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Transcending boundaries of new normal science education: Phenomenologizing the lived experiences of college science teachers

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Abstract

The COVID-19 pandemic transformed higher education by necessitating the rapid adoption of flexible learning modalities, particularly in science education where laboratory and practical activities are essential. This study explored the lived experiences of college science teachers in implementing instruction during the new normal at Ilocos Sur Polytechnic State College (ISPSC). Specifically, it examined the mechanisms employed in lesson preparation, instructional delivery, assessment of learning, and feedback provision; identified the challenges encountered; and explored the coping strategies adopted by the participants. Using a phenomenological research design, data were gathered through in-depth interviews with purposively selected science teachers from the six ISPSC campuses who had experience teaching before and during the pandemic. Colaizzi's method of phenomenological analysis was employed to analyze the interview data. Four major themes emerged from the participants' narratives: Taking the Virtual Route, which describes the transition to online platforms for instruction; Turtle Net, which represents poor internet connectivity as the primary challenge; Reaching Students, which highlights difficulties in student engagement due to personal, geographical, and technological constraints; and Being Flexible, which reflects the teachers' adaptability and resilience in addressing the demands of the new educational landscape. The findings reveal that while flexible learning enabled instructional continuity, significant challenges in technology and student participation persisted. Nevertheless, college science teachers demonstrated remarkable adaptability in sustaining quality instruction. The study recommends strengthening institutional learning management systems, improving internet infrastructure, and conducting further research on innovative strategies to support science education in flexible learning environments.

Keywords: phenomenology, science education, flexible learning, college science teachers, COVID-19 pandemic

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1. Introduction

Over the last few decades, the number of virus outbreaks has skyrocketed. The emergence of a new pandemic, Corona Virus Disease 2019 (CoVID-19), caused by the Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-CoV-2) resulted with a devastating impact on almost all sectors of society. The world is currently dealing with its overwhelming consequences. The COVID-19 pandemic has altered our way of life. During this crisis, the higher education sector faced a number of significant challenges. Universities around the world have been forced to make a rapid transition to online delivery while also dealing with the long-term consequences. Reactive strategies were required during the acute phase to ensure the immediate safety of staff, students, and, in some cases, clinical practice sites. After being immersed in both government and university restrictions and changes to procedure and practice, proactive approaches emerged to manage both the economic and educational impacts of COVID-19, as well as the implementation of practices to help students study off campus and "catch up," particularly with regard to practical activities and preparing for the "new normal."

In the Philippines, face-to face learning was discontinued in the middle of the semester of March 2020. Schools were locked-down. Community quarantines were imposed. Learning environment has changed. As a result, there is an urgent need to investigate other innovative learning modalities that will facilitate the transition from traditional to flexible teaching and learning options. Because learners differ in terms of time, place, and pace, these options allow for the customization of delivery modes in response to students' need for access to quality education. This will also give students the option to select the most convenient delivery mode for them as early as the time of enrollment. The paradigm shifts therefore in the teaching and learning process in the Philippine Higher Education necessitates the adoption of a learning modality that is very ideal to all types of teachers and learners. To secure the continuity of the delivery of instruction, several learning modalities emerged such as blended learning and online schooling (Gumede and Badriparsad 2021).

The Commission on Higher Education (CHED) issued the CMO 4 s. 2020, a memorandum stating the general guidelines in the implementation of flexible learning and teaching options, approaches, strategies, systems, pedagogies and modalities in the higher education programs. Flexible learning, as defined in the CMO is a pedagogical approach allowing flexibility of time place and audience including but not solely focused on the use of technology. Although it commonly uses the delivery methods of distance education and facilities of education technology, this may vary depending on the levels of technology, availability of devices, internet connectivity, level of digital literacy and approaches.

As described by Ludnin (2020), flexible teaching and learning is an idealized state where there is a mixture of educational philosophy, pedagogical strategies, delivery modalities and administrative structures which allows for maximum choice for differences in student learning needs, styles and circumstances. It is characterized by a shift in the emphasis of responsibility for learning from the teacher to the learner, use of a range of teaching and learning strategies, the ability of the learner to negotiate various aspects of the learning program, flexibility within the curriculum to provide learners with alternative pathways through the content to suit learner needs, a range of delivery systems, including the use of communication and information technologies, flexible administrative procedures; and increased learner support systems, including guidance services, pre-packaged learning resources, library and information services and access to computer facilities, in the recognition that there are several sources of information and knowledge, especially on-line electronic sources.

In adherence to the said CMO, Ilcoos Sur Polytechnic State College (ISPSC) adopted the flexible learning modality to maintain the momentum of the delivery of quality education. Blended learning was enforced and

conduct of online classes became the trend for almost two years. However, during the implementation of the said modality, loopholes were still identified by teachers most especially in science education. As they transcend from the boundaries of new normal education, various experiences were identified. To further dig into the knowledge underpinned in these experiences, this study was conceptualized.

2. Methodology

Selection and Study Site - The participants of this study were the science teachers of the six campuses of ISPSC namely, Sta. Maria, Narvacan, Santiago, Candon, Tagudin and Cervantes Campus. The Participants were chosen via purposive sampling; hence four criteria were set. First, they must be teaching science subjects in ISPSC during the new normal. Second, they must be 4 years or more in the service. Third, they must be teaching the same subjects during the "old normal" and the "new normal". And lastly, they must be willing to take part in this study. To achieve the study's stated objectives, the researcher first identified the participants. The participants were informed about the nature and scope of the study during this process. Their permission to participate in the study was also obtained. This study included a total of six (6) participants. These initiatives demonstrate that the researcher conducted the study in accordance with ethical considerations. After getting consent of the participants, due to limited mobility caused by travel restrictions, online interviews were conducted, in lieu of face-to-face interview. Following the interview, a member checking procedure was carried out. This was done by returning back the interview transcripts to the participants and by sharing to them the results of the study. Finally, the data collected were analyzed iteratively. Data analysis was guided by the Colaizzi's seven-step approach. First, transcripts were read repeatedly. Second, significant statements were extracted. Third, for significant statements, meanings were formulated. Fourth, formulated meanings were used categorized into clusters of themes. Fifth, integrate the clusters of themes into an exhaustion description. Sixth, establish the fundamental structure of the phenomenon identified and exhaustive descriptions were authenticated by obtaining participants' feedback. Finally, feedback were incorporated into the final descriptions of perceptions.

Data Collection Procedure - This study made use of phenomenology research design. Phenomenological research is a design of inquiry in which the researcher describes the lived experiences of individuals about a phenomenon as described by participants. This description culminates in the essence of the experiences for several individuals who have all experienced the phenomenon. This design has strong philosophical underpinnings and typically involves conducting interviews (Giorgi, 2009; Moustakas, 1994). Phenomenology, defined as the study of conscious experience, can be traced back to early 20th-century philosophers such as Husserl, Sartre, and Merleau-Ponty. Many of the ideas embodied in the works of these early phenomenologists were later adopted in the behavioral and social sciences by notable scholars such as psychologist Amedeo Giorgi (1970) and social scientist Alfred Schütz, (1967). In contemporary social science, the term is used more broadly to denote the study of individuals' perceptions, feelings, and lived experiences. Smith, Flowers, and Larkin (2009), for example, define phenomenology as a philosophical approach to the study of experience that shares a interest in thinking about what the experience of being human is like, in all of its various aspects, but especially in terms of the things that matter to us, and which constitute our lived world. In this study the phenomenon of teachers transcending the new normal education was studied.

Ethical Consideration - Ethical considerations for this study include ensuring the confidentiality and privacy of all participants by securely handling and storing their personal data. Informed consent was obtained from all participants prior to data collection, with clear explanations of the study's purpose, procedures, and their rights, including the right to withdraw at any time without penalty. The research complied with institutional ethical guidelines by seeking approval from the appropriate ethics review committee of ISPSC. Data collected were used solely for research purposes and reported in aggregate form to prevent the identification of individual respondents. Additionally, the study ensured voluntary participation and minimize any potential risks or discomfort, especially when conducting surveys. To mitigate potential challenges, such as teachers' time constraints during the school year and student survey fatigue across multiple campuses, data collection was scheduled in consultation with campus directors to avoid peak teaching periods, and surveys will be designed to be concise and user-friendly.

Researchers will also stagger survey administration and provide clear instructions to reduce burden on participants. The Researcher maintained honesty and transparency throughout data collection, analysis, and reporting to uphold academic integrity and avoid any form of bias or misrepresentation. Finally, care was taken to respect cultural and social norms of the participants, fostering an ethical research environment conducive to trust and openness.

Mode of Analysis - Data analysis was guided by the Colaizzi's seven-step approach. First, transcripts were read repeatedly. Second, significant statements were extracted. Third, for significant statements, meanings were formulated. Fourth, formulated meanings were used categorized into clusters of themes. Fifth, integrate the clusters of themes into an exhaustion description. Sixth, establish the fundamental structure of the phenomenon identified and exhaustive descriptions were authenticated by obtaining participants' feedback. Finally, feedback were incorporated into the final descriptions of perceptions.

3. Result and Discussion

This study mainly described the lived experiences of science teachers in the delivery of science instruction during the new normal. In the analysis of the extended texts on the mechanisms employed the delivery of science instruction and their challenges in the new normal, four themes emerged simultaneously as the researcher sought answers to the posted problems of the study: taking the virtual route, turtle net, reaching students, and being flexible. The first theme was formulated based on the verbalization on the participants (P) mechanisms in the delivery of science instruction. The second and third theme talks about their challenges in the delivery of science instruction during the new normal. The fourth theme describes the coping mechanisms. Notably, these themes capture rich corpora and provide summary of education.

3.1 Mechanisms in the Delivery of Instruction.

The current pandemic have brought changes and sudden shifts in the delivery of instruction. As such, teachers adopt different mechanisms in the delivery of instruction. With the sharing of the participants, this study noted the use of various online learning platforms in terms of preparing lessons, delivering instruction, assessing learning and providing feedbacks. This explains the first theme which is Taking the Virtual Route. It is contextualized to answer the first problem of the study. This theme implies that every respondents' processes and procedures in preparing lessons, delivering instruction, assessing learning and providing feedbacks are going online. The researcher went to ask the science teachers on their mechanisms in preparing lessons. Most of them claimed that they prepare electronic modules for their lessons to be uploaded in online/ virtual classrooms. They also stated that they are using Google Classroom to upload their modules. It serves as their virtual classroom.

Aside from modules, as mentioned by the participants, instructions, announcements, supplemental instructional materials, activity sheets and other course related documents and files are all uploaded in their respective Google Classrooms. Additionally, the researcher asked why they use Google Classrooms as a learning platform in the new normal. According to P4 *"It's more convenient to send e-modules in Google Classroom rather than the printed modules. If the modules are printed, students are required to get it form the school*". P1 also stated that *"the use of Google Classroom to upload modules are more convenient most especially to students who are from remote areas. They no longer need to travel just to bet their modules"*. In addition, P6 stated that "*if modules are sent online via Google Classroom, students can access it anytime anywhere so long as they have gadgets and internet connectivity*."

Google Classroom is a type of online classroom. It has had a significant impact on teaching. It has been used effectively for uploading assignments, classroom management, and communication with students; however, its overall use is not limited to these features; Google Classroom has much more to offer than just these basic features (Azhar & Iqbal, 2018). Furthermore, the advancement of ICT has had a significant impact on the field of education. The spread of ICT and its expanded platform with a diverse set of tools, as well as its integration into daily life, has become almost unavoidable. As a result of ICT tools, classrooms have become even more learner specific than

they were previously. In contrast to traditional classrooms' monotonous chalk and talk setup, the learner with any ICT tool emerges as an active participant rather than a passive listener in the entire teaching-learning process (Sobuwa, 2020).

Nanthinii (2020) stated that one example of this emerging ICT is Google Classroom, which was introduced as the most popular learning platform during the COVID-19 crisis. Accordingly, Google Classroom helps students understand key concepts more easily, it is more traditional than the traditional classroom, students are able to submit assignments on time, instructions are provided by the teacher on time and learning several skills is more effective in Google Classroom. As such Google Classroom is an effective platform and a useful facilitating tool (Heggart & Yoo, 2018). Nanthinii (2020) went on to say that in Google Classroom, the teacher can record the students' gradual progress in terms of assignments and questionnaires, and the feedback received from the students can be used as a guideline for future lessons in an ESL classroom. The use of Google Classroom has a positive impact on the skills of learners. Because Google Classroom is completely online, students have the opportunity to explore new learning environments in which they can confidently take on new learning challenges. Furthermore, because students' learning levels differ, Google Classroom serves as a platform where each student receives individual attention from the teacher and the learner does not feel as if he is outside of the classroom.

Hussaini et al. (2020) also highlighted the benefits of using Google Classroom such as (i) Allows teachers post lecture notes, create assignments, make announcements, set due dates for assignments; (ii) Teachers can create different groups in one classroom, then give each group a different assignment, thus making the class to be active and interesting; (iii) Teachers can easily identify students that miss class assignments and students that submit their assignments late; (iv) It is flexible, enabling teachers to extend due dates so that all students can submit their assignments, similarly it allows teachers to update or review students' grades (v) Previous posts made by teachers can be reused and then posted to the same group or to a different group; and (vi) Teachers can also be added in the classroom, they can as well grade students' assignments. When the participants were asked on their mechanisms on delivering instruction, most of them have stated that online classes were conducted via Google Meet.

Because of the Covid-19 pandemic, all activities, including teaching and learning, are now done online from home. Interventions are required for students in order to foster feasible online teaching and learning (Gumede & Badriparsad, 2021). As a result, Aswir et al. (2021) stated that the use of online-based platforms can be a solution to ensure that the learning process continues to run smoothly at this time. Google Meet, a video communication service, is one application that can be used. This application is extremely useful, especially in these conditions where we must keep our distance in order to avoid the Covid-19 virus. This application is very useful for students, educators, or workers who work from home because they can easily join via live video or video conferences even though we are in our respective homes. Google Meet's interface not only allows users to meet face to face directly and effectively, but it is also very light and fast. Management is simple and can be followed by a large number of people (Singh & Soumya, 2020). Furthermore, Google Meet is a secure application because Google has stated that all of their products are built and operated on a secure foundation (Al-Maroof et al., 2020). As a result, they believe that their product users' data will exist and remain private. Google's Google Meet product also includes built-in protection by default, which keeps users' meetings secure (St John, 2020). Many people in the business and education sectors prefer to use Google Meet as a video conferencing application because of its numerous benefits. Users find Google Meet to be simple to use, which creates a favorable impression of the platform. And the number of Google Meet users is steadily increasing (Purwanto & Tannady, 2020).

Google Meet is one of the options for online learning media during the pandemic, even though video conferencing alone is insufficient to replace the physical face-to-face learning process (Aswir et al., 2021). Nonetheless, teachers must use additional media to speed up and strengthen the teaching and learning process. Furthermore, the teacher must be innovative in order to make this online learning environment fun with unique learning ideas from the teacher so that students are interested in learning and easily understand the material that the teacher conveys. Sutarto et al. (2020) stated that teachers must have a learning strategy in place in order for learning activities to be effective. This learning strategy is also expected to increase students' interest in learning

so that they feel at ease and understand their learning material.

On mechanisms in assessing learning, most participants claimed that they are administering online examinations for their subjects via online platforms. Three of the respondents claimed that they give examinations through online platform at Testmoz.com. Testmoz test generator is a free online test maker with four types of tests: multiple choice, true or false, fill in the blank, and multiple response. The freeware tool has a 50-question limit and a 100-person limit per exam, but it has an unlimited test. The order of the questions and answers can be changed. The entries to take the test are a URL and a proctor's password. There is no need for a username or an email address. The proctor is the admin user, and he or she is the only authorized user who can modify the test. The exam taker would only take one test in one attempt. The test report is made available to the admin user immediately following the completion of the test. Testmoz offers a variety of features for a fee of $20 per year. The benefits of using Testmoz were revealed in a study conducted by Abogaa (2016). According to the findings, (a)testmoz is simple to use and customize; (b) the customized online course is a usable and functional tool in content course assessment; (c) the LMS adheres to reliability on online course exams; (d) testmoz test generator is advantageous online exams for those who cannot remember their email address; (e) the LMS is portable, with no data required except the taker's name and password to be able to take the test; and (f) proctor As a result, the use of such an online assessment tool was widely accepted and adopted by participants.

When the respondents were asked on their mechanisms in giving feedbacks, most of them responded that feedbacks are given online via various platforms. They claimed that feedbacks are given to students via FB messenger group chat, Google Classroom specifically in 'comment' and 'reply' boxes, and private messages. Hussaini et al. (2021) discovered that Google Classroom improves the teaching and learning process in their study. It is also dependable, effective, and efficient in increasing students' access and attentiveness to learning; activities in Google Classroom transform students from passive to active learners. Students can easily track their progress with online assessments in Google Classroom, and parents can easily check and monitor their children's performances and progress at their leisure. This finding is consistent with the findings of (Mafa, 2018; Nizal et al., 2016), who discovered that Google Classroom improves teaching and learning. However, a poor network prevents students from using Google Classroom effectively, causing them to submit their work late. With the current global Covid-19 pandemic, restricted movement, and social distancing, it is recommended that using Google Classroom will assist both students and teachers in connecting, working together, creating assignments, grading students, and posting lecture notes. Students can also ask questions about topics they are unfamiliar with.

Furthermore, Azhar and Iqbal (2018) exemplified that due to the growing number of undergraduates, particularly in the Faculty of Education, managing students' records is simple with Google Classroom; students' records about online assessments are easily accessible and can always be retrieved; and issues of missing grades can be easily resolved by referring to the students' account. Students are not limited to what they are taught with online quizzes and assignments; they can explore other resources about the specific topic through online mediums, resulting in a deeper understanding of the topic discussed in class. Teachers can experiment with using Google Classroom as an additional means of communicating with their students to supplement face-to-face teaching and learning by easily tracking students who miss assessments or submit their assessments late. Concerning the issue of a poor network impeding student participation, the University should ensure that the network is upgraded to accommodate all students across the University.

3.2 Challenges faced in the delivery of Science Instruction

The second theme that was conceptualized is Turtle Net. This answers the second problem of this study. This theme covers the challenges faced by science teachers in teaching in the new normal. The primary challenge among all participants that they faced is the poor internet connection. Poor connection to the internet results to delayed delivery of lessons to students. This results to poor performance of the students students. Laher et al. (2019) revealed in his study that students cited challenges with connectivity and data costs as the main reasons for their inability to access most online lectures. Several authors have shown that unavailability of data, coupled with

constant bouts of load shedding, result in connectivity issues. As a result, online teaching and learning becomes more ineffective regarding academic success than contact learning.

According to the current study, some students were uneasy with this method of learning due to the challenges of not being tech-savvy or not having suitable or compatible devices. It was discovered that some students struggled to focus during online lectures because they were unfamiliar with learning through their devices. Another study found that the lack of devices to provide all students with equal access to online teaching and learning may have an impact on students attending scheduled lectures. Gumede and Badriparsad (2002). Meanwhile, the third theme that was formulated is Reaching out students. This theme still addresses the second problem of the study. Most of the participants faced problems on reaching out their students due to their personal reasons, location and priorities. This characterizes the theme. These challenges are brought on by the students' backgrounds, specifically their socioeconomic and geographic backgrounds. Previous research has shown that students' socioeconomic backgrounds have an impact on their academic performance. Education has a direct impact on a person's life chances, income, and well-being (Battle and Lewis 2002). During the pandemic, students from low-income families find it difficult to purchase the necessary school supplies. Some students are forced to work simply to meet their financial obligations.

The findings of Ovansa (2017)'s study clearly show that socioeconomic factors have a dominant impact on students' school achievement. The importance of socioeconomic factors in each student's life has been clearly emphasized. The link between socioeconomic factors and academic performance cannot be overstated. It fosters an enabling environment, which has a significant impact on the student's outlook. A student who has access to good food, health care, school books, and other materials is more likely to demonstrate quick understanding and increase intelligence, especially if both parents and teachers are strict in their supervision. In general, higher socioeconomic families have educational facilities at home for their children to use from an early age.

3.3 Coping mechanism in dealing with the challenges.

The fourth theme formulated was Being Flexible. This theme answers the third problem of the study. Most of the respondents adopt flexibility in coping with the challenges faced during the new normal. In terms of challenges in internet connectivity, the participants state that they are making use of their own personal internet connection to suffice the need of strong connectivity. Additionally, some of them are moving out of their offices to look for areas where internet connection is stronger. Furthermore, the coping strategies of teachers in terms of challenges faced brought by students' personal reasons, location and priorities. Constant communication with students is essential for integrating the mandated new online teaching and learning method. "In other words, need physical distance is needed rather than social distance." To combat incidents such as the current pandemic, both lecturers and students require ongoing support and skill development during the transition from face-to-face to online teaching and learning. Sustainable teaching management should be used in programs to avoid negative effects on students' learning as a critical positive step toward online teaching and learning (Gumede & Badriparsad, 2021).

Teachers are expected to be flexible at all times. Flexibility means being able to use variety of teaching techniques and strategies to address the needs of the students. A flexible teacher is someone who is able to make modifications to the plan under specific circumstances. According to Keiser Collegiate System Publication, effective teachers are great at being flexible. This means that they can balance several responsibilities at once and still make students smile and feel appreciated. Additionally, Flexibility goes along with adaptability. In the classroom these two are the most important qualities that a teacher must possess. The two characteristics also go hand-in-hand with one another. Flexibility is the idea that your plans can change very quickly, sometime notice and sometimes without. Being flexible means incorporating feedbacks coming from the students. On the other hand, adaptability is the ability to adapt to change. In general, it is being able to acclimate yourself to changing roles, job responsibilities, materials and schedules. If one cannot accommodate these different aspects of teaching, it would be difficult to give your students the best learning experience that they could possibly get.

4. Conclusion

This study was designed to explore the lived experiences of college teachers who are teaching science courses. Specifically, seeks to identify the mechanisms used by science college teachers in terms of preparing lessons, delivering instructions, assessing learning, and providing feedback. Additionally, it also identified the challenges that the science college teachers encountered in teaching the new normal and their mechanisms in coping up with the challenges identified. Interestingly, using the Colaizzi's approach as a guide in the analysis of data on the extended texts on the mechanisms employed in the delivery of science instruction and their challenges in the new normal, four themes emerged simultaneously as the researcher sought answers to the posted problems of the study: taking the virtual route, turtle net, reaching students, and being flexible. Taking the virtual route means that every respondents' processes and procedures in preparing lessons. Turtle net describes the primary challenge faced by the participants in teaching in the new normal which is poor internet connectivity. Reaching students was characterized by the challenges faced by the science teachers on reaching out their students due to their personal reasons, location and priorities. Being flexible is the coping strategy adopted by science teachers in coping with the challenges faced during the new normal. Based on the findings of this study, the following conclusions are drawn:

1. Adoption of online teaching and learning through various platform became a trend in the delivery of instructions during the new normal.

2. Poor internet connectivity and reaching out to students are the primary challenges that Science College teachers face in teaching in the new normal.

3. Science College teachers are becoming more flexible and adaptable in order to meet the challenges of the new normal science education.

Recommendations - Based on the findings and conclusions of this study, the following recommendations are raised:

1. Since majority of processes and procedures in science teaching are done online in the new normal, an Institutional Learning Management System must be established to ensure the quality and efficacy of adopting such processes and procedures.

2. Fast and strong internet connectivity shall be established to facilitate better delivery of teaching-learning process in the conduct of new normal education.

3. Future researches that is geared towards identifying new normal science education-related challenges and coping mechanisms shall be conducted to provide clearer and vivid views about the cases of science college teachers in the new normal education

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