



Challenges And Coping Strategies of Science Teachers

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Abstract

This study explored the different challenges teachers experienced in teaching science subjects. It also tackles the techniques or strategies that teachers use to overcome the challenges they are experiencing. This study utilizes a qualitative descriptive case study design to explain the teachers' challenges, the effects of the challenges, and the coping strategies they use to address the challenges they face in teaching science. The researchers interviewed six participants from one of the private schools in Pagadian City, Philippines. Data collected from each interview were analyzed to come up with different categories. The findings revealed that the research participants are experiencing different challenges experienced, experiencing isolation, lacking laboratory materials, dealing with uninterested students, difficulty identifying the student's needs, lack of proficiency with new equipment, difficulty in adopting the new curriculum, and lacking administrative support. These challenges also unveiled the following effects: science neglect hinders appreciation, compromises the learning outcomes due to mediocre education, lacks actual learning and students' restricted progress, and enhances professional growth and increased motivation. With these challenges and effects encountered, the teachers were able to come up with four strategies to deal with the challenges and effects. The following are the strategies: promoting collaborative experimentation among students, exploring alternative substitutes for experimentation materials, presenting digitized activities, and embracing open-mindedness and adaptability in teaching, allowing them to effectively address and identify the difficulties and allowing them to create a more conducive learning environment and fostering professional growth and increased motivation among teachers and students.

Keywords: Science Teachers, Teaching Science, Challenges Encountered, Effects, Strategies

Introduction

In today's situation, the world is constantly and rapidly changing, and technology and development from different parts of the globe arise in the nick of time. With its fast-paced growth, great inventions can be used in daily living are created. Medical advancements, such as stem cell transplants, or technology can improve the quality of life.

The way humanity lives has undoubtedly changed due to how technology has affected several aspects of life and transformed living (Raja & Nagasubramani, 2018). Technology is essential in teaching because it enhances learning experiences, enables access to information and resources, facilitates collaboration, and prepares students for the digital world (Angeles et al., 2023). It also allows for personalized learning and interactive, engaging educational content creation.

Science has made several contributions to the development of the world. Some specific examples include developing vaccines and treatments and enabling global communication and information access. Science has an enormous scope, regardless of what it may be; science is the process of creating and analyzing the credibility of the claims made about the different phenomena in human life (Wallace, 2017). Since it requires many resources, science applied to education is crucial. When selecting an institution to train effective, well-prepared, and skilled science teachers, there are various factors to consider (Celesio, 2021). The organization should encourage and fully utilize information, technology, and the advancement of science teaching. Due to these advancements, the institution should also consider that as the world is rapidly changing, the students' way of acquiring knowledge is also changing. The pedagogical practices of science teachers and instructors must change to include decisions about what to teach in science lesson activities (Iwuanyanwu, 2019). Additionally, teachers should be aware of the entire educational system. In science, teachers should be exposed to science subjects and science-related seminars, and science research (Moyo & Hadebe, 2018).

The current educational system develops students' problem-solving skills and emphasizes student-centered learning. Students learn independently, while teachers act as facilitators to create a lifelong habit of problem-solving skills through self-directed learning (Ali, 2019). However, instructors face enormous obstacles due to continuous development. Teachers experience overwhelming workloads handling several tasks and duties with limited resources, equipment, and facilities such as laboratories (Ramirez, 2021). Teachers often manage the most challenging classrooms, handle huge classes, and take on non-teaching activities (Baraquia, 2022; Hayes et al., 2019). Performing various tasks disrupt the actual purpose of the job, which is to guide and develop students academically and socially. These demands obscure the essence of teaching with unnecessary things (Panela & Deniega, 2021). One explanation of this issue is that teachers keep teaching students in a manner that completely ignores the presuppositions that teachers introduce to the classroom. These presumptions include expectations for what students should know; teachers are responsible for ensuring that students to comprehend fundamental scientific concepts (Glaze, 2018).

Increased workloads and program requirements, college students adjust and alter their eating and sleeping patterns, affecting their lifestyle, performance, and academics. Teachers play a vital role in preventing or reducing student difficulties (Hsu & Goldsmith,

2021). Teachers are regarded as initial responders in the classroom as they are responsible for maintaining their students' well-being and safety. By being prepared and trained to respond in an emergency, teachers can help ensure a safe and supportive learning environment for their students. However, due to their various responsibilities and the number of students, the teacher cannot give the student's attention equally (Placito-De Rango, 2018). Since the teachers are the first aiders, their problems and challenges should also be considered.

Overcoming challenges requires determination, and problem-solving skills, especially for teachers. As they teach the students daily, they encounter challenges that might be old or new to them. This study unveiled the challenges teachers encounter while teaching science subjects. It also determines how these challenges affect them and how they deal with them.

Theoretical Framework

This study was based on the JD-R model developed by (Bakker & Demerouti, 2001). The job demands, and resources model is about how various job demands and resources act as a challenge, hindrance, or job resource that accounts for a positive relationship with particular job demands such as workloads and work engagement (Bakker & Demerouti, 2001). It explains the relationship between job characteristics, employee well-being, and work outcomes.

The JD-R model proposes two broad categories of factors in the work environment: job demands and job resources. Job demands refer to aspects of the job that require physical, cognitive, or emotional effort annually, leading to strain or stress. On the other hand, job resources are the physical, psychological, social, or organizational aspects that can help individuals achieve their work goals, reduce job demands, and promote well-being. Job resources include social support, autonomy, feedback, skill variety, career development opportunities, and supervisor support (Bakker & Demerouti, 2001).

It emphasized the importance of balancing job demands with adequate job resources to promote employee well-being and performance in the workplace.

Research Objectives

This study aimed to determine the challenges Science Teachers encountered in teaching Science subjects. The study also explored how these challenges affect the teaching and learning of science. Furthermore, the study explored the strategies of teachers in overcoming their encountered challenges.

Method

Research Design

The research design utilized by the researchers was qualitative research with a phenomenological approach. This approach examined the challenges science teachers encountered in teaching science at the tertiary level (Moustakas, 1994). Qualitative research involved closely examining and interpreting observations to uncover underlying meanings and patterns of relationships. It also entailed categorizing different phenomena and bodies focused on descriptive analysis rather than relying on mathematical models. A transcendental phenomenological approach was applied to examine a particular phenomenon or experience from a first-person perspective. These involved exploring the subjective experiences, perceptions, and attitudes of individuals who had undergone particular experience and the researchers delved into the data provided by the participants to understand the nuances of their lived experiences and how they experienced it.

Research Environment

The study took place during the second term of the 2022-2023 academic session. It encompassed one of the private institutions teaching science-related subjects in Pagadian City, Zamboanga del Sur, Philippines.

Research Participants

The research participants in this study were the teachers from the Junior High, Senior High, and College Department of the chosen school in Pagadian City who taught science subjects. The participants were chosen using purposive sampling, in which the researchers selected the participants according to their predetermined standards. The participants were required to have two years of experience teaching science subjects and to be currently teaching in the institution.

Research Instrument

The researchers served as the research instrument as they conducted the interviews, gathered information, and collected the data. The selected participants were teachers who taught science subjects and took part in a one-on-one interview. The interview method involved the researcher asking questions to the participants in order to gather in-depth, qualitative information about their thoughts, feelings, experiences, and perspectives. The interview guide was divided into different parts, where the researchers introduced themselves, informed the participants about the interview, and explained the research or interview process. The confidentiality consent form stated that all information collected

during the interview would only be used for research purposes and would only be recorded with authorization from the participants, engaging questions, and the interview guide.

Research Gathering Procedure

Prior to the data collection, the researchers informed the Science Subject teacher participants about the purpose of the study, its objectives, and the duration of the interview guide. Informed consent was obtained from the participants before the one-on-one interview, ensuring their comprehension of the study's parameters and objectives. The researcher strictly followed ethical guidelines by securing informed consent and safeguarding the participants' privacy during the interview process.

The researchers personally administered the interview guide to the participants to foster authenticity in their answers. This qualitative study, which employed the Transcendental phenomenological approach, utilized open-ended questions and uncovered the difficulties experienced by Science Subject teachers and their methods for overcoming them.

Every utterance made during the interview was recorded using an audio recorder and served as evidence for the curriculum vitae. The participants willingly consented to have their session recorded, and this consent was documented in the informed consent form they filled out before the interview.

Data Analysis

This study used qualitative data analysis, characterized by descriptive accounts of the research participants. The researchers reviewed the interview transcripts, and the emerging concepts were recognized and analyzed their interconnections. The data gathered from interviews and observations was utilized to comprehensively describe, interpret, and analyze the case.

Ethical Considerations in Research

The researcher applied the principles of ethical considerations developed by Bryman and Bell in 2007.

Informed Consent. The participants' full consent was sought before the study was conducted. They were fully informed about the study's purpose, procedures, and risks.

Anonymity and Dignity. The confidentiality of research participants was protected throughout the study. The researchers considered that the participants' voluntary involvement in the study was respected and treated fairly without discrimination.

Privacy and Confidentiality. The confidentiality of research participants was protected. The researchers ensured that, unless otherwise approved, the participant's identity, personal information, responses, etc., would not be exposed to anybody outside

the research team.

Honesty and Transparency. The researchers credited the participants' data and were honest and transparent in the data collection and analysis. Participants had the option to decline or withdraw from the study at any time if they chose to do so.

Results and Discussions

This chapter provides a thorough analysis and explanations to elucidate the data acquired from the selected study participants. This chapter aims to improve comprehension of science instructors' different challenges in teaching science.

This research focuses on teachers' challenges in teaching science in different grade levels. The participants are the teachers who are teaching science in a private Junior High School, Senior High School, and the College departments. Each participant was designated a code P1, P2, P3, P4, P5, and P6 to maintain the confidentiality of their profiles. P1 and P6 are teachers from the college department, P2 and P5 are from the Junior High School department, and P3 and P4 are teachers from the Senior High School department.

Challenges Encountered by Science Teachers in Teaching Science

The data gathered by the researchers during the one-on-one interview revealed the different challenges they encountered in teaching science subjects. Nevertheless, despite their challenges, they still try to share their knowledge with their students and teach efficiently.

The data collected from the interview revealed seven categories for the first statement of the problem, which was "the challenges encountered by instructors in teaching science." These are the following categories: working alone, lacking laboratory materials, uninterested students, difficulty in identifying the student's needs, lack of proficiency with new equipment, difficulty in adopting the new curriculum, and lack of administrative support.

Working Alone. During the interview, the participant shared different challenges, and one of the challenges was experiencing isolation; one shared the feeling of experiencing isolation and a lack of support as a new teacher. The participant mentioned feeling alone in their program and highlighted the absence of senior colleagues who could guide them, unlike other new teachers who benefited from such guidance. As a result, the participant had to independently address issues they faced, such as creating a syllabus and developing learning materials. In line with this category, the respondent said:

“As a teacher, I feel isolated in my program due to the challenges I face. Unlike other new teachers who have senior colleagues to guide them, I am the only science teacher. Consequently, I have no one to turn to with my questions or concerns, and I must handle them independently. When problems arise, I am solely responsible for finding

solutions since my colleagues are not knowledgeable in science either.” P1

The participant has already acknowledged that they were the only ones with expertise in that program. They were no choice but to deal with it independently. Doing their task and finding their guides can help them create a syllabus and appropriate learning materials to produce effective student learning.

Due to the unsupported educational setting that the school provided, the teacher expressed their honest feeling during the first two years that they had spent having feelings of isolation, low self-confidence, limited control over their professional development, and the lack of assistance from the administrators, lack of senior teachers resulting to insufficient constructive feedback and lack of effective mentoring. Pushing them to establish networks to plan curriculum, instructional methods, and laboratory experiences. (Nehmeh & Kelly, 2018).

Lacking laboratory materials. One of the challenges common to most participants shared is that a lack of laboratory materials is one of their challenges in teaching science subjects. Laboratories' unavailability of the needed materials during experimentation can hinder the students from exploring independently during experiments and learning and grasping the concepts. It also decreases the teachers' efficiency as they lose hope of carrying out a successful experiment with the students due to the lack of materials, resources, and equipment. With this category, the respondents narrated:

“My main challenge in teaching science is the need for more resources. It becomes difficult for me to explain my lessons effectively to my students because we need to conduct experiments for them to understand the lessons better.” P3

“Despite being a private school, we still need more resources, particularly regarding virtual laboratories and simulations. While there are free versions available, the paid versions offer better quality. However, we have yet to integrate them into our school due to the need for additional payment, which would burden our students further.” P4

“These challenges would diminish teachers' efficiency when they need more resources. It becomes a significant challenge for teachers, including myself, to motivate students to learn science, especially when some are not interested in the subject, particularly if it is not their major.” P4

Insufficient availability of laboratory materials poses a primary challenge for teachers, hindering their ability to conduct experiments and impeding their effectiveness in effectively explaining lessons. Consequently, more instructional resources are needed to improve teachers' overall efficiency in delivering quality education. With access to the necessary laboratory apparatus, teachers can provide hands-on experiences and practical demonstrations, crucial for reinforcing learners' conceptual understanding.

Laboratories help teachers facilitate active science learning and produce an adequate education, allowing students to think creatively and critically while solving real-world problems. However, due to inadequate laboratory facilities, science equipment, malfunctioning laboratory equipment, and insufficient learning materials. Both teachers and students need help teaching and learning science concepts. (Hadji Abas & Marasigan, 2020). The availability of instructional materials allows students to engage in hands-on learning experiences, enabling them to actively participate in the learning process. Students can explore and experiment by interacting with the apparatus, fostering a sense of curiosity and discovery (Danjuma & Adeleye, 2015).

Uninterested students. One of the challenges the teachers have dealt with is getting their students interested in science subjects such as physics, biology, chemistry, and other science subjects. Students that take up majors unrelated to science tend to have a lesser interest than other students since they consider it optional for their future programs. In other situations, the participant gave, it affected their teaching strategy, such as teaching in higher order. However, since they need more interest in the science subject, the teacher has to go back to basics so that the student can comprehend the lesson better. In line with this category, the respondents stated:

“Since most students lack interest in science, it affects how I handle them. As they are in grade 10, I should present them with higher-order questions and activities. However, I need to teach them again the basics of science for them to understand better and grasp the main points I am trying to convey.” P2

“If it is not their major, some may still be interested, but the majority of the group, if it is not their major, would not see the essence of learning science.” P4

Science teachers acknowledge that one of the challenges they face is making adjustments when conducting experiments in their science classes due to a need for more laboratory equipment. They must adapt and find alternative solutions to conduct experiments and ensure students understand the topic better.

Despite all the hardships teachers encounter in an inclusive classroom, they have decided to keep their job. The lack of facilities, support, and training could not hold these teachers from becoming more creative to the needs of the students. These teachers are creative in thinking of differentiated activities for their learners. They, too, are very supportive of considering making individualized learning materials for their students (Cui, 2022).

Difficulty in identifying the student's needs, the participant emphasizes the importance of identifying the learning needs of students and implementing suitable techniques and strategies based on their learning phase. This highlights the participants' recognition that each student has unique learning needs. With this category, the respondent narrated:

“Identifying students' learning needs and tailoring techniques and strategies to their specific learning phase is critical. Each student has unique requirements. Understanding them is essential for effective teaching and learning.”

This category emphasizes the difficulty in identifying students' needs, indicating that it is a complex task. This recognition underscores the importance of identifying and understanding the learning needs of individual students. By doing so, educators can tailor their teaching techniques and strategies to accommodate the specific learning phase of each student. Acknowledging unique learning needs suggests a student-centered approach that recognizes the diversity of learners. Ultimately, this highlights the significance of personalized education and its role in fostering effective learning environments. By disregarding the explicitly stated needs, we are forfeiting the chances to cultivate individual abilities, inner drive, and the pleasures of acquiring knowledge. Students have diverse learning styles and preferences, but educators may only sometimes provide content and learning opportunities that align with students' ways of learning (Chetty et al., 2019).

Lack of proficiency with new equipment highlights the challenges related to the inadequacy of laboratory equipment. The participant admits to needing to be an expert in the current major and mentions the difficulties faced in conducting experiments due to the lack of expertise and availability of necessary equipment. This implies that the teacher might feel less confident facilitating hands-on learning experiences, which are crucial for science education. In line with this category, the respondent narrated:

“Because of the inadequacy of laboratory equipment, it is now more challenging for me since I am not an expert and need more expertise in my current major. Unlike before, it is more difficult to conduct experiments now because of many requirements and demands. This present time is more challenging for me.” P6

The statement highlights the challenges of insufficient proficiency with new laboratory equipment. The participant acknowledges the need for expertise in their field of study, emphasizing the difficulties encountered in conducting experiments due to limited knowledge and the unavailability of necessary equipment. This suggests a potential hindrance to the teacher's ability to facilitate hands-on learning experiences, which is vital for effective science education. The lack of confidence resulting from these challenges may impact the overall quality of the learning environment and the student's practical understanding of scientific concepts. Addressing the issue of equipment proficiency becomes crucial in fostering a robust and engaging science education experience. Gaining proficiency in operating laboratory equipment requires extensive practice, making it easier for students to navigate the equipment with prior experience (Singh et al., 2021).

Difficulty in adopting the new curriculum. The researcher's interview data reveals that it is evident that the respondent needs help implementing the new curriculum. This

difficulty can be attributed to the respondent teaching for 33 years, during which the traditional curriculum was predominantly used. As a result, adapting to the new curriculum poses a considerable challenge for her. The respondent's prolonged exposure to the conventional curriculum may have ingrained specific teaching methods and content delivery approaches, making it harder for her to embrace the changes associated with the new curriculum. Consequently, the transition to the new curriculum requires additional support, training, and resources to help the respondent navigate the unfamiliar territory and effectively integrate the latest teaching methods into her instructional practices. With this category, the respondent said:

“Since I have been accustomed to the old curriculum for the past 33 years, I am struggling to implement the new curriculum.” P6

When a teacher is accustomed to using the traditional curriculum, adapting to a new curriculum can prove challenging. The familiarity and comfort gained from years of teaching the conventional curriculum make it difficult for the teacher to transition to the new approach. The teacher may need to unlearn specific methods and teaching strategies while simultaneously learning and implementing the new curriculum. This process requires time, effort, and support to effectively integrate the new curriculum into the teacher's instructional practices. Modifications to curriculum development necessitated embracing fresh cognitive obligations (Wallace & Priestley, 2017). The necessary training and resources can help alleviate the teacher's difficulties, ensuring a smoother transition to the new curriculum.

Lacking administrative support. The researcher's interview data indicates that insufficient administrative support negatively affects the quality of education teachers provide. This includes inadequate provision of essential resources and limited promotion of programs. The lack of support from administrators directly impacts the teachers' ability to deliver a high-quality education to their students. More resources are needed to ensure effective teaching and allow opportunities for student learning. Additionally, the absence of program promotion undermines the visibility and impact of educational initiatives, further impeding the overall quality of education. In relation to this category, the respondent said:

“There should be support from the administration, and there should be a laboratory available. Since science is all about exploration, actual learning should be emphasized.” P6

The research findings highlight the crucial role of administrative support in ensuring the quality of education teachers provide. The lack of such support directly impacts the resources available to teachers, hindering their ability to deliver effective

instruction. Furthermore, the absence of program promotion limits the visibility and effectiveness of educational initiatives. The adverse consequences of inadequate support for exceptional education staff encompassed minimal notification regarding schedule changes, consolidation of students with different disabilities into a single class, elimination of effective programs or supports for both teachers and students, implementation of ineffective programs or supports, and the existence of an unfavorable school atmosphere overall (Haydon & Stevens, 2018). To improve the quality of education, administrators must prioritize providing necessary resources and actively promoting educational programs. By addressing these areas of concern, administrators can empower teachers to deliver high-quality education and create a conducive learning environment for students.

Effect of the Challenges in Teaching and Learning Science

The gathered data revealed five categories that exhibit the effects of the challenges in teaching science and learning science. The following are the five categories: Difficulty in performing the suggested experiment, Science is not adequately recognized or valued by students, compromised learning outcomes due to limited subject proficiency, Absence of actual learning and students' restricted progress, and Enhanced professional growth and increased motivation.

Difficulty in performing the suggested experiment. The researcher's interview data reveals that the need for more materials significantly impacts science teaching. As science subjects rely heavily on experiments to reinforce theoretical concepts, teachers need help delivering comprehensive lessons when they cannot conduct experiments due to defective materials, equipment, and apparatuses. This limitation directly affects the quality and effectiveness of their teaching methods.

With the necessary materials, teachers can provide practical examples or hands-on experiences essential for students to grasp scientific principles fully. The lack of practical experiments prevents students from actively participating in the learning process, impeding their grasp and practical application of scientific ideas. In line with this category, the respondents narrated:

“These challenges affect my teaching with my students, especially with the experiments. I have plans, but when I want to conduct an investigation, I get discouraged since there is a need for more chemicals and materials.” P1

“It affects my teaching since there need to be more materials. Hence, we cannot fully utilize the learnings of that topic since science is more on experimentation. Therefore, we cannot perform the activities since there is experimentation is necessary” P3

Experiments are vital in learning about science since it fosters a practical understanding of the concepts and it helps the students to understand more about the lesson. The unavailability of chemicals and materials impacts science education because the

students are only given theoretical knowledge. By providing students with concrete experiences, experimentation increases student engagement, motivation, and interest in science. It fosters resiliency, flexibility, and the ability to learn from errors while assisting kids in comprehending the iterative nature of science. Furthermore, experimentation develops students' teamwork, collaboration, and communication skills, enabling them to share ideas and effectively express their findings. Since it includes diverse activities to improve students' comprehension of complex topics, the laboratory within the educational context is crucial in encouraging the overall development of students (de Borja & Marasigan, 2020).

Science is not adequately recognized or valued by students. The gathered data revealed that uninterested students' presence significantly impacts instruction's effectiveness. Recognizing the need to engage these students and cultivate their interest in learning science, regardless of their primary academic focus, requires substantial time and effort. In line with this category, the respondent narrated:

“It is indeed a challenge for teachers, including myself, to motivate students to learn science, especially when some are not interested in the subject, mainly if it is not their primary. If it is not their major, they may not recognize the importance and value of studying science.” P4

The absence of hands-on experiments hinders students' active involvement in learning, thereby obstructing their comprehension and practical utilization of scientific concepts. Doing so requires a considerable investment of time and effort from educators. By implementing strategies to captivate and motivate these students, educators can enhance the learning experience for all students and help them recognize the value of studying science beyond their major. Addressing the challenge of disinterested students is essential for promoting a comprehensive and engaging science education.

Compromised learning outcomes due to limited subject proficiency. The data collected disclosed that due to the lack of proficiency, the participant admitted needing more expertise in the topics and concepts in the new curriculum, which prevented the participant from teaching the students effectively. It significantly hinders the participants' ability to deliver quality instruction. The teacher's limited knowledge and understanding of the subject make it challenging to provide accurate and comprehensive explanations to students. In relation to this category, the respondent said:

“I am no longer an expert now; I currently lack expertise in my major, unlike before. It is more difficult to teach now because there are many demands and challenges at the current time. Students also do not have mastery, just like the teacher, perhaps due to the changes in the curriculum.” P6

The limited knowledge and understanding of the subject matter significantly

impede the participant's capacity to deliver high-quality instruction. This deficiency poses challenges in offering accurate and comprehensive explanations to the students, potentially hindering their learning experience. Addressing this issue necessitates focused efforts to enhance the participant's knowledge and competency in the new curriculum, ultimately improving the quality of education provided to the students.

Absence of actual learning and students' restricted progress. One of the participants revealed that due to the lack of support from the administration. The teachers need help to perform and teach the concept and topics in a way that the students will understand. Some cases require proper laboratory equipment and material. Still, due to needing more support, the teacher cannot suggest doing laboratories, resulting in students not having actual learning and restricting their learning progress. In line with this category, the respondent narrated:

“So, the teacher and students are engaging in learning science. There should be support from the administration, and there should be a laboratory. Since science is more about exploration, the learning should be hands-on and experiential. However, due to the lack of support, students need actual learning experiences, and their knowledge needs to be improved.” P6

Teachers require assistance in effectively delivering concepts and topics that students can understand. In some instances, proper laboratory equipment and materials availability is crucial. However, teachers cannot offer laboratory activities because of inadequate support and limited resources, thus denying students crucial hands-on learning experiences necessary for their educational advancement. The limited support from the administration creates a barrier to providing a comprehensive learning environment. The teachers emphasized that the most crucial factors for their effectiveness were support from the administration and the effectiveness of their team (Conley & You, 2017).

Enhanced professional growth and increased motivation. During the one-on-one interview, the participants were asked about the effects of their challenges in teaching science subjects. Most of the data concluded adverse effects, but one positive effect prevailed. The participant (P5) stated:

“These challenges helped me grow professionally, and at the same time motivated me to give more and beyond what is due for the students.” P5

Despite the typically negative impacts associated with challenges, the research participant, in this case, views them as beneficial for professional growth. The respondent recognizes the value of overcoming challenges, as they provide personal and career development opportunities. The research participant can enhance their professional skills and abilities by embracing and navigating through challenges. This positive outlook allows the research participant to leverage challenges as a catalyst for growth and advancement in

their chosen field. Teachers' dissatisfaction with their teaching and students' learning drove their professional development (Appova & Arbaugh, 2018).

Strategies the Teachers Employ to Overcome These Challenges

The participants were asked about strategies to overcome these challenges during the interview. The researchers then gathered the given answers and revealed four categories. The following are: Promoting Collaborative Experimentation among Students, Exploring Alternative Substitutes for Experimentation Materials, Presenting digitized activities, and Embracing Open-Mindedness and Adaptability in Teaching.

Promoting Collaborative Experimentation among Students. The researcher's interviews uncovered valuable insights about the teacher's instructional practices. The data revealed that the teacher actively employs a strategy called collaborative experimentation to tackle the challenges faced by the students. This approach fosters a collaborative learning environment where students explore and experiment with concepts. The students can better understand the subject matter and develop problem-solving skills through this. The researcher's findings highlight the teacher's effective use of collaborative experimentation to overcome the challenges encountered by the students. In relation to this category, the respondents stated:

“The strategy that I usually employ is the collaborative strategy, which is collaborative and experimental. In the experimental aspect, they become aware of what they are doing and can say, 'This is what Ma'am said' or 'This is what Ma'am meant' because they have witnessed it. In terms of collaboration, at least they have assistance or support if there is something they need help understanding. I also use individual brainstorming and recitation, but my approach mostly focuses on collaboration and experimentation.” P2

“I changed my teaching strategy. I use a collaborative type of learning now, unlike before.” P6

The collaborative strategy in education has proven to be highly effective in overcoming challenges commonly faced by instructors. Encouraging students to work together fosters a sense of shared responsibility and accountability for their learning outcomes. This strategy promotes engagement and participation, as students participate actively in discussions, problem-solving, and knowledge sharing. It also enhances critical thinking and communication skills as students learn from their peers and develop a deeper understanding of the subject. Collaboration allows students to learn from diverse perspectives and build critical social and teamwork skills. The collaborative strategy empowers students to take ownership of their learning and creates a supportive and dynamic learning environment. While students collaborate, they can participate in activities that foster their learning process through collaboration (Van Leeuwen & Janssen,

2019).

Exploring Alternative Substitutes for Experimentation Materials. The researcher's interview data highlight a noteworthy finding: Teachers often employ alternative substitutes when conducting experiments. Since there is a need for more experimental materials and apparatus. Teachers face challenges accessing the necessary resources, leading them to seek creative solutions and find suitable alternatives. This adaptive approach allows them to continue providing hands-on learning experiences for students despite the limitations imposed by the lack of materials. Using alternative substitutes, teachers strive to ensure that students still gain valuable practical knowledge and engage in meaningful scientific exploration. In relation to this category, the respondent stated:

“What we do when there is a lack or shortage of materials and resources is to search for alternatives we can substitute whenever we conduct experiments. I group my students so that they can easily compile the materials needed to experiment.” P3

The need for more materials and equipment poses challenges to student experimentation. Teachers are actively seeking solutions to address this issue. Utilizing alternative substitutions is the most effective method for teachers to conduct experiments. By exploring alternative materials, teachers can overcome the limitations imposed by equipment scarcity. This adaptive approach enables educators to continue providing practical learning experiences despite resource constraints. Ultimately, finding alternative materials becomes crucial in ensuring uninterrupted experimental opportunities for students.

Presenting digitized activities. The researcher's interview reveals that the teacher discovered that the students will be interested during the discussion if they include digitized activities or motivations. Including digital tools and resources during the discussion engages the students and captures their attention. Technology, such as interactive presentations or online platforms, creates a more dynamic and interactive learning environment. By integrating digitized activities and motivational components, the teacher enhances student engagement and fosters a positive and enthusiastic attitude toward the subject. This approach taps into students' interests and effectively supports their learning process. With this category, the respondent narrated:

“So far in senior high school, since they are younger students, it is easy to extrinsically motivate them by creating motivational games and encouraging them through innovative teaching strategies. I have discovered that they are more interested in digitized games, motivational components, and discussions on this subject.” P4

Integrating digitized activities during discussions enhances student engagement

and interest. By incorporating technology, such as interactive presentations or online platforms, students are more likely to participate in the discussion actively. Digitized activities provide a dynamic and interactive learning environment that captures students' attention and encourages their involvement. Incorporating technology in discussions enhances students' learning experience by fostering greater engagement and interactivity (Booc et al., 2023). Integrating digitized activities fosters student engagement and stimulates their interest in the subject. Technological advancements can enrich the teaching and learning experience, motivating learners to actively engage with the educational content (Aniskin et al., 2020).

Embracing Open-Mindedness and Adaptability in Teaching. The researcher's interview uncovers critical insights into overcoming challenges in teaching. It highlights the importance of specific attributes that a teacher must possess. Open-mindedness is vital, enabling teachers to embrace different ideas and perspectives. Flexibility is crucial, allowing teachers to adapt their teaching methods and approaches to suit diverse situations. Resourcefulness significantly empowers teachers to find innovative solutions and utilize available resources effectively. In combination, these qualities enable teachers to overcome challenges and create successful learning environments. In line with this category, the respondent narrated:

“Being an open-minded teacher, flexible, and resourceful to try new and relevant things and have a high success rate.” P5

Being an open-minded, flexible, and resourceful teacher is essential for effectively addressing challenges that may arise. These traits enable teachers to adapt their teaching methods and approaches to cater to diverse student needs, ensuring an inclusive learning environment. This type of mindset equips teachers with the tools to overcome obstacles and provide a quality education that meets the evolving needs of students. Teachers with growth mindsets demonstrate a slight yet meaningful positive correlation with the progress and growth of their students (Mesler et al., 2021).

Conclusion

The data gathered from this study revealed the different challenges teachers encounter in teaching science. Science teachers face challenges such as isolation, insufficient laboratory materials, uninterested students, difficulty identifying student needs, lack of proficiency with new equipment, struggles in adopting a new curriculum, and insufficient administrative support. The challenges also unveiled the effects and the strategies that the teachers have come up with to overcome the challenges. Despite numerous challenges, the teachers demonstrated resilience and resourcefulness in finding innovative ways to deliver

high-quality science education. The teachers hope to have some support and development in science education to teach and produce top-notch science teaching effectively.

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