070442>
- [28] Yuan, C., Road, C. P., & Li, C. (2022). Chung Yuan Christian University establishes world's first ViewSonic hybrid teaching classroom. Viewsonic.com. Retrieved June 4, 2023, from https://www.viewsonic.com/vsAssetFile/ap/file/pdf/education/Case_Study_Chung_Yuan_Christian_University_Establishes_Worlds_First_ViewSonic_Hybrid_Teaching_Classroom.pdf.
- [29] Zaharah, Z., Kirilova, G. I., & Windarti, A. (2020). Impact of Corona Virus Outbreak Towards Teaching and Learning Activities in Indonesia. *Salam*, 7(3), 269–282. <https://doi.org/10.15408/sjsbs.v7i3.15104>