GROPING IN THE DARK: LIVED EXPERIENCES OF NOVICE SCIENCE TEACHERS ON ONLINE TEACHING

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ABSTRACT

This study employed a phenomenological approach to examine the lived experiences of novice science teachers in the context of online instruction. Semi-structured interviews were conducted with a purposive sample of five novice teachers, with teaching experience ranging from two to four years, all currently teaching science subjects online. The recorded interviews were transcribed and analyzed using phenomenological procedures, including data reduction, identification of meaning units, clustering of themes, and validity checks. Analysis revealed two main themes: (1) Challenges and (2) Adaptations. Based on these findings, it is recommended that schools provide induction programs, professional development, and technological support for novice science teachers, while CHED may consider updating teacher education curricula to enhance competencies in online science instruction. The study concludes that, despite significant barriers, novice science teachers demonstrate resilience, adaptability, and innovation, highlighting the importance of institutional support and curriculum development in preparing educators to effectively integrate digital technologies in science teaching.

Keywords: Novice science teachers, Online instruction, Phenomenological approach, Phenomenological data reduction, Commission on Higher Education (CHED), Philippines

INTRODUCTION

Novice teachers face a steep learning curve when moving from theoretical training to classroom practice, a transition that shapes their professional identity, self-efficacy, and readiness to manage real-world challenges. Efforts to implement idealistic pre-service concepts often meet resistance and limited influence on student learning, and recent reports—highlighting tragic incidents among Filipino teachers and difficulties with online distance education (Mateo, 2018; Iballa, 2022)—underscore serious mental health risks and the urgent need for improved support and preparation across diverse teaching contexts. The COVID-19 pandemic amplified these challenges by forcing many educators, especially novice science teachers, into remote teaching without sufficient preparation, creating difficulties for conducting hands-on laboratory work and raising concerns about the quality of science education (Erkut & Sahu, 2020; Sung, 2021). With limited research on how novice science teachers adapted to online instruction, this study seeks to examine their lived experiences at a private high school during the pandemic, emphasizing the importance of distinguishing novice from experienced teachers and providing targeted support to sustain effective teaching and learning (Bozkurt & Sharma, 2020; Laplante, 2020).

OBJECTIVES OF THE STUDY

This explored the lived experiences of novice science teachers in a private higher education institution in online teaching during the COVID-19 pandemic. Specifically, it sought to fulfill the following specific objectives: 1) Examine the challenges that novice science teachers experienced in teaching online. 2) Describe the adaptations that novice science teachers implemented to overcome challenges in teaching online.

METHODOLOGY

The study employed a phenomenological approach to explore the subjective experiences of newly qualified science educators adopting online instructional methods during the COVID-19 crisis. Conducted at a private, technology-forward institution in Bacolod City, Philippines, the researcher purposively selected five novice science teachers (specializing in Physics, Chemistry, Biology, or Earth Sciences) who taught first-year college students online and had been teaching no more than five years. Data collection used semi-structured online interviews (Microsoft Teams and Google Meet), with participants receiving question summaries beforehand and providing consent for recording; automatic transcriptions and manual translation of Hiligaynon responses were used to produce verbatim transcripts. Ethical safeguards included gatekeeper negotiation, informed consent, voluntary withdrawal, anonymity through changed names, and adherence to established interview protocols.

Data analysis followed phenomenological procedures to capture lived experience: the researcher bracketed personal biases via a subjectivity statement and practiced epoché, then applied Hycner's guidelines for examining meanings. NVivo 12 and its transcription tools supported coding, while manual transcription and Microsoft Excel were used for phenomenological reduction to identify significant statements and themes; transcripts and recordings were repeatedly reviewed. Member checking was conducted by presenting initial findings to participants for validation, and translations of Hiligaynon terms were handled carefully to preserve meaning. The researcher maintained a reflective stance, acknowledging their role in accessing participants' perspectives while striving for rigor in interpretation.

Trustworthiness was addressed using Lincoln and Guba's criteria—credibility (believability), dependability, confirmability, and transferability—through methods such as member checking, meticulous transcription and rechecking, and transparent handling of biases. Key themes center on novice teachers' transition into their professional roles, adaptation to technology-mediated pedagogy (including use of virtual lab simulations), ethical and procedural safeguards in human-subjects research, and methodological rigor in phenomenological inquiry. The findings reflect how early-career science educators experienced and made meaning of shifting to online science instruction amid the pandemic, with implications for teacher support, training, and digitally mediated science pedagogy.

RESULTS AND DISCUSSIONS

1. Challenges that novice science teachers experienced in teaching online

The research study explored the lived experiences of novice science teachers in online teaching during the COVID-19 Pandemic. Analysis of the findings revealed two main themes that emerged from the twelve sub-themes that outline the experiences of novice science teachers in online teaching.

***1.1 Main Theme**:* Challenges of Novice science teachers in online teaching

Subthemes:

1. Telecommunication and technological infrastructure
2. Teaching the practicality of science

3. Limited classroom interaction & student engagement
4. Challenges as a new teacher
5. Design and implementation of modules and assessments
6. Science content knowledge issues

Lived Experiences

Brownouts and the weak internet. Because it's online, I have students from rural areas and municipalities almost 30 km away from Bacolod, and some don't have internet signal" (T1)

"In a lab setting, safety protocols and precautions are essential for students—future medical professionals—to practice, observe, and internalize; emphasizing hands-on experience in a physical chemistry lab is especially important." (T3)

It is hard to engage online because it feels like a one-way monologue and, with cameras off, we can't see what students are doing behind their devices." (T5)

I felt too anxious and intimidated to ask colleagues or superiors for help after a few times when their responses seemed annoyed." (T3)

"*As a new teacher, I was surprised by how to make formative & summative assessments and how the table of specification or TOS is required to make one? I am still not familiar with those"* (T2).

"*My initial observation is that some of my students have difficulty in learning my lesson on vectors, and that's where I found out that some concepts in trigonometry and algebra were not fully emphasized during online mathematics back in Senior high school"* (T2).

***1.2 Main Theme**:* Adaptations of Novice science teachers in online teaching

Subthemes:

1. Strengthening the integrity of online assessments
2. Personal pursuit of professional development
3. Relocation and physical reporting to school
4. Review of fundamental concepts
5. Supplementing online teaching resources
6. Upgrade of technological and telecommunication devices

Lived Experiences

Initially I discovered this assessment platform online and it allowed me to monitor student progress.. It has various of options that mitigate cheating online" (T2).

A teacher recommended participating online webinars of UP college of education, which is relevant because the things being discussed are about pedagogical practices in online, which I've learned a lot. Best thing is it's free and have certificates" (T5).

"*I relocated to my sister residing in Bacolod because the internet signal of PLDT is stable, then when the school opened, once in a while I did report physically to school from time-to-time to have a straight and stable classes online"* (T1).

"Labster, the virtual laboratory of the school glitches and lags. What I did is buy an SSD on Shopee to upgrade laptop hardware and for a smooth virtual laboratory" (T5).

When I found out about their low math skills, that's where I started reviewing trigonometry and sohcahtoa to them" (T2).

Well, I attach and upload YouTube videos that visually explain, for example, glycolysis, the Krebs cycle. Those concepts in books can sometimes be confusing, and with the help of videos, students can easily understand the topic" (T3).

2. Challenges of novice science teachers in online teaching

2.1 Telecommunication and technological infrastructure

Internet accessibility and electrical power outages were reported by all five participants as primary obstacles to online science teaching. Three relied on WiFi while two novice teachers had to use the school computer lab, highlighting unequal access to home-based technology. When asked about challenges, participants immediately cited power and internet problems: "Brownouts and the weak internet. Because it's online, I have students from rural areas and municipalities almost 30 km away from Bacolod, and some don't have internet signal" (T1). They described unannounced and weekly power interruptions, particularly during typhoons and natural disasters, which hinder timely student interaction and reflect a lack of prompt infrastructure response. These accounts align with Alvarez (2020), who found internet and power accessibility to be challenges rather than advantages.

Participants also described a broader digital divide affecting both teachers and students. Beyond connectivity and electricity issues, some novice teachers and their students lack appropriate devices; one participant noted, "The chemistry virtual laboratory simulations demand a higher specification on the students' computer or laptop for it to be accessed. Usual observations and clamor of students to me is that their device is lagging, also, it demands faster internet, so my students from remote areas cannot access it" (T4). These technological limitations reduce student participation, impede meeting instructor requirements, cause delays, and restrict access to resources needed to complete course requirements (Baluyos et al. 2021).

2.2 Difficulty in teaching the practicality of science

Science, as a practical subject, needs to be applied for students to fully realize their learning outcomes (Tanik Onal, 2020). The challenge for novice science teachers was to convert face-to-face laboratory activities into online. Teacher 1 narrated how difficult it is to teach Biology online: "*There were online laboratories, but only 60% can attend and participate, the rest cannot because they cannot access them. What I did is that I just let those students who can access the virtual lab share their devices with their classmates who cannot access. Biology is much better if they could manipulate the microscope or hold realias"* (T1). Facing the same obstacle, chemistry teachers also mentioned the same sentiment on a laboratory set up: "*In a laboratory setting, laboratory safety protocols and precautionary measures is very important for them to perform, observe and internalize because our students are future medical professionals so it would be much better if we could emphasize the practicality of a physical laboratory setting, especially on chemistry"* (T3). The practical aspect of engaging in a teaching laboratory environment appears to enhance students' comprehension of theoretical principles and laboratory techniques (Tanık-Önal, N., & Önal, N., 2020). Nevertheless, the interview findings confirmed the point of Sung et al. (2021), arguing that the use of virtual laboratories or simulation-based laboratories, which lack tangible components, may prevent students from engaging in an authentic real-world experience.

2.3 Limited Classroom Interaction & Student Engagement

Novice science teachers mentioned that during online synchronous lectures, they were having a hard time engaging each student. They shared that classroom management and instruction are a bit challenging during online classes, especially teaching science. When asked a question regarding class interaction they observed that students are virtually present but mentally absent during class lectures: "*It is difficult to discuss online because it's like a one-way radio*

that you're the only one doing monologue, Also challenging because their cameras are closed and that's actually the challenge because we really never know what they are doing behind their cameras and laptop" (T5). This finding aligns with the research conducted by Blieza (2021), which supports the notion that online instruction presents challenges due to its impersonal nature and absence of emotional connection. Novice teachers, like senior and experienced teachers, started online teaching on the same starting line. However, Torabzadeh & Hashamdar (2022) argued that despite the same beginning point in this new normal setup, novice teachers have low self-efficacy in terms of classroom management, designing classroom activities, and syllabus compared to experienced teachers.

2.4 Challenges as a new teacher

The shift to online remote classrooms forced teachers—especially novices—to adapt quickly (Capacio et al. 2021). Many beginning teachers entered online teaching without formal induction, learning the system on the job: "I was hired during the height of online teaching, and I instantly taught and met with the students. There were guidelines and self-paced trainings given, which are the things that I'm still checking until now" (T1). Some felt anxious about seeking help from colleagues and superiors, worrying they were a nuisance, and then relying on self-directed exploration: "I was hesitant and shy to ask for help or contact my colleagues and superiors because there were a couple of times that I sought help, then I felt they were annoyed at me. After that, my anxiety and intimidation just built up, and at the same time, I did and explored things on my own because I felt that they were not open to help" (T3).

Participants' responses highlight the need for targeted support for novice educators so they can recognize their value and access resources to sustain a fulfilling career. Novice teachers reported feeling overwhelmed by rapid change, increased anxiety, and growing expectations, indicating that better induction, mentoring, and resource provision are necessary.

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3. Adaptations of novice science teachers in online teaching

3.1 Strengthening the integrity of online assessments

The acquisition of digital literacy is now a societal necessity, requiring teachers—especially novice, digitally native ones—to embrace these skills; interviews showed novice teachers using specific online platforms to monitor progress and reduce cheating, as one reported: "Initially, I discovered this assessment platform online, and it allowed me to monitor student progress. It is very good because you can see them individually on what item they are currently taking in the test, and you control their tabs. It has various options that mitigate cheating online. I then pitched it to our dean and department head, and it was deliberated. 2 weeks after we began pilot testing of quizzes and it was successful. After that, it was institutionalized as the main platform for assessments" (T2).

Cuaton (2022) found that many prominent online assessment systems use school ID authentication, disable copy-paste, employ semi-automatic monitoring, and analyze video, image, voice, and screen data to detect cheating. Overall, assessment remains central to online teaching and learning, and educators must both foster student integrity and implement verification strategies to minimize academic dishonesty.

3.2 Personal pursuit of Professional Education

The COVID-19 pandemic forced education to shift rapidly to online and distance learning, prompting a focus on refining instructional approaches and ensuring their effectiveness. This urgency raises a central question for educators: "How can I enhance my instructional methods?" There is a clear need to provide support and professional growth opportunities—especially in information and communication technology (ICT) and related areas—for both current teachers and those training to become educators. Novice teachers find training and support particularly valuable for adjustment: "A teacher recommended

participating in online webinars of UP College of Education, which is relevant because the things being discussed are about pedagogical practices in online, which I've learned a lot. Best thing is it's free and has certificates" (T5). Some educators are also taking advantage of online graduate programs: "It is very important because I am teaching in the college setting, and as an educator, I need it as a refresher on some concepts in assessment of education and other important concepts in science, most especially its online and no need for you to go physically to school" (T4).

A considerable proportion of emerging science educators actively pursue avenues for professional growth, participating in training courses, webinars, classes, and graduate studies to improve their teaching and meet the demands of modern, diverse classrooms. It is widely acknowledged that educators have a professional responsibility to seek new knowledge and develop additional skills; doing so not only advances their careers but also fosters the development of more proficient learners.

3.3 Relocation and physical reporting to school

One unique sub-theme that emerged is teachers' relocation and physical reporting to school on the onset of community lockdowns and quarantines. Due to the common occurrence of unannounced power interruption, intermittent internet connectivity and device issues, novice teachers reported that to address those issues they need to temporarily relocate and physically go to school to utilize the institutions' telecommunication and technological resources like computer, internet and electrical power: "*when the school announced that they will be open and will allow teachers to utilize computers in the computer lab, and because my laptop is not functional, I just physically report to school every day, riding my motorcycle"* (T2). Some teacher who resides from the provinces have to go relocate within the city to have stable internet connection: "*Initially, because I'm from La Carlota, I relocated to my sister residing in Bacolod because the internet signal of PLDT is stable, then when the school opened, once in a while I did report physically to school from time-to-time to have a straight and stable classes online"* (T1). Due to the absence of transportation during the onset of the pandemic, it is noteworthy that the school offered shuttle services that transport faculty and staff from strategic locations within the city to the research site. However, some reside in cities outside Bacolod and cannot avail it.

3.4 Upgrade of technological and telecommunication devices

Several participants highlighted their ability to overcome challenges related to device compatibility and internet connectivity problems. It was felt by the participants that adjusting technologically is necessary for the proper implementation of science classes, particularly in laboratory classes: "*Labster, the virtual lab that the school uses, is heavy and a highly demanding software. Students often would complain also regarding that. What I did is bought SSD on shopee to upgrade laptop hardware and for a smooth virtual laboratory"* (T5). Some teachers emphasized the importance of having back-up mobile data for emergencies like unannounced brownouts and WiFi connection issues: "*always back-up mobile data, I always load up additional data for emergencies like power interruptions or my wifi just disappeared, at least I have a way to go back to my students"* (T2).

Several participants also noted that the institution has a technological assistance program for teachers. This program enables faculty members to temporarily borrow electronic devices for educational reasons, particularly for those who are unable to afford technologies that could improve their online teaching experiences. Nevertheless, the participants expressed their dissatisfaction with the lengthy duration of the application procedure and indicated a preference for the autonomy to select their own gadgets.

3.5 Review of basic science concepts

To address concerns about students' foundational knowledge in science, most novice teachers reported routinely reviewing basic concepts in biology, chemistry, and the

mathematics required for physics to ensure comprehension of more advanced topics and facilitate smooth instruction; as one teacher explained, *"I always review in order for all my students to grasp the topic that I am discussing, that's why I always go back and discuss basic topics like cell organelles for example*" (T1), and a physics teacher echoed this emphasis on fundamentals: "*When I found out about their low math skills, that's where I started reviewing trigonometry and sohcahtoa to them, which is easy to understand because they already have calculators"* (T2).

Participants also observed that some students struggled to follow basic directions on exercises and quizzes, and, recognizing the challenges learners face—particularly in online settings—teachers responded with careful consideration and supplementary handout materials to support student learning.

3.6 Supplementing online teaching resource

As digital natives, novice teachers demonstrated resourcefulness in online teaching by independently researching and gathering digital materials such as e-books, online science activities, and virtual laboratory simulations to supplement their classes. Many sought mobile-friendly simulators and student-accessible e-books to accommodate learners who primarily use cellphones: *"I researched other e-books, which are student friendly that they can just access anytime. Then for the virtual laboratory, we searched other simulators that allowed access for mobile users because most students especially for nursing, use cellphone only for online class*" (T5).

Pre-recorded lecture videos and YouTube clips were widely used to clarify abstract science concepts and to provide review material; teachers found that visual explanations made complex topics more understandable: *"…well I attach and upload YouTube videos that visually explain for example glycolysis, Krebs cycle. Those concepts on books can sometimes be confusing and with the help of videos, students can easily understand the topic.."* (T3).

All novice teachers reported using two or more online resources in their classes, illustrating their digital proficiency and familiarity with online platforms. This competence gave them a notable advantage in remote teaching, enabling effective incorporation of diverse digital instructional resources.

CONCLUSIONS

Findings from the study promoted challenges and adaptations of novice science teachers on how they play they role in the new educational approach of online teaching. Novice teachers are still beginning not only in the field of education, but also in the field of online teaching. Noting their experiences in teaching science online, which is a practical discipline, is a great way to know and understand how they react to such change in the educational approach and certain disruptions:

1. According to the results obtained from this study, the delivery of online science education requires a significant requirement for technological and communications resources.
2. A sense of resourcefulness and independence were the primary concepts assimilated by novice science teachers during their interaction in online education.
3. Novice teachers demonstrated proficiency in using digital resources to enhance instruction. However, they faced challenges with classroom management, sustaining active participation in synchronous sessions, developing instructional modules, designing courses, and implementing effective assessment strategies.
4. Novice science teachers encountered multiple obstacles that prompted them to employ specific adaptive strategies to address the issues shows their resiliency.

5. Virtual laboratory experiments can be a supplement but not totally a full alternative on teaching the practicality of science.
6. Beginner teachers often experience anxiety and hesitancy when seeking help from more experienced colleagues. This apprehension reflects the overall faculty and staff receptiveness to supporting new instructors.

This study examined the perspectives of new science teachers in online education, acknowledging that participant-specific circumstances shaped the findings. Consequently, the conclusions may have limited generalizability and should not be assumed applicable to all educators nationwide.

RECOMMENDATIONS

Future research should aim to expand the scope of the study by incorporating a larger number of schools, multiple science subjects taught, a broader geographical area, and a more diverse sample of teachers from various year levels within the higher educational system. In light of the following findings in this study, It can be fully supplemented and improved by:

1. Institutional support—through targeted professional development like trainings and webinars—is essential for effectively implementing online science teaching, especially the use of virtual laboratory simulations.
2. Trainings in classroom management, assessment strategies, and module and syllabus design should be emphasized to address challenges faced by novice science teachers.
3. Commission on Higher Education (CHED) may revitalize and revamp the teacher education curriculum to emphasize educational technology and online teaching for the new normal.
4. Curriculum planners in higher education should design science online learning that emphasizes practical skills, largely through virtual laboratory simulations.
5. The government and private academic institutions should provide every teacher with a personal online teaching device and upgraded internet capable of supporting simultaneous, uninterrupted use. Educational Technology tools might be also given to teachers for them to avoid personal spending.
6. Educational institutions, including schools and higher education establishments, should consider implementing teacher induction programs to support newly recruited and inexperienced educators. Such programs facilitate a smoother transition and improve teacher readiness and retention.
7. Novice teachers may feel obliged to engage in advanced academic pursuits at the graduate and professional levels in order to enhance their understanding of contemporary advancements in the realm of education, as well as the multifaceted aspects of pedagogy and knowledge acquisition.

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