

Learning Delivery Modalities of Senior High School Science Teachers Amid Pandemic

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Abstract— This study investigates the different learning delivery modalities used by science teachers, academic performance of Grade 11 students in science, when grouped according to learning delivery modalities and the problems encountered by the science teachers in the use of different learning delivery modalities for the school year 2020-2021 at one division of Southern Luzon. The researcher utilized a descriptive correlation type of research using a questionnaire to carry out the study. The findings revealed that majority of the science teachers in the Senior high school were teaching modular distance among other modalities. Among them, students perform well in online distance learning, which can be attributed to the idea that they are all Science and Technology Engineering and Mathematics (STEM) students, and those students in other modalities were regular students at the school. It is recommended that Science teachers may continue to attend seminars, trainings, and workshops in various levels such as the school, division, national or international levels to further enhance more their knowledge about the implementation of learning modalities in the new normal class. Also, the Department of Education through science education department may craft supplemental learning materials such as modified learning modules to the students.

Keywords— Learning Delivery, Modalities, Senior High School Teachers, Southern Luzon, Philippines.

INTRODUCTION

Due to the global spread of COVID-19, the education sector has implemented school closures. In response to the pandemic, the department of education developed a strategic plan for continuing education. This strategy makes use of multiple learning modalities in part.

Phelan, Katz, and Gostin (2020), stated that with the widespread outbreak of the pandemic in March 2020, schools around the world have been forced to change from classroom-based methods of instruction to some form of modalities, or none. In addition, Doghonadze, Aliyev, Halawachy, Knodel, and Adedoyin (2020), said that remote learning therefore has become one of the best options. Accordingly, the whole world had to switch to distance learning for an indefinite amount of time because the only other option was to stop all education, which is not an option.

According to UNICEF reports, there are several issues with the Department of Education's implementation of various learning modalities, like distance education. Despite concerns regarding distance education, enrollment is high. Concerns raised by parents about the transition to remote learning included a paucity of devices, funds for materials, and time to support children. Despite these concerns, enrollment for the academic year 2020-2021, at 93%, is only slightly lower than enrollment for the previous year, at 96%. It was concluded based on the survey that schools' outreach

efforts had not yet reached all parents of school-aged children.

Ateş (2011) discussed that Science is a subject learned in middle and senior high school. Science learning involves students using probability to check their own ideas and assemble their own understanding. So, it is necessary for a teacher to be able to make authentic experiences, to educate and facilitate students' learning, and to support students' hands-on and mind-on learning to help them make their own understanding.

It was also emphasized by Shah (2013) the need to promote global earth science education. Similarly, the Geological Society of America (2016) also recommended that science education be taught in K-12 institutions, both public and private. Consequently, despite the current health crisis and the resulting changes to teaching and learning methods, the value of pursuing Earth science remains. Therefore, the DepEd employs a variety of instructional strategies when teaching science, particularly to senior high school students.

The Executive Order No. 11210, issued by the President on April 30, 2020, applies the risk severity classification to the classification of cities, provinces, and regions in the country. Based on a classification instrument that considers the case doubling rate and critical care utilization rate, the DOH Risk Severity Grading is divided into Low, Moderate, and High. For severity

levels of moderate and high, schools must remain closed. For low-risk severity ratings, school closures are "possible" or optional. We assume DEP will exercise the option based on its risk assessment and the viability of risk mitigation and response measures.

Philippine education is in the process of adapting to the new normal form of education, with educators' ongoing innovations and the active participation of other stakeholders serving as its propelling forces. The Department of Education implemented modular distance learning to ensure the continuity of education and each school's ability to fulfill its mission and vision, which is to provide quality education to every Filipino student.

Objectives

This study aimed to determine the different learning delivery modalities used by senior high school Science teachers in one division in Southern Luzon for the school year 2020-2021. Specifically, it sought to (1) determine the academic performance of Grade 11 students in science along the selected learning modalities such as modular distance learning, online distance learning and combined learning delivery modalities; (2) identify the problems encountered by the teachers along those learning delivery modalities; and (3) describe the problems encountered by the students along those identified learning delivery modalities.

Methodology

The study utilized a descriptive type of research with the use of a questionnaire to satisfy the problem of the current study. As descriptive research, its principal aim is to describe the nature of a situation as it existed at the time of the study.

This study includes 17 senior high school science teachers in the as the main respondents. In addition, 150 grade 11 students from the senior high school of the school division were respondents to the study. A questionnaire was utilized to gather information from the respondents. Furthermore, the study utilized

frequency counting, percentages, and a weighted mean to interpret the data gathered.

A survey questionnaire and checklist with two components were used to identify senior high school science teachers learning delivery methods. The first part determined science teachers' delivery methods while the second addressed science teachers' difficulties implementing and using diverse learning delivery modalities in the new education standard. The students also received a two-part questionnaire. The first part determined the student learning modality and the second part revealed student issues with new typical class modalities.

The researcher used the frequency count and percentage to identify the learning delivery modalities used by science teachers, as well as the academic performance of grade 11 students in science across modular distance learning, online distance learning, and combined learning delivery modes. In addition, a weighted mean was utilized to identify the problems encountered by science teachers and students in modular distance learning, online distance learning, and combined learning delivery modes.

Likewise, the researcher utilized a Likert scale to identify the problems encountered by science teachers and students in modular distance learning, online distance learning, and combined learning delivery modes. In addition, the level of performance of students using ranges was adapted and utilized from DepEd CLP criteria to identify the academic performance of students in science in the second semester of the school year 2020-2021.

RESULTS AND DISCUSSIONS

1. Learning Modalities Used by Science Teachers

The table 1 shows that 59 percent of the respondents were teaching science using modular distance learning, and only six percent were teaching online distance learning.

Table 1: Learning Modalities Used by Science Teachers

Learning Modalities	No. of Teachers	Percentage
Modular Distance Learning	10	59
Online Distance Learning	1	6
Combined Learning Delivery Modality	6	35
Total	17	100

This implies that there are a lot of students who choose modular distance learning rather than online distance learning, which is why a lot of teachers also need to teach through the MDL modality. Based on the learner enrollment form survey (LESF) report, almost 75% of the students chose the modular distance learning modality of the 3 schools involved in the study. This may also be because of the students' lack of internet connection and mobile data, which are necessary for other learning delivery modalities. Moreover, due to an increase in transportation fares and several restrictions on movement, students and parents choose modular distance learning.

On the other hand, some of the students with stable internet connections prefer to use the online distance mode, but only in a few numbers; that is why limited teachers only assign the online mode. Furthermore, knowledge of the use of advanced technology may also be a factor in why few students choose the online modality.

According to Landicho (2021), amidst the COVID-19 pandemic, teachers, students, parents, and all stakeholders are expected to respond proactively to the needs of the time. Changes and challenges can be turned into opportunities that will provide quality education during this uncertain period. This supports the findings of the study, wherein teachers pursue the use of the three modalities, especially modular distance learning, to continue education for all students amidst the pandemic.

Based on the interview, teachers revealed that they were assigned to teach on the modular distance learning modality because most of their students choose this modality because they don't have gadgets and, at the same time, no internet connections. In addition, some of the science teachers may not have enough knowledge about the use of advanced technologies.

This result was also parallel to the objective of the Department of Education (2020), which is to embark on the development of the BE-LCP, or Basic Education-

Learning Continuity Plan, wherein students and teachers need to continue the teaching and learning process in the safest way possible, which is through the utilization of different learning modalities such as modular distance learning, online distance learning, or combining learning modalities.

2. Academic Performance of Grade 11 students

Table 2 shows the academic performance of Grade 11 students along modular learning modality, online distance learning modality and combined learning delivery modality. The basis for the performance was their final rating in science.

The table 2 revealed that in the online modality, 90% of the class or students are at the outstanding level. In addition, the online modality also got a performance mean of 91. This implies that these students may come from the STE/STEM (Science, Technology, Engineering, and Mathematics) section, which may have access to gadgets, internet connections, and other learning resources. Furthermore, these also imply that teachers give a lot of consideration to the effort of the students in answering their modules or activities amidst the pandemic, where teachers are not evident at their side.

Based on the study of Tanik-nal (2020), which aims to evaluate the views of parents regarding middle school students' learning of science at home via the Educational Information Network or online platform, the study revealed that, generally, parents believed that science education via the EBA or online platform was beneficial for the students

In addition, in the study of Janer and Ricafort (2020), it was found that most students use only smartphones and access the internet via mobile data that is capable only of fair download and upload speeds, between 1 and 10 Mbps when the connection is stable. However, despite the unideal infrastructure, students maintain a positive attitude towards e-learning. This is also the reason for having high grades in science.

Table 2: Academic Performance of Grade 11 Students

Ratings	Modular Distance Learning		Online Distance Learning		Combined Learning Delivery Modality	
	f	%	f	%	f	%
90-100 (Outstanding)	44	54	27	90	19	50
85-89 (Very Satisfactory)	22	27	3	10	13	34
80-84 (Satisfactory)	16	19	0	0	6	16

Total	82	100	30	100	38	100
Mean Performance	88 (VS)		91 (O)		88 (VS)	

Another observable finding is that students in the online learning modality do not have a grade of satisfactory (80–84). This implies that they may have maintained the STEM average required to be retained in the STEM curriculum. In addition, their parents strictly imposed their expectations, especially on their grades in science as a core subject.

In line with this, Syauqi (2020) conducted a study that aimed to provide an overview of students' perceptions of mechanical engineering education through online learning because of the impact of the COVID-19 pandemic. The study reveals that students feel that online learning has not provided better experience and productivity in mastering competencies but can provide motivation and ease in their learning. This may be a

reason why students who attend online classes can maintain grades not lower than 80 and get the highest mean performance among all the modalities used by the schools.

3. Problems encountered by the teachers along modular distance learning.

The presented table revealed that the most encountered problem for science teachers in modular distance learning was monitoring children's learning and progress, with a weighted mean of 4.7. This may be because, during this time of pandemic, face-to-face meetings were prohibited, resulting in the teachers not being able to personally monitor the learning performance of the students, leading to difficulties in assessing the students' learning.

Table 3: Problems encountered by the teachers along modular distance learning.

Indicators	Weighted Mean	Description
1. Possibility to be contracted with the Covid-19 disease in the learning set-up.	2.80	Moderately Encountered
2. Establishing a network of communication among stakeholders such as parents for support at home.	4.00	Much Encountered
3. Find it hard in finishing printing, sorting and organizing SLMs for the succeeding weeks.	2.40	Less Encountered
4. Monitoring children's learning and progress.	4.70	Very much Encountered
5. Releasing SLMs on time because of lack of enough school printing equipment's and supplies.	1.80	Less Encountered

This implies that teachers may find it difficult to develop assessment tools that will monitor the honest learning progress of the students at home. This may be because the Department of Education did not release a standard tool for assessing the students' learning.

In addition, teachers were not able to visit and monitor all the students because they live in a faraway place, which takes a lot of time to finish monitoring. Furthermore, based on the local interviews with teachers here in Sorsogon, one of the most difficult parts of teaching during this time of pandemic is how to monitor the regular learning progress of the students since they are not sure who is truly answering the modules or LAS.

This may be because most parents want their child to have a higher grade, so they do the assignments for their children.

The result was supported by the study by Gordy, Sparkmon, Imeri, Notebaert, Barnard, Compretta, & Rockhold, (2021). They investigated how high school science teachers who had previously been trained in flipped learning and advanced educational technology through the Science Teaching Excites Medical Interest (STEMI) program perceived their transition to distance learning during this pandemic. The result revealed different factors that affect teachers work and load, especially in monitoring the learning and progress of the students.

On the other hand, the table also revealed that the less encountered problem of the science teacher was releasing SLMs on time because of a lack of school printing equipment and supplies, which has an average of 1.8. This implies that the school management has a good plan for the dissemination and retrieval of modules during a pandemic.

Based on Chang and Yano (2020), the lockdowns have put an unprecedented challenge on the governments to ensure that there should be continuity of learning, The Department of Education ensures that even though the country faces a big problem in education, teachers and the agency find a way to ensure that education will continue.

4. Problems encountered by Students along modular distance learning

Table 4 lists the weighted mean of the problems encountered by science teachers during modular

distance learning. It revealed that the most encountered problem of students along modular distance learning was finding it hard to understand the lesson on the modules/LAS distributed, with an average of 3.26.

Every week, students receive their individual modules, but it is hard for them to understand and answer the activities in the module because maybe no one assists and guides them throughout the lesson.

Table 4: Problems encountered by the students along modular distance learning

Indicators	Weighted Mean	Description
1. Lack of support came from the teachers or the guardian of the students in answering their modules.	2.66	Moderately Encountered
2. Find it hard in understanding the lesson on the modules/LAS distributed.	3.26	Moderately Encountered
3. Difficulty in meeting the deadlines set by the teachers to finish the modules.	2.83	Moderately Encountered
4. Lack of learning resources available at home to search for reference purposes.	2.83	Moderately Encountered
5. Burden in communicating to teachers in times when lessons are confusing.	2.71	Moderately Encountered

This implies that without the help of teachers', students cannot understand the module. In addition, there are a lot of distractions and obligations at home that may affect understanding the module or task.

Parallel to the study of Calpo (2020), he conducted a study that identified the correlation between the different factors related to science education and self-efficacy of higher education students in one program at one ASEAN premier state university.

Generally, the results revealed that the students could hardly seek support from their parents, community, peers, classmates, and other possible sources of help during the new normal class. Due to these reasons, students' interest in answering their modules decreased.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of the study, the researcher arrived at the following conclusions: First, majority of the science teachers in the Senior high school were teaching modular distance learning since they have large percentage of modular students. Also, among the three modalities, students perform well in online distance learning; maybe they are all STEM (Science,

Technology, Engineering, and Mathematics) students, and those students in other modalities were regular students at the school. In the three modalities, assessing the learning of the students was difficult for them to implement during the pandemic. Moreover, the learning of the students in the three modalities was significantly affected by the unavailability of learning materials such as gadgets, cellphones, and laptops. Finally, an action plan for science teachers may be proposed to enhance their knowledge on the use and implementation of the three learning modalities (modular, online, and combined).

Based on the findings and conclusions, the following are recommended: Science teachers may continue to attend seminars, trainings, and workshops at various levels, such as the school, division, national, or international levels, to further enhance their knowledge about the implementation of learning modalities in the new normal class. Also, linkage with the Local Government Unit (LGU), concerned alumni, and DepEd officials for providing enough gadgets and a stable internet connection for teachers and students may help. It is also suggested that to cope up the gap in handling modern technologies used in online distance learning, there is

the need to develop self-motivation and confidence in attending online classes. Moreover, advanced technological learning materials may be considered to enhance the teaching and learning process in any kind of learning modality. Further studies may be conducted to investigate the effectiveness of the seminar and to include other variables not covered in this study, including the inclusion of other science teachers in the province.

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ISSN: 2582-6832