Redesigning Sciences Courses based on A Local Senior High School in Iloilo, Philippines' Student Performances and Perspectives towards Hybrid Learning Approach

Donna Hembra Gabor[1]*, Leona Marie Canaway Camano[2]

[1]Division of Physical Sciences and Mathematics, University of the Philippines Visayas, Philippines
[2]University of the Philippines Visayas, Tacuyong Sur National High School, Philippines

*Corresponding author: dhgabor@up.edu.ph

ABSTRACT This study aimed to examine learners' perspectives on the hybrid learning approach, using printed modules and social media as learning materials to redesign science courses and improve their performances. This study involved 37 students from Tacuyong Sur National High School, 20 from the Grade 9 class and 17 from the Grade 12 Technical Vocational Livelihood (TVL) class in the fourth quarter of the school year 2021-2022. The 5-items multiple-choice test assesses student performance. A survey question determined learners' perspectives on hybrid learning after revising the delivery mode for science courses. Student performances based on their pre-test/post-test revealed the benefits and problems connected with the hybrid learning approach. Program for statistical analysis of sampled data (PSPP) interpreted the survey and student performance. Hybrid learning survey results revealed a practical approach to improve science learners' performances during the COVID-19 pandemic. Data results through teacher-technology innovation demonstrated the effectiveness of hybrid learning techniques to help teachers and curriculum planners redesign course subjects that improve science student performances.

Keywords Hybrid Learning, Printed Modules, Student's Performance, Students' Perspective

1. INTRODUCTION

The Covid-19 pandemic has brought enormous changes and challenges to education worldwide. Government officials suspended lectures and class discussions inside the classroom in response to government legislation to handle the COVID-19 pandemic. As a result, the distance learning approach has emerged as a new approach to teaching strategies to sustain the learning process while ensuring the safety of students, faculty, and staff (Abu Alhaija et al., 2021).

Tacuyong Sur National High School, one of the public barangay high schools in Leon, Iloilo, Philippines, adopted a printed modular distance learning modality based on surveys conducted with the parents, learners, and other stakeholders. The printed modular approach to learning was the only applicable modality for the school due to its location and poor access to the internet and cell phone signal.

During the pandemic, lecture presentations and some educational resources in the form of videos were the only teaching strategies available to learners who had access to the internet via Facebook messenger. Self-learning

modules (SLMs) and hand-outs were additional learning materials for learners through their parents, and a hybrid learning approach was one of the best options for student learning. Midun & Rorimpandey (2021) defined a hybrid learning strategy (HL) as a product of learning technology and a combination of online and face-to-face learning. During the Covid-19 pandemic, students must have independent learning skills to improve their student performance in science. They stated that the HL strategy has a crucial effect on improving student learning outcomes in understanding and applying concepts making HL one of the best learning models for students who are still adapting to the development of internet technology. Hybrid Learning (HL) provides students with engaging learning opportunities by combining face-to-face instructional mediums with other learning opportunities as online or modular. The Covid-19 outbreak led to the strict implementation of protocols to ensure learners' safety while maintaining quality education and dealing with the

rapidly surging crisis. Self-learning modules were the central element of online classes or blended courses that enhanced and built on the concept discussed in the classroom (Singh, Singh, & Steele, 2021) to achieve social distancing to control infection (Abu Alhaija et al., 2021).

On April 4, 2022, Tacuyong Sur National High School opened its doors to serve learners as one of the selected schools to implement a progressive expansion of limited face-to-face classes. The school decided to utilize a blended and hybrid learning approach, where students learned theoretical concepts at home through given modules and followed up in face-to-face meetings with teachers.

In the new normal phase, educational institutions have no choice but to adapt to new teaching strategies that can help students understand science concepts. The Department of Education stated that each school must begin to prepare for educational realization in this new normal phase. The new normal was a new form of interaction that relied on health and safety protocols in light of the Covid-19 pandemic to stem virus outbreaks within social interactions in various sectors (Rita & Safitri, 2020). If the government reopened educational activities in schools, educational institutions must comply with all government policy regulations and implement the Covid-19 health protocols. In this connection, perceptions from students were vital for teachers and curriculum planners.

Perceptions could either be positive or negative. The perception from the students in the new normal phase was that the school had face-to-face classes where students were motivated to ask questions about technical resources and that engagement and interaction with peers and lecturers as part of the teaching during the COVID-19 pandemic. Students perceived HL as a well-designed pedagogical strategy in disaster situations compared to traditional classroom instruction (Lim & Mali, 2021). On the other hand, the pandemic has made some students uncomfortable attending face-to-face lectures, so educators must use strategies to improve student performance with the help of blended/hybrid learning. To help improved teacher-student teaching, the researchers provided students with survey questions. According to Lim & Mali (2021), during the period of COVID-19, due to limited face-to-face interactions with teachers, questions that provide students with a platform to express their opinions to change in preference, motivation, stress, flexibility, support, engagement, and group work was not a consideration.

According to the works of Abu Alhaija et al. (2021), blended/hybrid learning offers flexible and engaging opportunities for students in the learning process, and the rapid transition from face-to-face (F2F) to hybrid learning has the potential to establish HL as the new normal. Hybrid learning instruction allowed students to go through face-to-face and modular learning in scheduled and self-paced classrooms. It also helped students, faculty, educational institutions, instructional designers, and administrators as everyone works together by streamlining current practices and including hybrid learning to enhance teaching and learning practices in academic settings.

1.1 Hybrid Learning as an Effective Learning Approach

During the pandemic, schools, supported by government funding, were doing what they could to work with the environment to enable blended and hybrid learning, pursuing creativity and endurance for teachers worldwide (Boyarsky, 2021). According to Boyarsky (2021), many were concerned about how students take online courses to support face-to-face learning, and virtual learning depends on both the educator and the learner. Educators and Curriculum planners have seen how effective online learning is and used it to improve performance to take advantage of the benefits of a hybrid learning environment. Laili & Nashir (2021) stated that learning innovations and the effectiveness of suitable and diverse media for learning enhance educational quality in the new normal. One of the appropriate learning model solutions was adapting and applying hybrid learning in the classroom.

In hybrid learning, students who need extra time to complete assignments and special tools to succeed in class can get what they need on their own time. Project-based learning or games can also be part of blended and hybrid learning (Boyarsky, 2021). Boyarsky (2021) stated that from 2020-2021 hybrid learning where K-12 secondary educators, administrators, and families saw the impact of hybrid/blended learning as leverage of online platforms and solutions to challenges that made e-learning more effective during the pandemic. Hybrid classrooms incorporated live streaming videos that served as a two-way conversation, integrating remote and in-person students in a singular environment. A hybrid learning classroom blended live and in-person classes with recorded videos and asynchronously online learning modules that supplemented student coursework.

A literature review on hybrid and blended learning showed that hybrid learning increased student engagement, achievement, and positive perceptions of the learning process for K-12 students (Boyarsky, 2021). Hybrid learning incorporated these unproven student engagement methods to be personalized learning that improved academic performance in science and other related subjects. Hybrid learning also has a positive impact on learners' communication skills. Also, hybrid learning (HL) proposed an innovative strategy using multimedia. This strategy was very workable in terms of time, place, delivery of material, and student participation. Previous studies have revealed that HL increases student participation, satisfaction, learning community, and learning outcomes. Furthermore, hybrid learning showed that students obtained better learning outcomes than those taught using face-to-face learning (Midun & Rorimpandey, 2021).

According to Afzal et al. (2019), the benefits of hybrid/blended learning were primarily for students. Those students enrolled in blended learning courses obtained better outcomes than traditional face-to-face classes (Hill & Smith, 2018). Researchers also suggested that in blended learning, students experienced both independent and self-directed learning, allowing them to learn at their own pace (Aycock et al., 2012). Furthermore, hybrid and blended learning methodologies were becoming more advanced with increased cloud-based potential, enhanced synergy, and more creativity by the instructors and students. In addition to online learning becoming increasingly progressive, it has allowed a safe way to earn an education and be safe during the restrictions that COVID-19 introduced to us all globally. Embracing digital citizenship in an online experience has shown to be a positive response to COVID-19 to ensure a safe and flexible learning environment thanks to advanced technology (Singh et al., 2021).

According to Singh et al. (2021), COVID-19 has taught educators that online learning is more commonplace for students than it once was before this global pandemic. They also stated that from the works of Simbolon (2021) that most students were highly optimistic and showed increased enthusiasm through online learning. However, on the other hand, many students felt online learning was lonely and contributed to feeling lazy versus being on campus for a traditional classroom experience, which created a sense of productivity. This feeling of loneliness could also be due to the abrupt restrictions and forced quarantine that would contribute to that sense of loneliness during the global pandemic.

Blended and hybrid learning helped curriculum planners restructure the pedagogical practices, with the potential to recapture the ideals of higher education (Garrison & Vaughan, 2008). Hybrid learning curriculum design could integrate face-to-face and online learning, and courses organize student interaction and restructure and replace traditional classroom contact time. As noted by Dziuban, Graham, Moskal, Norberg, & Sicilia (2018), student satisfaction and interaction with coursework were dependent on the design of the online learning environment. Hybrid learning provided more opportunities to enroll students without needing new classroom space and increased the study flexibility for both staff and students, which was relatively cost-efficient (Dziuban et al., 2018). Hybrid learning helps teachers stay organized and connect with the students inside or outside the classroom.

1.2 Students' Perspective towards Hybrid Learning

Due to the covid-19 condition, knowing students' perceptions of hybrid learning were necessary. In the new normal, this approach was used by many institutions for the improvement of student performance. For example, Erliza & Septianingsih (2022) defined perception in their work as a way in which someone thinks, how they notice things using their senses of sight and hearing, and their inherent capacity to understand things immediately. As a result, understanding others' points of view or opinions on the issues or things in their environment was valuable.

Many researchers have studied students' perspectives of hybrid learning in different courses. According to Erliza & Septianingsih (2022), learners' perception of blended/hybrid learning enhanced learners vocabulary and expanded their reading capabilities in an English course. In addition, it provided enough training for students' independent learning leading to impressive performance for teachers and students. Akib, Baso, & Talis (2018), in their research, showed that students had positive attitudes toward hybrid learning in the English language relating to learners' experience, such as comfort, interest, activeness, and responsibility in learning. Erliza & Septianingsih (2022) stated that Ginting's (2018) works indicated that many students had positive views on the hybrid learning model in aspects of the curriculum, assessment, classroom management, resources, teaching and learning activities, and teachers' feedback.

Rerung (2018) confirmed that many students had positive perceptions toward blended/hybrid learning in learning English listening and speaking classes. Learners perceived online learning as an alternative to their traditional classroom learning. Simbolon (2021) revealed that students in hybrid learning had positive perceptions of their learning experience, such as their familiarity with the learning tool that motivated the learner to participate in learning. Alfiras, Bojiah, Nagi, & Sherwani (2021) proved that the effectiveness of the hybrid learning model was through students' knowledge of online resources available through hybrid classrooms, students' preparedness to integrate hybrid classes, and teachers' efficiency in providing an incredible learning experience. Learners had positive attitudes toward the atmosphere of the hybrid method, and they noticed that it could help them develop their critical thinking skills in various areas.

With positive responses from learners' perceptions, according to other researchers, this study wanted to answer the following questions:

a) What are the junior and senior high school learners' perceptions of hybrid learning systems in terms of improving their science performances amidst the Covid-19 pandemic?

b) How successful is the hybrid learning approach in redesigning the science courses of Tacuyong National High School?

c) Do grade level and gender affect the hybrid learning approach?

2. METHOD

2.1 Purpose of the Study

The current study wanted to investigate students' perceptions and experiences of taking hybrid learning through technology, social media, and printed modules as materials in learning science to redesign its curriculum during the Covid-19 pandemic that affects learning performances.

2.2 Context of the Study

Tacuyong Sur National High School is a secondary public school located in Leon, Iloilo, under the management of the Department of Education. This National High School tried to improve the education system to become a driving force for economic development. High-quality secondary education was one of the priorities identified by the government and the municipality of Leon to develop and implement basic education plans incorporating the local dialect and English as the language of instruction.

This year 2022, Tacuyong Sur National High School opened its doors to serve learners who were gradually expanding limited face-to-face classes. The school used a hybrid learning approach, combining printed modular modality (distance learning), technology, and face-to-face classes. Students learned theoretical concepts at home through the provided modules and internet access, followed up with lectures and skills during face-to-face meetings. This approach allowed students to develop a deeper understanding of the lessons and ideas explored to make their learning more relevant. In addition, it allowed learners to bridge the gap between the concepts learned through the module and the help offered by the teachers during the short face-face classes. Physics and other science subjects were blended courses restructured with intensive face-to-face learning on campus with a modular learning approach before and after the intensive session. Of the 37 students from grade 9 and 12 levels in a week, 20 students took 4.5 hours of face-to-face classes while the 17 learners went through the modules at home. The following week, these 17 students had 4.5 hours face-to-face while 20 took modular teaching. There were 17-20 students assigned to one teacher to facilitate face-to-face learning in all phases of the course.

2.3 Module and Social Media

The Department of Education allowed learners to use the Self-learning module (SLM) in print or digital format/electronic, whichever applies to the learner. Tacuyong Sur National High School used only printed materials for hybrid learning because of the weak internet connections and lack of access to better technology. Teachers taught and used social media such as Facebook Messenger and downloadable videos were complementary tools to provide guidance when learners turn to teachers for more help. Due to weak internet connections, students could not use social media platforms daily and sometimes used emails, phone calls, and text/instant messages when they posed specific personal questions to faculty but were not part of the study. In blended learning, parents or any adult members of the family serve as a guide or para-teachers to learners at home.

The printed module examined students' performance and only resource material in learning science subjects. Lessons were delivered via module and assisted by downloadable videos and social media to supplement the teachers' instruction. A series of modules were part of the subject teaching, and students answered the assigned topics related to readings and activities. In addition, the module has text and graphics that consists of learning objectives. The content and context of the modules were real-world examples that promote critical thinking skills and enhance the core content of the science subject with the foundational learning theory used by the teacher to design the content subject.

At the end of each module, students answered a short multiple-choice test to assess their understanding of the key concepts in the module. This assessment verified the student's completion of the unit of study and part of the research-based learning outcome. Students received grades for each module. The primary modes of communication between students and teachers took place on social media, private accounts, messengers, emails, and phone calls.

2.4 Instrument

After the module lesson went through, students answered survey questions that were administered to science students anonymously from April to May 2022 and after a class discussion of the module as teaching resource materials for the third quarter of the year. The survey included learners' perspectives on hybrid learning, various gadgets used for hybrid learning, the number of hours students spend, the effectiveness of the medium used for teaching, and learners' performances. It also included how helpful teachers facilitate learning from hybrid classes, showed the various changes from hybrid learning, and provided honest feedback on learners' experiences using the hybrid learning method. A total of 17 students from Tacuyong Sur National Secondary High School participated in the trial and completed the survey based on improvements in actual results. The study took place in the first week of April 2022, the first face-to-face interaction after nearly two years of distance learning. Pre-tests, post-tests, and survey questions verified how hybrid learning improved learners' performances in general science and physics. The descriptive statistics and t-test analyzed the statistical significance of the various measures in this study.

2.5 Participants

The determination of sample class was randomly selected using a random sampling technique from the junior and senior classes that attended the general science and physics course. It was because each student (class) has relatively the same character, academic ability (preliminary
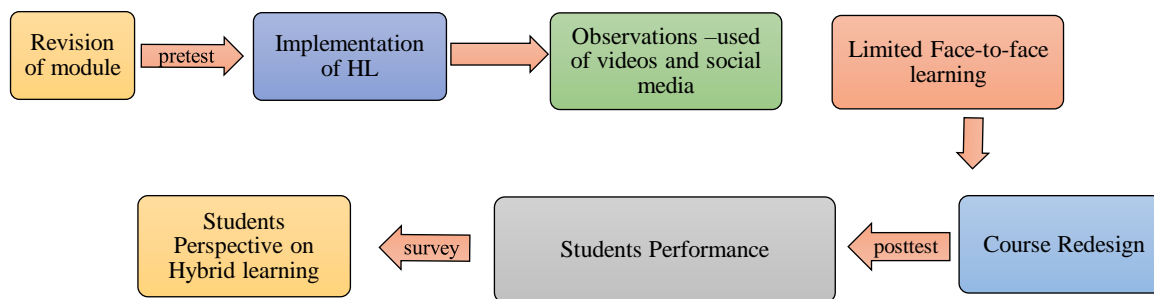
Figure 1. Summary of the research procedure

Table 1 Participant's characteristics
Gender

		Frequency	Percent	valid Percent	Cumulative Percent
valid	male	23	62.2%	62.2%	62.2%
	female	14	37.8%	37.8%	100.0%
Total		37	100.0 %		

Grade Level

		Frequency	Percent	valid Percent	Cumulative Percent
valid	grade 9	20	54.1%	54.1%	54.1%
	grade 12	17	45.9%	45.9%	100.0%
Total		37	100.0%		

test results), access to information (learning modules), and digital technology (social media).

The subjects of this study were 37 participants, 17 learners from Technical Vocational Livelihood (TVL) and 20 from junior high school (Grade 9 level). This study of a hybrid learning approach used printed modules, social media, and face-to-face meetings as part of learning materials and data sources that answered the researchers' questions. The characteristics of the participants are in Table 1.

As indicated in Table 1, the overall sample generated by gender where 62.2% males and 37.8 % females. Also, the participants consisted of 54.1 % of grade 9 students and 45.9% percent of TVL (Technical Vocational Livelihood).

2.6 Data Gathering Procedure

There were four stages in this research: 1) Revision of the learning module as teaching materials, carrying out a pre-test to determine students' prior knowledge; 2) The implementation of an HL strategy and the limited face-to-face learning and carrying out observations; 3) Redesign science courses through a hybrid learning approach; and 4) Measuring student-learning outcomes through post-test and analyzing student perceptions from answered survey questions (Figure 1).

A pre-test was for the student's initial learning, and post-test results determined the improvement of students' performances after implementing a hybrid learning approach and using topics assigned for this quarter week of the school year 2021-2022 to analyze students'

performance over time and not interrupt the scheduled assignment at the end of the third quarter. Module 6 was a one-week module for researchers to conduct research in the third quarter. In April 2022, trials started, and participants from every class were instructed to complete weekly modules and follow up with the assistance of teachers and through messengers in their private accounts. With the guidance of their teachers, students participated in the trials.

Students from each group participated in their own specific discussion time to discuss the same topics (definitions, context, and content of modules for hybrid learning). The next topic in science and physics learning was the follow-up activities for the following week. Students performed module activities, and if students needed clarifications on the lessons, an online platform was available where students exchanged ideas with definitions, context, and content and followed up with teacher assistance during a short face-to-face class. For the third week, an actual study was prepared and conducted inside the classroom by the teacher. The collected data of both groups were analyzed, interpreted, and concluded using mean-standard deviation and t-test. The results of the research were in favor of a hybrid learning and teaching approach. The researchers suggested that hybrid learning methods were an alternative to teaching to help students adjust to the new classroom environment due to the Covid-19 pandemic.

2.7 Data Analysis

Quantitative and qualitative data were collected from respondents and analyzed separately using the Excel program and the PSPP application, open-source software or program for statistical analysis of sampled data (PSPP) intended as a free alternative for IBM SPSS Statistics. The frequencies of nominal variables and descriptive statistics like percentages, standard deviations, and means of categorical variables were analyzed using PSPP also. T-test was used to test the relationships of variables. The 37 respondents of Grade 9 and Grade 12 TVL tracks students answered all parts of the research questionnaires, and no missing value from the participants' answers.

3. RESULT AND DISCUSSION

Of the 37 student participants, all completed the student survey questionnaire, pre-test, and post-test given during the hybrid learning approach. The frequency of participants and their grade levels were recorded. A hybrid learning approach was used to help students improve their science and physics performance during the Covid-19 pandemic implementation period. The participant's perspective on the hybrid learning approach through the questionnaire was to assess their feedback on their experience with the learning modules and the gradual expansion of the limited face-to-face curriculum implemented by the Department of Education during the pandemic implementation period. Feedback was dependent on the question asked. An example rate from 5-excellent, 4-very reasonable, 3 - good, 2- moderate, and 1-needs improvement. Pre-test/post-test determined whether the use of hybrid learning affects student performance, a part of the modules. The majority of the respondents indicated that they use online media to work

with classmates outside of class and to discuss or complete assignments beyond the assistance of the teachers during the progressive expansion of limited face-to-face instruction.

3.1 Student Survey on Hybrid Learning

This survey aimed to identify the effectiveness of hybrid learning from student feedback to assess physics and general science performances during the COVID-19 pandemic implementation. These students' survey results experiencing hybrid learning are reflected in Table 2. Results from this survey helped researchers to redesign its hybrid learning approach to improve student performances in science. These parameters were based on different types of learners and other factors that may affect the teaching process and student performance.

3.2 Grade Level on Hybrid Learning

As seen in Table 3, both grade levels have a rating score of very good for hybrid learning. Most learners from both grade levels used tablets for hybrid learning. Grade 9 spent 2-3 hours, grade 12 level had 4-5 hours for hybrid learning provided with the time of their choice, and the teacher provided the learning modules. Grade 9 level has a 4.0 mean average, where hybrid learning is moderately effective for junior students. Grade 12 level has a 4.0 mean average of moderately effective and has equivalent to junior students. With an overall rating, hybrid learning was moderately effective for both grade levels. The mean value of 4.0 showed that hybrid learning was very effective in student life during the COVID-19 pandemic as they attended classes inside the classroom. With a mean value of 4 for grade 9 students, stating that the teacher was beneficial in teaching. In contrast, grade 12 students had a mean value of 3.0, affirming that hybrid learning and redesigning science courses were necessary to improve

Table 2 Participants hybrid learning survey results

		Gender	Grade Level	How do you feel overall about the hybrid learning approach?	What device do you use for the hybrid learning approach?	How much time do you spend each day reading your learning materials?	How effective is hybrid learning for you as a learner?	How helpful is your teacher in facilitating hybrid learning?	Do you find hybrid learning enjoyable?
N	Valid	37	37	37	37	37	37	37	37
	Missing	0	0	0	0	0	0	0	0
Mean		1.38	1.46	3.73	3.86	2.35	3.78	3.49	1.73
S.E. Mean		0.08	0.08	0.13	0.10	0.15	0.17	0.14	0.13
Mode		male	grade 9	very good	tablet	4-5 hrs	very effective	very helpful	Yes, absolutely
Std Dev		0.49	0.51	0.77	0.63	0.92	1.03	0.84	0.80
Variance		0.24	0.26	0.59	0.40	0.85	1.06	0.70	0.65
Range		1.00	1.00	3.00	4.00	4.00	3.00	3.00	3.00
Sum		51.00	54.00	138.00	143.00	87.00	140.00	129.00	64.00

Table 3 Grade-level students' survey results on hybrid learning

Grade Level		How do you feel overall about the hybrid learning approach?	What device do you use for the hybrid learning approach?	How much time do you spend each day reading your materials?	How effective is hybrid learning for you as a learner?	How helpful is your teacher in facilitating hybrid learning?	Do you find hybrid learning enjoyable?
grade 9	Mean	4	4	2	3	4	2
	N	20	20	20	20	20	20
	Std. Deviation	1	0	1	1	1	1
grade 12	Mean	4	4	3	4	3	2
	N	17	17	17	17	17	17
	Std. Deviation	1	1	1	1	1	1
Total	Mean	4	4	3	4	4	2
	N	37	37	37	37	37	37
	Std. Deviation	1	1	1	1	1	1

Table 4 Gender students' survey results on hybrid learning

Gender		How do you feel overall about the hybrid learning approach?	What device do you use for the hybrid learning approach?	How much time do you spend each day reading your materials?	How effective is hybrid learning for you as a learner?	How helpful is your teacher in facilitating hybrid learning?	Do you find hybrid learning enjoyable?
Male	Mean	4	4	3	4	4	2
	N	23	23	23	23	23	23
	Std. Deviation	1	1	1	1	1	1
Female	Mean	4	4	2	4	3	2
	N	14	14	14	14	14	14
	Std. Deviation	1	0	1	1	1	1
Total	Mean	4	4	2	4	3	2
	N	37	37	37	37	37	37
	Std. Deviation	1	1	1	1	1	1

student performances. A student's learning experience was that they learned at their own pace with moderate help from teachers. A mean value of 2.0 showed that students found hybrid learning enjoyable, but with few changes, and students agreed that hybrid learning was beneficial learning with minimal changes to the implementation.

Grade 9 and Grade 12 both attained a mean average of 4.0 in Table 3. The average mean for both grade levels is 4.0 showing that hybrid learning was moderately effective. Thus, the results of the study done at the grade level pave the way for educators to understand the effectiveness of hybrid learning.

From Table 3, the results also revealed that redesigning the mode of delivery of subjects in hybrid learning motivated students, and the study's outcome supported these observations as they find hybrid learning helpful for them (mean value = 4.0). With these results, redesigning an effective style from hybrid learning was necessary to improve students' performances in science.

3.3 Gender in Hybrid Learning

Table 4 shows the survey results on gender. Male and female 9th and 12th-grade participants have outstanding ratings on hybrid learning. Also, hybrid learning was very effective for male and female participants, and help from the teachers was essential for male students and moderately for females, where the gender participants learned at their own pace comfortably, providing a good ambiance and atmosphere for effective hybrid learning. Outstanding overall results from the gender survey made a hybrid approach an effective way to redesign science courses.

Table 5 Participants' pre-tests and post-test results

	Gender	Grade Level	Pre-test Q1	Pre-test Q2	Pre-test Q3	Pre-test Q4	Pre-test Q5	Post-test Q1	Post-test Q2	Post-test Q3	Post-test Q4	Post-test Q5
N valid	37	37	37	37	37	37	37	37	37	37	37	37
Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean	1.38	1.46	0.35	0.30	0.30	0.46	0.16	0.76	0.57	0.73	0.76	0.62
S.E. Mean	0.08	0.08	0.08	0.08	0.08	0.08	0.06	0.07	0.08	0.07	0.07	0.08
Mode	male	grade 9	wrong	wrong	wrong	wrong	wrong	correct	correct	correct	correct	correct
Std Dev	0.49	0.51	0.48	0.46	0.46	0.51	0.37	0.43	0.5	0.45	0.43	0.49
variance	0.24	0.26	0.23	0.21	0.21	0.26	0.14	0.19	0.25	0.20	0.19	0.24
Range	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Sum	51.00	54.00	13.00	11.00	11.00	17.00	6.00	28.00	21.00	27.00	28.00	23.00

Table 6 (a) Pre-test results of the participants in the study

Pre-test Q1

	Frequency	Percent	Valid Percent	Cumulative Percent
valid wrong	24	64.9%	64.9%	64.9%
correct	13	35.1%	35.1%	100.0%
Total	37	100.0%		

Pre-test Q2

	Frequency	Percent	Valid Percent	Cumulative Percent
valid wrong	26	70.3%	70.3%	70.3%
correct	11	29.7%	29.7%	100.0%
Total	37	100.0%		

Pre-test Q3

	Frequency	Percent	Valid Percent	Cumulative Percent
valid wrong	26	70.3%	70.3%	70.3%
correct	11	29.7%	29.7%	100.0%
Total	37	100.0%		

Pre-test Q4

	Frequency	Percent	Valid Percent	Cumulative Percent
valid wrong	20	54.1%	54.1%	54.1%
correct	17	45.9%	45.9%	100.0%
Total	37	100.0%		

Pre-test Q5

	Frequency	Percent	Valid Percent	Cumulative Percent
valid wrong	14	37.8%	37.8%	14
correct	23	62.2%	62.2%	23
Total	37	100.0%		37

3.4 Student's Performance Using Hybrid Learning Approach

After the pre-test results (Table 5), the researcher redesigned its science courses through a hybrid learning approach. The proper observation was done after the pre-test results, and focusing on the use of technology and revisions of the modules were carried on improving student post-test results indicating the effectiveness of the hybrid learning approach.

Table 6 revealed an increase in the mean value of the post-test after implementing the hybrid learning approach. Pre-test results from the participants had an average value of 0.31. In contrast, the post-test had a 0.69 mean value indicating a successful redesign of science courses through a hybrid learning approach.

The pre-test results of the participants are in Table 6a. This result was prior knowledge from hybrid learning and the provided modules. The pre-test results indicated that in

Table 6(b) Post-test results of the participants in the study

Post-test Ql

	Frequency	Percent	valid Percent	Cumulative Percent
valid wrong	9	24.3%	24.3%	24.3%
correct	28	75.7%	75.7%	100.0%
Total	37	100.0%		

Post-test Q2

	Frequency	Percent	valid Percent	Cumulative Percent
valid wrong	16	43.2%	43.2%	43.2%
correct	21	56.8%	56.8%	100.0%
Total	37	100.0%		

Post-test Q3

	Frequency	Percent	valid Percent	Cumulative Percent
valid wrong	10	27.0%	27.0%	27.0%
correct	27	73.0%	73.0%	100.0%
Total	37	100.0%		

Post-test Q4

	Frequency	Percent	valid Percent	Cumulative Percent
valid wrong	9	24.3%	24.3%	24.3%
correct	28	75.7%	75.7%	100.0%
Total	37	100.0%		

Post-test Q5

	Frequency	Percent	valid Percent	Cumulative Percent
valid wrong	31	83.8%	83.8%	37.8%
correct	6	16.2%	16.2%	100.0%
Total	37	100.0%		

Table 7 Paired sample test results for pre-test and post-test of students

Paired Samples Test								
	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	SE Mean	9S% Confidence Interval of the difference				
				Lower	Upper			
Pair 1 Pretest Ql - Posttest Ql	-0.41	0.55	0.09	-.59	-0.22	*4.48*	36	0.000
Pair 2 Pretest Q2 - Posttest Q2	-0.27	0.69	0.11	-.50	-0.04	-2.37	36	0.023
Pair 3 Pretest Q3 - Posttest Q3	-0.43	0.65	0.11	-.65	-0.22	4.06	36	0.000
Pair 4 Pretest Q4 - Posttest Q4	-0.30	0.66	0.11	-.52	-0.08	-2.74	36	0.010
Pair S Pretest QS - Posttest QS	-0.46	0.56	0.09	-.65	-0.27	-S.01	36	0.000

5-item questions, an average of only 31% of the participants got the correct answers for every question.

Table 6b shows the post-test results after implementing the hybrid learning approach. These results have a general 69% average of getting a correct answer indicating an improvement of 28% increase in student performance, an indicator of the effectiveness of a hybrid learning approach.

With the initial results from the pre-test, the researchers implemented a hybrid learning approach to improve learners' performance in science and physics courses. As

Rabail & Tayyaba (2019) stated, the pre-test/post-test model was an assessment tool that helped to assess the curriculum and whether students were improving their learning. The study measured participants' basic knowledge at the beginning of the course and compared it with the knowledge gained after the subject ended.

The research used this as a testimonial to see whether the activity increased their understanding of the content taught. The t-test determined the relationship between the pre-test and post-test of students' performance. Results

revealed a significant difference in the pre-test and post-test of students (Table 7).

Data from Table 7 divulged that hybrid learning only depends on the materials and educational technology used during the implementation of the said approach. With an efficient hybrid learning approach implementation, teachers and students developed a creative way to improve teaching and learning styles during the COVID-19 pandemic. Intervention from the teachers or an application of a hybrid learning approach aside from social media platforms was vital for the student's performance. Social media platforms were an additional means for teachers to help improve physical performance. In Table 7, hybrid learning was an efficient way to help students during the Covid-19 pandemic regardless of what type of grade level or gender the participants belonged to.

4. CONCLUSION

The effectiveness of hybrid learning was analyzed based on student performance. Thirty-seven participants from grades 9 and 12 participated in the study with a very effective rating on hybrid learning, and students were enjoying distance education with moderate effectivity. Initial findings guided the researcher to redesign the hybrid learning approach to improve student performance. The results of the pre-and post-test determined the grade levels' performances. A massive increase in scores from students' post-test indicated that the hybrid learning approach was vital in improving students' performances in the new normal. Gender and grade level were not significant factors in pre-and post-test assessments. Pre-test and post-test provided estimated effects of hybrid learning methods that transpired during the gradual expansion of limited face-to-face courses in the Covid-19 pandemic.

The results of the present study helped teachers redesign subject delivery in a blended approach to motivating students in classroom activities. It also helped the student improve their physics performances while teaching at their own pace with small classroom meetings that provided a good ambiance for blended/ hybrid learning. The result of hybrid learning and teaching was not only the growth of knowledge but also the improvement of physical skills and the development of students' attitudes on how to understand the concepts presented with the help of teachers.

This study also concluded that the hybrid learning approach did not replace only virtual and face-to-face learning but created a new environment and a more effective learning space. The hybrid learning approach focuses on achieving learning objectives by implementing proper technologies in shape with the learning, time, person, and place. Results also revealed that the hybrid learning approach has good and bad effects on learners. The strong point of hybrid learning was that the students could express their ideas, which were not visible during face-to-face classes due to external factors like inadequate communication skills. Through hybrid learning, learners worked independently with the available technology. Learners from Tacuyong National High School used the tablet as their technology for learning and had weak internet access, making them less exposed to the appropriate information. Another weakness of hybrid was that not all students have equal competencies and understanding of the concepts, which made it easy for active and advanced learners, but not those who were less acquainted with the learning materials provided in the modules and technology application used in activities of learning. The responsibility of studying from home became a critical impediment for students. They often complained about the difficulty of internet connections and were often lazy and less motivated. Learners often selected the simplicity of copy-paste the assignments, a common problem for teachers in the new normal.

The data supporting our findings were available from this journal, and availability was limited and used under the current study's license and was therefore not public. However, data were available from the authors upon reasonable request and with approval from the authors.

REFERENCES

Abu Alhaija, E., Ali, K., Al-Fodeh, R., Alwahadni, A., Bani-Hani, T., Daher, D., & Daher, S. (2021). Quality, effectiveness, and outcome of blended learning in dental education during the COVID pandemic: Prospects of a post-pandemic implementation. *Education Sciences, 1*(12), 810. https://doi.org/10.3390/educsci11120810.q

Alfiras, M., Bojiah, J., Nagi, M., & Sherwani, M. (2021). Students' perceptions of hybrid classes in the context of Gulf University: An analytical study. *Journal of Hunan University Natural Sciences, 48*(5), 181–188.

Afzal, M., Gulmira, T., Gulnara N., Helmer, J., Jonbekova, D., & Malone K. (2019). Challenges and benefits of blended learning in higher education. *International Journal of Technology in Education, 2*(1), ISSN: 2689-2758.

Akib, E., Baso, F. A., & Talis, S. S. N. (2018). The students' perception toward implementing blended learning method in English Language Teaching (ELT) at the 5th semester students of English Education Department (A descriptive qualitative research). *Jurnal Keguruan Dan Ilmu Pendidikan (JKIP), 5*(1), 37–51. https://www.researchgate.net/publication/326732132.

Aycock, A., Barkley, E., Behnke, C., Gau, T., Glazer, F., & Hartwell, R. (2012). Blended learning: Across the disciplines, across the academy. *Journal of Teaching and Learning with Technology, 1*(2), 59–61.

Boyarsky, K. (2021). *What is hybrid learning? Here's everything you need to know.* Retrieved from https://resources.owllabs.com/blog/hybrid-learning.

Dziuban, C., Graham, C., Moskal, P., Norberg, A., & Sicilia, N. (2018). Blended learning: the new normal and emerging technologies. *International Journal of Educational Technology in Higher Education*, *15*(3), 1-16. DOI 10.1186/s41239-017-0087-5.

Erliza, S. & Septianingsih, P. (2022). Undergraduate students' perception of hybrid learning: Voices from English language education students in pandemic era**.** *Journal of English Language Teaching and Linguistics*, *7*(1), 231-243. DOI:10.21462/jeltl.v7i1.782.

Garrison, D., & Vaughan, N. (2008). Blended learning in higher education: Framework, principles, and guidelines. 10.1002/9781118269558.

Hill, J., & Smith, K. (2018). Defining the nature of blended learning through its depiction in current research. *Higher Education Research & Development, 38,* 1-15. 10.1080/07294360.2018.1517732.

Laili, R., & Nashir, M. (2021). Hybrid learning as an effective learning solution on intensive English program in the new normal era. *Journal of Language Teaching and Learning, Linguistics and Literature*, *9*(2), 220– 232. DOI: 10.24256/ideas. v912.2253.

Lim, H., & Mali, D. (2021). How do students perceive face-to-face/ blended learning as a result of the Covid-19 pandemic?. *The International Journal of Management Education, 9*(3). https://doi.org/10.1016/j.ijme.2021.100552.

Midun, H., & Rorimpandey, W. (2021). Effect of hybrid learning strategy and self-efficacy on learning outcomes. *Journal of Hunan University Natural Sciences, 48*(8). ISSN 1674-2974.

Rabail A., & Tayyaba, G. M. (2019). Comparative analysis between pre-test/post-test model and post-test-only model in achieving the learning outcomes. *Pakistan Journal of Ophthalmology*, *35*(1).

Rerung, M. K. T. (2018). Students' perception on blended learning in English listening and speaking class. *Journal of English Language and Culture, 9*(1), 17–28.

Rita, Y., & Safitri, N. (2020). Blended Learning in Package C Equality Programs in Facing New Normal Education. *KOLOKIUM Jurnal Pendidikan Luar Sekolah*, *8*(2), 165-170.

Simbolon, N. E. (2021). EFL students' perceptions of blended learning in English language course: Learning experience and engagement. *Journal on English as a Foreign Language*, *11*(1), 152–174. https://doi.org/10.23971/jefl.v11i1.2518.

Singh, J., Singh, L., & Steele, K. (2021). Combining the best of online and face-to-face learning: Hybrid and blended learning approach for COVID-19, post vaccine, & post pandemic world. *Journal of Educational Technology Systems 2021*, *50*(2), 140–171. DOI: 10.1177/00472395211047865.